

# EU FIRESTAT - CLOSING DATA GAPS AND PAVING THE WAY FOR PAN-EUROPEAN FIRE SAFETY EFFORTS

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## Progress report 1

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## **PREFACE**

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The aim of this pilot project is to map the terminology used and the data collected by the EU Member States regarding fire events, and to propose a common terminology and a method to collect the necessary data in each EU Member State with a view to obtain meaningful datasets (based on standardised terms and definitions). This in turn would allow for knowledge-based decisions regarding fire safety at the MS and at the EU level regarding building fires (i.e. houses, apartment blocks, office buildings, commercial buildings, hospitals, schools and kindergartens, elderly homes, etc.).

This first progress report summarises the work carried out during the first twenty-two weeks (five months) of the project SI2.830108 financed by the European Parliament and commissioned by the European Commission – DG GROW. This report contains the final report from the accomplished Task 0 and Task 1 and a progress report from the ongoing Task 2.

Task 0 focussed on assembling all the knowledge of the consortium members regarding fire statistics, such as where fire data comes from, who is responsible for them, how the data sets are defined, how they are collected, analysed and what is the output of these fire statistics. From there, issues and limitations have been identified, as well as the best practices in the investigated countries. The findings of this task will be used as preliminary groundwork for all the discussions that occur during the project and as an input for all the following tasks.

Task 1 investigated in depth the semantic differences used in the fire safety fields and the recording approaches for the information gathered. Task 1 focuses on the terminology and data collection methodology of the 27 EU Member States as well as other European and non-European countries.

Task 2 entailed developing a questionnaire that focused on fire data needed to provide meaningful datasets and allowing legislative and other policy decisions for the fire safety.

The project has been communicated through different channels. A website dedicated to the project has been established (<https://eufirestat-efectis.com/>). Due to the COVID-19 pandemic it has not been possible to organise physical meetings, however several web-based meetings have been held within the consortium and with different stakeholders. More web-based meetings will be scheduled as the project advances in 2021. A list of challenges, a risk analysis, and a Comment Handling Document have been developed. These documents are updated continuously during the course of the project.

Finally, the consortium would like to thank all the interviewed persons and the stakeholders for their valuable input, support and commitment to the project.

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## **1<sup>ST</sup> PROGRESS REPORT**

### **TASK 0 REPORT - DIAGNOSTIC**

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EUFireStat - Closing data gaps and paving the way for pan-European Fire Safety Efforts

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## **EXECUTIVE SUMMARY**

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This report provides an analysis and evaluation of the current state of fire statistics and data collection in European countries and selected non-European countries of interest. For each country, the project team created a detailed diagnostic sheet describing important components of fire statistics practice, with a focus on terminology, collection methods, interpretation issues and the state of existing data. The information was gathered by the consortium members by researching in public datasets, literature review, and networks of contacts. For some countries, there are missing data, those will be added in the following tasks of the project.

The review of the literature shows that fire data collection systems have been instrumental in informing firefighting strategies, building codes, educational programs, and technical innovations, to cite just a few applications. However, there is substantial agreement in the literature that differences between fire data collection systems in different countries complicate the ability to make comparisons that could be useful in evidence-based planning and prevention efforts. They are currently most useful in describing the global fire safety situation and certain fire-related trends.

The amount and quality of information in different data collection systems appear to be influenced in part by whether they include information from sources outside the fire service, such as insurers or medical authorities, through data linkage or other means. Data collection systems that collect too little or imprecise information may not produce useful data. At the same time, it was also observed that overly detailed data collection systems may overwhelm data collectors and thereby compromise data quality.

In general, it appears that the fire data collection systems in most countries are presumed to provide an accurate representation of their respective experiences with fire incidents. However, information gathered through this initial project task suggests that those involved in data collection efforts may be unaware of important limitations of their data due to missing information, differences in the way terms are defined or interpreted, and other identified issues. No European country appears to employ a methodology for dealing with missing data, although some countries do acknowledge that missing data is a potential problem that compromises data quality. Additionally, none of the consulted reports included uncertainty estimations.

To provide relevant information regarding the national fire safety situation (number of fires, fire fatalities, fire injuries, fire losses, etc.), fire statistics will have to be improved through common terminology, common methodology, and common training and qualification of persons in charge of filling in the fire report, including uncertainty estimation methods. The findings of this task will be used as preliminary groundwork for all the discussions that will occur during this project and as an output for all the following tasks.



## **1. INTRODUCTION**

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This first task of the project is established to assemble all the knowledge of the consortium members regarding fire statistics. A special focus was set upon sharing feedback on practices of each country in Europe and at least in Canada, New Zealand and USA, about where fire data comes from, who is responsible for what, how the data sets are defined, how they are collected, analysed and what is the output of these fire statistics. From there, common issues and limitations can be identified, as well as the best practices in the investigated countries. As most of the organisations within the consortium are based in western and northern Europe, though covering a substantial part of European countries, naturally more information is available in these countries, whereas less information was accessible or available from the rest of Europe. This has set an important challenge of gathering information through professional networks and through publicly available publication, despite the language barrier.

In this report, a literature review of work on fire statistics is presented; those are separated into studies focusing on national fire statistics and studies focusing on international comparison between practices. Publications of international organisations such as CTIF, ISO and WHO are also reviewed and considered as baseline of available international fire statistics. Finally, our findings about the investigated countries are presented in the different chapters of this report. Some countries present deeper descriptions than others, this is either due to the fact that in some of them more substantial studies or feedback relevant to the project are available.

The findings of this task will be used as preliminary groundwork for all the discussions that will occur during this project and as an input for all the following tasks.

## 2. LIST OF ABBREVIATIONS

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APIRE	Association Public Insurance Companies for Real Estate
BAM	Bundesanstalt für Materialforschung und –prüfung (Federal Institute for Materials Research and Testing)
CDC	Centers for Disease Control and Prevention
CFS-CTIF	Centre for Fire Statistics of CTIF
CTIF	International Association of Fire and Rescue Service
DBI	Danish Institute of Fire and Security Technology
EC	European Commission
EMS	Emergency Medical Services
EU	European Union
EuroFSA	European Fire Safety Alliance
GDP	Gross Domestic Product
ICD	International Classification of Diseases
IRS	Incident Recording System
ISO	International Organization for Standardisation
LU	Lund University
MS	Member State
MSB	Swedish Civil Contingencies agency
NF	Number of Fires
NFD	Number of Fire Deaths
NFI	Number of Fire Injuries
NFIRS	National Fire Incident Reporting System
NFPA	National Fire Protection Association
PIRE	Public Insurance Companies for Real Estate
PT	Project Team
TR	Technical Report
UoE	The University of Edinburgh
USFA	US Fire Administration
VFDB	Vereinigung zur Förderung des Deutschen Brandschutzes (German Fire Protection Association)
WFSC	World Fire Statistics Centre
WG	Working Group
WHO	World Health Organization
WISQARS	Web-based Injury Statistics Query and Reporting System

### **3. LITERATURE REVIEW**

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As part of the project's initial work, the team undertook a comprehensive review of research into fire incidents and literature on fire data collection, as well as documents relating to fire data collection systems in member countries of the European Union, Australia, Canada, New Zealand, and the United States. In accordance with the project scope, our review of the existing literature focused as much as possible upon research and documents related to building fires.

#### **3.1. RECENT TRENDS IN INTERNATIONAL FIRE EXPERIENCE**

Several reports from the World Fire Statistics Centre (WFSC) in Geneva provided background for the project team on basic recent indices of the fire experience at the international level [1]. These reports also offered important insight into how currently available data on fire incidents are used, as well as its potential limitations.

The WFSC's information bulletin from 2011 reported findings from the United Nations that based on percentage of gross domestic product (GDP) calculations, direct losses from fire for the 2006-2008 period were generally stable, with most countries experiencing a slight decrease or holding steady [1]. Minor increases were observed in the United States, Finland, France, the Netherlands, and Poland. Western and Central European countries were reported to compare well against the average situation in Eastern Europe and central Asia/Eurasian countries in the number of fire deaths per 100,000 population. Variance observed in the cost of fire service organizations between similar countries was attributed to different ratios of public, private, and volunteer organizations. Notable differences were observed in the costs of fire protection for buildings between countries, reflecting varying requirements for different types and sizes of buildings. The report also noted that high fire death rates in Russia, Ukraine, Belarus, Moldova and the Baltic states were in decline, though still very high. The high variance in fire deaths was attributed to inadequate fire protection services, to poor building construction and maintenance and to high level of cigarette and alcohol consumption. Some of the Eastern and Eurasian countries were not members of the European Union and had not benefited from the possible advisory regulatory harmonization. The report emphasized that substantial differences in how fire data are collected and interpreted posed a critical challenge in using world fire statistics.

Findings from the United Nations for the 2007-2009 period were reported in the WFSC bulletin on world fire statistics in 2012, with fire deaths in Eastern Europe and Eurasia reported for 2001-2009 [2]. Direct losses due to fire showed that most countries had very minor decreases or increases in their losses as a percentage of GDP. Italy was an exception and experienced the largest increase. Proportional costs for funding fire service organizations remained largely stable, with only minor variances over the previous year's report, and absolute cost also saw relatively minor changes which generally took the form of small increases. Many countries continued to experience improved long-term trend in fire deaths, while Singapore showed the lowest proportion of fire deaths. Germany and Sweden continued to see slight increases in death figures for the three-year period of the report. The fire mortality rates in Eastern Europe and Eurasia showed improvement since 2000, but remained significantly higher compared to the Western and Central European states. In Estonia, Latvia, Lithuania and the Russian Federation, the reductions in mortality rates throughout the entire reporting period were dramatic, ranging from a low of twenty percent in the Russian Federation to a high of forty-two percent in Estonia.

The WFSC's 2014 report of fire analysis findings from the United Nations covered the period from 2008 through 2010 [3]. GDP calculations for direct losses were again reported to be stable or show a slight decrease, while showing decreasing costs in absolute figures. Scandinavian countries suffered above average fire losses, seen as possibly a result of the harsh climate and higher percentage of buildings containing wood. Most countries experienced small to noticeable decreases in per capita mortality due to fire for the reporting period, coinciding with decreases in deaths due to fire in 2010. The proportional costs of funding fire service organizations were again reported to be generally stable, with minor variances from the prior year's report, with the greatest variance being a noticeable decrease in costs in Japan. Absolute costs also saw relatively minor changes and frequently involved comparatively small increases, with the exception of the United States, which showed a noticeable cost increase in 2010. Cost of fire protection showed significantly higher cost estimates for various types of buildings than earlier reports and raised important questions about appropriate methods of calculations. The wide variation in building fire protection costs to some extent reflects differences in estimation assumptions and methods, but also differences in rates of construction activity within the larger economy.

### **3.2. RESEARCH USING FIRE INCIDENT DATA**

Advocates of data collection emphasize that it is not an activity that is pursued for its own sake but should be guided by the practical goal of collecting useful information that can be applied to action. In the case of fire data collection, a number of studies were identified in the literature review that highlight the vital importance of information on fire incidents for efforts seeking to improve fire safety and guide interventions that reduce the human and economic cost of fire. National fire incident databases were used in the majority of the research, but some of the studies relied upon other sources of fire-related research.

#### **3.2.1. Country specific studies**

A 2003 study of fire deaths in Ireland from 2001 to 2002 evaluated at-risk individuals and behaviours linked to death and injury [4]. The research, drawing from multiple data sources, found that most fatalities (67%) occurred in house fires and that almost half (46%) occurred in two- or three-story dwellings. Most victims were male (65%) and alcohol was a factor in thirty-nine percent of fire deaths. Victims most often lived in urban locations. Fires occurring between 12 p.m. and 6 a.m., usually on early Sunday morning, accounted for most fire deaths. There was no working smoke alarm in eighty-two percent of fatal fires.

Research from the United States in 2006 used data from the National Fire Incident Reporting System (NFIRS) to examine fatalities and injuries in building fires during 1993 [5]. The research found that the number of injuries and deaths and proportion of deaths depend mainly on the extent of fire damage, area of fire origin, material ignited, and ignition factor, while the absolute number of fatalities depended upon the material ignited and form of the heat of ignition. High fatalities were found to be significantly influenced by the victim's condition, location and activity at the time of ignition.

A report by Swedish researchers from the SP Technical Research Institute of Sweden in 2009 used the country's fire data collection system to study arson fires between 1991 and 2007 [6]. In addition, detailed information from the municipal insurance company for the city of Gothenburg was used in studies of larger arson fires, including the role of technical equipment. Information from insurers was also used in identifying the costs of arson fires. The research found that arson fires most often targeted cars and waste containers, while arson in buildings most often occurred in apartment buildings. School buildings experienced fewer arson incidents, but arson nevertheless accounted for approximately half of all school fires. Insurance data indicated a higher number of school arson fires in Gothenburg than the national fire database, which the researchers attributed to the likelihood that the insurance company was likely to include minor fire incidents that did not require involvement of the fire service and that the fire service was likely to designate the cause of a fire as unknown rather than arson if there was uncertainty about the cause. Insurance company investigations found that wood façades on school buildings were critical to fire development. Single-story buildings with roof extensions beyond the façade also were found to constitute a risk, and inferior compartmentation of a building was associated with greater damage. Major arson fires could be reduced through restrictions on building access.

A subsequent study from Sweden in 2012 elaborated an approach to understanding deficiencies in fire protection by drawing upon both statistical data and more qualitative data from case studies of school fire incidents in Sweden [7]. The study used Swedish fire statistics on fire cause, extent of the fire, and room of fire origin in order to identify the types of fires that produced the greatest damage in Swedish school buildings. Data indicated that the most destructive school fires were those that were deliberately set during evening and night-time hours. Fire investigation reports of these fires showed that an absence of fire detection and insufficient fire separation contributed to the ability of fire to spread along the façades and into the attic space of school buildings. All case reports showed that a fire was very difficult to extinguish without causing substantial damage to the building once it spread into the attic space.

A study from Poland in 2014 examined residential fires in order to assess safety levels for the country as a whole and for the city of Warsaw for the years from 2000 to 2012 [8]. The researchers geocoded and mapped residential building fire incidents on a 25-kilometer cartography grid for national incidents and a one-kilometre grid for the city of Warsaw. Administrative Districts were ranked to show the highest and lowest number of residential fires. Fire causes were divided into three categories: human factor (caused directly or indirectly by humans), technical (caused by faulty devices, domestic appliances or other building structure defects) and unknown (unspecified). The research estimated that human factors accounted for sixty percent of residential building fires at the national level and seventy-three percent in Warsaw were caused by the human factor.

Technical factors were attributed to nineteen percent of national incidents and eleven percent of incidents in Warsaw, while twenty-one percent of national incidents and sixteen percent of Warsaw incidents were due to other factors.

A short communication analysed in 2017 the data collected by the Laboratoire central de la Police Prefecture in Paris (LCPP) concerning fires which caused casualties deceased on the spot for the years 2012, 2013 & 2014 [9]. The geographic sector includes Paris and its surrounding counties, constituting more than 10% of the French population. As this database is filled by trained staff that is called systematically when a fire causes one or several casualties, this data constitute one of the most reliable analyses in France, despite being limited to Paris and its suburbs. It was found that the origin of the fire was intentional for 19 deaths out of 124 (i.e. 15% of cases). Out of the 108 fires that were analysed, the origin of the fire could be determined in 90 cases out of 108 (i.e. 83%). In residential buildings, for 88 fires having caused 100 deaths, 26 fires caused 37 deaths, i.e. 35% of the recorded deaths. In four of the fires having caused 7 deaths, the flashover also reached the building staircase. In 43 fires having caused 44 deaths, i.e. 41% of the total number of deaths registered, the fire was limited to the room where the fire started: most often in a bedroom (20 fires having caused 20 deaths), then the living room and the lounge (10 fires having caused 10 deaths), last in the kitchen (9 fires having caused 9 deaths). The origin of the alarm was registered for 92% of the fires analysed: the alert was given by someone who neither was a victim nor lived on the premises in 90% of the cases registered; it was given by a victim or a resident in 7% of cases; smoke detectors gave the alarm in only 3% of the cases.

A significant number of death occurs during the day, when people are not usually asleep, with 44% of death from 9am to 9pm. Knowing that 94% of the victims were found in their homes and that the home occupation rate is much lower in the daytime, this goes against general opinion that fires kill in majority when people are asleep. The gender of the deceased is unknown for 8 victims. Males represent 58% of the deceased of known gender, females 42%.

Research from Australia in 2015 by Xiong and co-authors examined risk factors related to surviving or dying in residential fires [10]. The study used *The Victoria University Fire Fatality Coronial Database*, which includes fatalities from the states of Victoria, New South Wales, and Queensland, to identify fire deaths. Survivors of residential fires were drawn from the *Victoria University Residential Fire Survivor Database*, which includes data on fire survivors from the state of Victoria. Researchers removed deaths due to suicide, murder, deliberate fires, undetermined cause, fires in non-residential premises, or incidents with more than one victim, creating a database of 177 single-fatality fire deaths. The database of survivors included 183 survivors following the removal of missing data. The researchers found that the leading risk factors associated with fatal fires were psychotropic and sedative drug intake, discarded cigarettes, living alone, being over seventy years of age, being asleep, location in the room of fire origin at time of ignition, and alcohol intake. Risk factors most significantly associated with surviving fires included cooking fires, electrical fires, involvement of stove in ignition, and fire occurrence in a one- or two-family dwelling. Fire survivors were more likely to wake up to non-smoke alarm cues, such as smoke or breaking glass, than a cue from a smoke alarm.

### 3.2.2. Comparative and multiple country studies

Several studies were identified which examine fire incidence or fire-related outcomes in multiple countries and identify potential factors that influence disparities or trends.

One of the earlier studies in this area was a comparative analysis of fire risk in the United States, Japan and the United Kingdom by Sekizawa that was published in 1994 [11]. The research utilized data on the causes of residential fires and deaths, fire death trends, fire death rates by age group, and victim location to compare risk indices. The United States was found to have much higher fire death rates than the United Kingdom and Japan in almost every age group. Japan experienced the highest death rates among those 80 years or older, and it was also found that older or handicapped victims tended to be closer to the area of fire origin, suggesting that early detection was insufficient for such victims as evacuation probably had a key role. Common patterns for fire risk were shown in the United Kingdom and Japan. Further study involving international collaboration was identified as an important means for gaining a better understanding of fire risk.

A more recent study by the United States Fire Administration from 2011 examined fire death rate trends in the United States and twenty-three other industrialized countries [12]. The research found that although the USA had made substantial progress in reducing fire deaths since the 1970s, its fire death rate was the tenth highest among the 24 industrialized nations in 2007. Fire death rates per million population consistently fell throughout the industrialized world from 1979 to 2007 but fell faster in North America and Eastern European regions than

in other regions. From 1979 to 2007, the fire death rate in the United States declined by 66 percent. Fire death rates in Japan, a leader in fire safety, showed a slight worsening over the study period. The study identified a variety of factors that might contribute to differences in fire death rates, including differences in fire prevention practices and education, building practices and regulations, differences in lifestyles and cultural attitudes, and the proportion of senior citizens in the population. The authors note that one of the difficulties in determining the cause of different fire death rates in different countries is a lack of available data. Increased cooperation is identified as an important step for learning more about the causes of fire deaths and developing prevention measures.

Still more recently, a 2016 study used fire statistics from the United States, the United Kingdom, Japan and Finland for the 2002–2012 period to compare the number of deaths and injuries from structure fires started by a small open flame ignition source to those from fires started by smoking materials [13]. The research found that Japan had substantially more fires ignited by smoking materials than the other countries, but not more fatalities from these fires, while the problem of deaths from fires started by smoking materials was greatest in the United Kingdom. A more detailed quantitative analysis compared the relative contributions of low-energy ignition sources (match, lighter, space heater, etc.) to ignitions by smoking materials ignition to the USA fire problem. The analysis found that fires ignited by smoking materials more commonly resulted in fatalities than low-energy ignition fires, while the overall volume of low-energy ignition fires and corresponding losses and injuries are greater. Finally, a logistic regression model indicated that older persons were at greater risk of death from fires ignited by smoking materials than by low-energy ignition sources.

A 2016 study from Lund University in Sweden sought to understand why more people were killed in residential fires per population in Finland than in Sweden [14]. Using reports and fire databases in the two countries, the research found that fire victims in Finland were more likely to be male and that they were often single. A higher share of victims in Finland were under the influence of alcohol or drugs than in Sweden. A research of possible risk factors for fire death found that alcohol consumption, tobacco use, and the proportion of the population living alone were all higher in Finland than in Sweden and were seen as potentially contributing to disparities in the death rates in building fires between the two countries.

Another 2016 study from Sweden reviewed fire fatality data from 42 countries, using data from World Fire Statistics reports and from the International Association of Fire and Rescue Services [15]. The research found that reported rates of fire fatality experienced a decrease in most countries, but were particularly significant in Estonia, Germany, Great Britain, Latvia, Russia, and the United States. Fire safety interventions that contributed to the decreases in deaths included increased use of smoke alarms and sprinklers systems and fire regulations for children's sleepwear and for furniture and furnishings. The research noted that differences in how data is collected or how deaths due to fire are defined could explain differences in death rates between countries, but the focus of the study was on trends within countries rather than a direct comparison between them.

Comparative data from thirteen countries was used in a 2020 Swedish study of arson in schools and pre-schools in order to better understand the apparently high rates of school fires in Sweden and to assess school arson trends in the country over the preceding 20-year period [16]. The data indicated that Sweden experiences a higher frequency of school fires than most other comparable countries, with only New Zealand showing more fires per million inhabitants. However, the study concluded that inter-country comparisons on fires are complicated by substantial differences in the way they are collected and stored, as well as how fires or data elements are defined. The report notes, for instance, that Sweden reports all incidents which receive a fire service response, even if the fire is already extinguished, while qualifying events in other countries may be more restrictive. The report also points out that differences may also distinguish the classifications of different levels or types of schools from one country to another.

### **3.3. STUDIES OF NATIONAL FIRE INCIDENT DATA COLLECTION SYSTEMS**

Due to the low level of consistency in how different countries record and obtain fire statistics, the Department for Communities and Local Government in the United Kingdom commissioned a study in 2011 with the European Union Fire Safety Network to examine and better understand fire data in member states of the European Union [17]. The research team relied upon an extensive literature review, telephone interviews with key stakeholders, and an on-line survey of national organizations collecting fire statistics in European Union states, as well as Norway and Iceland. The research found fire data to be collected at national and state levels in order to track and inform policy measures, raise awareness about fire risk, evaluate the number of fires and

deaths, and develop interventions. However, the research also confirmed substantial differences between countries in numerous aspects of fire data collection. The research noted that countries used different ways of recording in-scope fires and fire-related deaths and injuries. While most countries recorded such key points as the number of fires or deaths, the recording of other critical factors, such as type of injury, information about fire safety systems, and size of the fire, was much more mixed and infrequent. Such differences were recognized as complicating the ability to make comparisons in a number of key variables of interest. The research determined that reconciling data between countries in its current form would be a significant task, but noted that respondents expressed support for developing comparable datasets. The researchers emphasized that common datasets would facilitate comparisons that could be used to inform the development and effectiveness of fire safety interventions.

Data collection of fire incidents in Canada at the national level has been inactive in recent years and two reports from the Canadian Centre for Justice Statistics published in 2017 review the state of the country's fire data collection [18]-[19]. One report summarized preliminary observations from the National Fire Information Database, a pilot project designed to: collect ten years of microdata information on fire incidents and fire losses from Fire Marshals and Fire Commissioners Offices across Canada, create a standardized national system for the collection of fire statistics, and link the database with other relevant socio-economic data to assist in the development of new, relevant, evidence-based research related to fire incidents, public safety and security. Seven of Canada's provinces and territories participated in the project. The report found that this participation covered seventy-two percent of the Canadian population. Total reported fires declined by twenty-five percent between 2005 and 2014. The share of structural fires in the database rose from half of all fire incidents to more than sixty percent of fire incidents over that period, but the number of structural fires declined by twenty-six percent. Three-quarters of structure fires were in residential structures. Cooking equipment and smoking materials were the leading cause of structural fires. Fire-related deaths rose between 2004 and 2008 before declining by thirty-two percent between 2008 and 2014. Most fire-related deaths occurred in structural fires (87%), followed by vehicle fires (11%) and outdoor fires (4%). Smoke inhalation was the most common cause of death.

The second report from Canada evaluated the pilot National Fire Information Database project, examining the data collection system in relation to: the development of content (taxonomy), data collection, standardization of data, geo-coding activities and the addition of social domain data, and aggregation of jurisdictional files [8]. The report pointed out that although seven of thirteen provinces participating in the project represented seventy-two percent of the Canadian population, the database should ideally represent full coverage of every jurisdiction. In addition, the content of reporting data elements was found to vary between fire service participants. Some jurisdictions had limited reporting capacity due to financial or other constraints. Certain data elements were argued to require updating in order to reflect developments in technology (i.e., cell phones, laptops) or language conventions. A variety of data quality issues and data limitations due to underreporting were identified as issues that required resolution. The report argued that harmonization of the contents of reports and greater standardization of data was needed, and longer and more flexible data collection periods were proposed as one option for improving participation in reporting. In order to improve the capacity to provide linkage to other data sets, standardization of data elements for victims and geographic identifiers is recommended. The report concluded that the sustainability of any forthcoming national fire data collection system would require interest and support of stakeholders and funding support.

Several studies were identified which examined data quality issues with the US National Fire Incident Reporting System (NFIRS) [20][23]. A 2012 study by Butry and Thomas from the National Institute for Standards and Technology evaluated the ability of NFIRS data to depict fire activity in non-reporting US cities, to test differences between those cities which reported fire incident data and those which did not, and to discuss how findings could be used to weight NFIRS-based statistics in order to produce more accurate national estimates [20]. The report analyses data from NFIRS from 2002 to 2009. In addition, the report used socioeconomic data from the Census of Population and Housing (income, sex, race and housing items, such as the status of a housing unit, median age of units, and median value). Data from the National Fire Department Census were used to include information about fire departments listed with the US Fire Administration. The research found that there were differences in socioeconomic and fire department characteristics between those cities that submit reports to NFIRS and those that do not. The authors argued that if those factors also affected the risk of fire, then generalizations made about fire safety and risk based only on NFIRS data will not apply to non-reporting areas of the United States.

A second study of NFIRS data by the National Association of State Fire Marshals examined the problem of unknown data to better understand why NFIRS data elements for area of origin and causal information were frequently reported as undetermined, unreported, or inappropriately coded as “none” [21]. The researchers conducted qualitative interviews, collected and analysed fire department data collection policies, and conducted an on-line survey of fire departments in seeking to understand the problem of unknown data. They found that information containing causal information from fire investigations was often not included in NFIRS incident reports because the reports were not updated after the information became available. Liability concerns also influenced decisions about how much information to report in fire incidents. The researchers suggested that another factor could be insufficient training of firefighters about the importance of data collection, while the reporting system itself was seen to be overly complex and not to be user-friendly. They concluded program managers at the state level could be valuable resources for data quality by interacting with fire departments, supporting fire department participation, and providing quality control and feedback. “Data champions” within fire departments who recognize the value of data were also seen to be important resources for data quality efforts. The authors also argue that future iterations of the NFIRS system should strive to improve user-friendliness and reduce confusion about appropriate codes.

A 2016 study of NFIRS data by Kinsey and Ahrens examined the NFIRS three-digit coding system for types of fire incidents [22]. In this coding structure, the first digit of an incident type code is a broad category, the second is somewhat narrower, and the third provides the most detail. The researchers compared NFIRS narrative information from three large municipal fire departments with corresponding codes for type of incident, property use, and actions taken by the fire department. The authors independently reviewed the information provided and assigned their own incident type codes to the records. The authors found that they were most likely to agree at the broadest code level, but results were poor at the three-digit level. Agreement between at least one author and the incident report was about the same as the agreement between authors. More than seventy-five percent of incidents used just ten percent of the codes, suggesting that many codes get forgotten. The authors pointed out that long lists reduce accuracy and that too many choices can lead to no decision or a default choice. A standard research procedure is to measure broad categories first, then use follow-up questions for details. The research concluded that the NFIRS coding structure was based upon the researcher preferences rather than taking account of the way firefighters think and process information.

A more recent study of NFIRS data quality by the United States Fire Administration from 2017 assessed data quality and data usability for required data elements in NFIRS reports [23]. Data quality for each data element was indexed on the total proportion of valid entries for that element. Data usability for each data element was indexed on the proportion of valid known entries for that element. Both metrics were assigned a maximum value of 100. The report found that required data elements (Incident Type, Property Use, Incident Date, Alarm Time, Deaths, Injuries, Property Loss, Contents Loss, Area of Fire Origin, Heat Source, Item First Ignited, Cause of Ignition, Factors Contributing to Ignition, Equipment Involved in Ignition, Fire Spread, Presence of Detectors, Detector Operation, Detector Effectiveness, Presence of Automatic Extinguishing Equipment) had either or close to a perfect value of 100 for the overall data quality index. Lower scores were recorded for outside fires, fires with injuries, and the presence of detectors and automatic extinguishing systems in fires other than buildings and mobile property structures. The data quality index for fires with injuries was in the low 90s due to the number of injuries that occurred in outside and other fires where alternate reporting methods were allowed, and reporting requirements were less stringent. Fire injuries occurred frequently and across all types of fires. The lower data quality index for the presence of detectors and automatic extinguishing systems in fires other than buildings and mobile property structures was largely a result of deaths and injuries in vehicle incidents and outside fires.

### **3.4. PREVENTION-RELATED RESEARCH**

Research on fire prevention measures can be useful in informing policy decisions and educational outreach. Three studies reviewed by the research team used fire incident data in order to examine and evaluate prevention-related interventions.

A study by the University of Surrey in 2005 argued that detailed fire statistics in the United Kingdom facilitated the ability to evaluate the potential benefits of fire safety design features of consumer products or residential fire safety equipment [24]. The study used fire data to show that prior to the 1990s, the use and effectiveness of residential smoke alarms in the United Kingdom was low and referenced findings from the United States indicating that a decline in the country’s fire deaths was strongly correlated with the increased use of residential



smoke alarms. The study went on to conclude that it was important for Europe to improve its fire data collection practices in order to establish high levels of health, safety, and consumer protection.

A 2009 study conducted by researchers from the Netherlands Institute for Safety (IFV) examined fire statistics in European countries and research on fire causes and development and found that domestic fires were more often caused by human behaviour than by technical failure [25]. The most common causes of fires involved smoking materials or cooking, while the presence of upholstered furniture or textiles were also contributing factors to fire development. The research also emphasized the need to exercise caution in drawing comparisons between countries on the basis of fire statistics due to the absence of European standards for gathering, analysing, and publicizing data on fire statistics. The report also cautioned that national fire data only include information reported to the responsible data bodies for data collection and are likely to substantially undercount the actual number of domestic fires.

Smoke alarms have received substantial attention as a fire safety intervention that can save lives by alerting occupants to fires and providing opportunities to extinguish a fire before it grows or additional time to escape. Research in the United States by Ahrens used data from the National Fire Reporting System and the NFPA annual fire experience survey to examine the presence and performance of smoke alarms in home fires [26]. Information about unreported fires was obtained from the US Consumer Product Safety Commission's 2009 report, 2004-2005 National Sample Survey of Unreported Residential Fires. The research found that the death rate in reported home fires with working smoke alarms was half that of fires without smoke alarms or with non-working smoke alarms. Two of every five home fire deaths resulted from fires with no smoke alarms at all. Nine percent were caused by fires in which smoke alarms failed to operate, typically due to missing or dead batteries or disconnected power. Hardwired smoke alarms were more likely to have operated than those powered by batteries. The thirty-seven percent of fatal fire victims with working smoke alarms were more likely to have been at least 65 years old, been in the area of origin when the fire began and unable to act, to have been engaged in fighting the fire than were victims without working smoke alarms. Victims with working smoke alarms were less likely to have been sleeping at the time of the fire. The death rate per one thousand reported home fires was lowest in fires in which hardwired smoke detection and sprinklers were both present.

A 2019 study by Shokouhi and co-authors conducted a systematic review of 30 studies of residential building fires, risk factors, and prevention measures in multiple countries, including the USA, Canada, the U.K., Denmark, Scotland, the Netherlands, Taiwan, Australia, New Zealand, and India [27]. The authors found that older adults, people with physical or mental disabilities, tobacco users, and people impaired by alcohol and drugs were at particular risk for fire-related injury or death. Single-parent households, low-income families, and areas with large numbers of young children were also identified as being at higher risk for fire-related injuries or death. Key prevention measures were identified as environmental modifications, behaviour change, improvements in emergency medical services, and education.

### **3.5. THE CASE FOR DATA COLLECTION**

More recently, a multi-national group of researchers reviewed a number of emerging trends that present challenges for fire safety and highlighted the critical role of data in driving fire safety interventions in response to these challenges [28]. The report identifies climate change, resiliency, sustainability, population growth, urbanization, and globalization as key developments likely to influence - and potentially exacerbate - the threat of fire. Hazards related to these developments include the need for quickly-constructed buildings to address rapid population growth, adequate fire protection, and the threat of wildland fires and fires in the wildland-urban interface as a result of climate change. The report calls for greater collaboration across disciplines and between countries on fire data collection in order to facilitate applied research and formulate interventions to improve fire safety. The paper calls for a common database of information in order to promote the ability to learn from experience and promote effective collaboration. The fragmentation of fire statistics, lack of common terminology and uneven access to data in different countries are seen to be major challenges to meeting the emerging challenges.

### **3.6. FIRE INCIDENT DATA COLLECTION: CURRENT ISSUES AND FUTURE CONSIDERATIONS**

A review of the literature provides strong evidence that fire data collection systems have been instrumental in reducing building fires and their associated deaths, injuries, and economic damage. The utility of information about these fires is apparent in the design of many fire safety interventions and policy initiatives. Data on fire incidents can inform firefighting strategies, building codes, educational and training programs, and technical innovations, to cite just a few applications. It is logical to assume that safety efforts can benefit from strategies that have worked in other places. However, there is substantial agreement in the literature that differences between fire data collection systems in different countries complicate the ability to make comparisons that could be useful in evidence-based planning and prevention efforts.

While national fire data collection systems are likely to share certain core features and to gather some fire incident data in common, there appears to be considerable variation in the type and scope of information collected, the way that data elements are defined and levels of detail they seek, as well as the types of training and resources dedicated to collection efforts. In addition, literature suggests that fire data are influenced by differences between data collection procedures and practices. Some data collection systems appear to provide opportunities to update information that may not be available at the time an incident record is first created, such as the cause of a fire or deaths that occur some time after the incident. The amount and quality of information in different data collection systems also appear to be influenced by whether they include information from sources outside the fire service, such as insurers or medical authorities, through data linkage or other means.

Literature suggests that the issue of how much information to collect is an important area for consideration in the design of fire data collection systems. Data collection systems that collect too little or the wrong kind of information may not produce data that are useful, while overly detailed data collection systems may overwhelm data collectors, and thereby compromise data quality, as suggested by studies from the United States.

In many respects, the issue of how much information to collect appears to be driven by available resources, as well as the capacities of data collectors, who mainly are fire service personnel, to collect and record information. Concise data collection records will require less support and fewer resources than those that are more complex. To that end, recent literature on fire data collection in Canada emphasizes that such factors as funding, resources, personnel, and stakeholder acceptance are critical considerations in the design and sustainability of national fire data collection systems.

Whatever model of fire data collection system is employed in host countries, available literature suggests that closing the gap between the data needed for drawing comparisons and information that is practically accessible will remain a challenge, but one with substantial public benefits.

#### 4. DESCRIPTION OF WHO DATA

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The World Health Organisation (WHO) maintains a wide range of data collections related to global health and well-being, as mandated by its member countries.

These databases contain not only information on diseases, such as malaria, influenza, tuberculosis, cholera, but also data on nutrition, health expenditure, road safety, etc. [29][30], and they have some utility for examining fire-related injury outcomes. Data for “burn deaths” offer one potential source of information. The most recent fact sheet with respect to burn deaths was published in 2018 [31], while the most recent official publication and evaluation is a 2008 report outlining a plan for burn prevention and care [32]. It is important to note and observe that the databases for burn deaths includes all type of burn injuries and is defined as an injury to the skin or other organic tissue primarily caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals [31].

“Thermal (heat) burns occur when some or all of the cells in the skin or other tissues are destroyed by:

- hot liquids (scalds)
- hot solids (contact burns), or
- flames (flame burns)” [31]

The 2018 fact sheet includes some specific data on countries and risk groups. The databases kept by the European members of WHO provide an indication of trends in the European Mortality Databases [32]. In this case, data are reported as total number of deaths, as well as standardized death rates (SDRs) and crude death rates (CDRs).

SDRs are an age-standardized death rate calculated using the direct method and standard European population structure, while CDRs are calculated as a simple ratio: the number of registered deaths/ mid-year population (per 100000). The mortality rates have been calculated by the WHO Regional Office for Europe using the data on deaths by cause/age/sex and mid-year population by age/sex, annually reported to WHO by European Member States. It should be noted that mortality rates for some countries may be biased due to the under-registration of death [32] [34]. The parameters include deaths from exposure to smoke, fire and flames and are consequently a broader classification than exposure to fire.

Following groups are available on the WHO website:

- Deaths(#), Exposure to smoke, fire and flames
- SDR(0-14), Exposure to smoke, fire and flames, per 100 000
- SDR(0-64), Exposure to smoke, fire and flames, per 100 000
- CDR(1-4), Exposure to smoke, fire and flames, per 100 000
- SDR(15-24), Exposure to smoke, fire and flames, per 100 000
- SDR(25-64), Exposure to smoke, fire and flames, per 100 000
- SDR(30-44), Exposure to smoke, fire and flames, per 100 000
- SDR(5-14), Exposure to smoke, fire and flames, per 100 000
- SDR(60-74), Exposure to smoke, fire and flames, per 100 000
- SDR(75+), Exposure to smoke, fire and flames, per 100 000
- SDR, Exposure to smoke, fire and flames, per 100 000
- CDR(0 year), Exposure to smoke, fire and flames, per 100 000
- SDR(1-19), Exposure to smoke, fire and flames, per 100 000
- SDR(15-29), Exposure to smoke, fire and flames, per 100 000
- SDR(45-59), Exposure to smoke, fire and flames, per 100 000
- SDR(65+), Exposure to smoke, fire and flames, per 100 000

Figure 1 gives an example of the SDR trends for a selection of European countries for all age groups. Figure 2 shows the averages available for a variety of country classifications. The MDB has several visualisation tools available on its website [32].

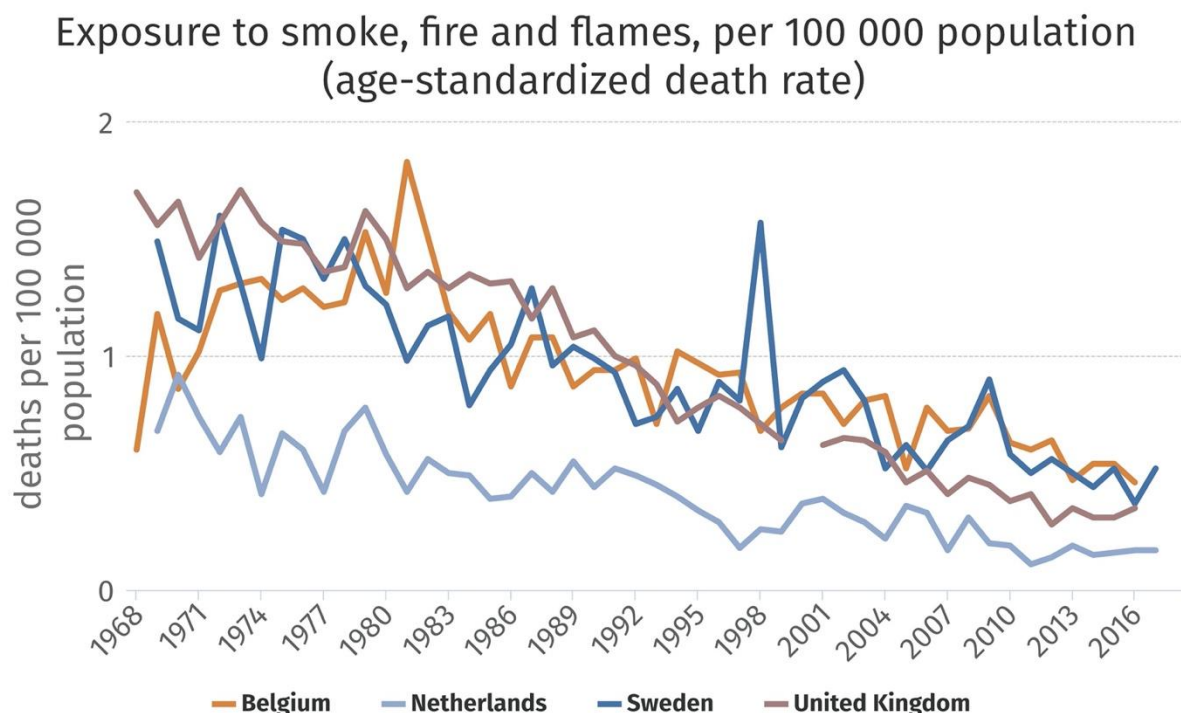


Figure 1: SDR data, Death per 100 000 population based on European WHO database for a selection of European countries (retrieved from [33]).

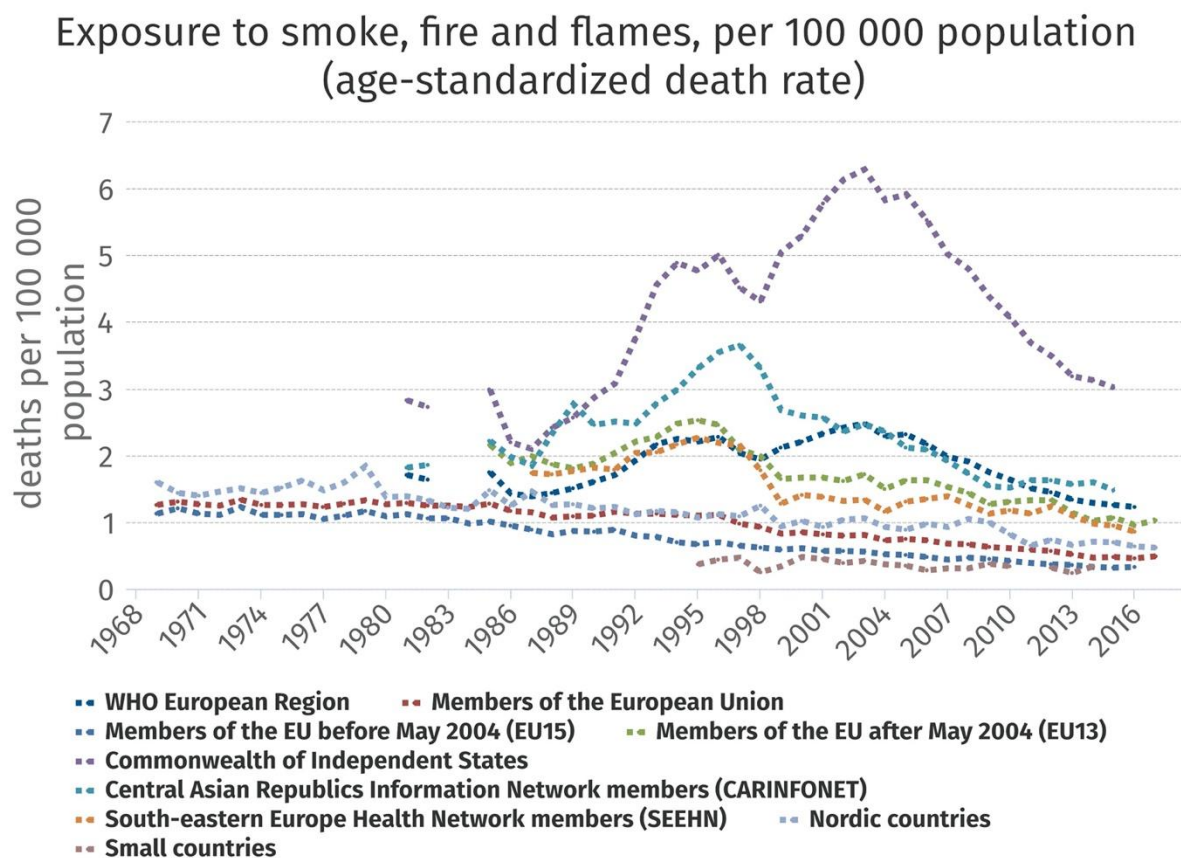
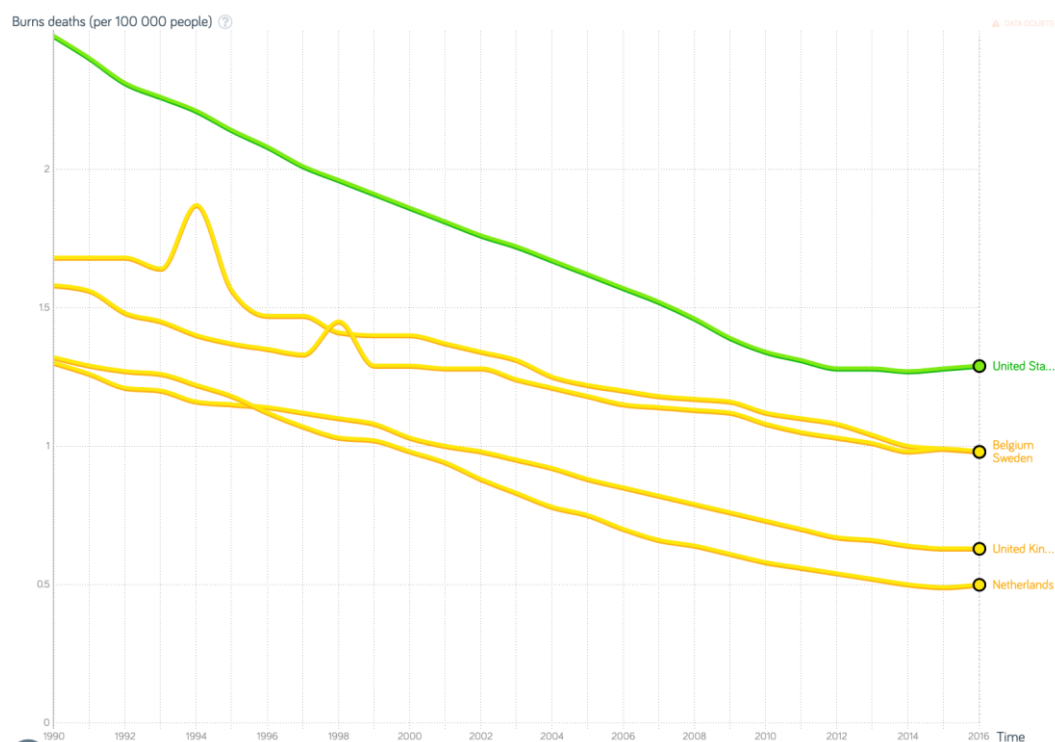


Figure 2: SDR Death per 100 000 population based on European WHO database with averages for group of countries (retrieved from [33])

Information on burn death trends for the same selection of European countries is available from Gapminder, an independent educational non-profit Swedish foundation which uses data from the World Health Organization and other sources [33], and is shown in Figure 3 below.



**Figure 3: Trend of Burn Deaths per 100.000 for a selection of European countries and the USA retrieved from [35]**

The figures from both WHO Europe and Gapminder show peaks influenced by specific large fires, including the 1998 Gothenburg discotheque fire in Sweden and the 1994 Switel fire in Belgium). The figures nevertheless show that burn deaths have followed a declining trend for the last two decades followed by a stabilisation.

It is important to acknowledge that the databases currently have limited utility in examining fire-related outcomes because they lack sufficient detailed fire data. However, the power for analysing data can be noted, contingent upon data quality. More information can be found in the paragraph 8.2.2. on ICD codes.

## **5. ANALYSIS OF CTIF REPORTS**

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### **5.1. GENERAL DESCRIPTION**

As fire is a very complex phenomenon involving many different parameters, achieving a complete and precise understanding – including causes and circumstances of the fire, casualties, and damages, as well as firefighting issues – needs relevant, efficient, and complementary indicators. These indicators may be found in fire statistics. In many countries, provinces, municipalities, and cities, fire departments regularly collect important fire-related statistics. These statistics are frequently published and increasingly available on official websites. Although comparisons from one country to another are frequently complicated by a lack of common definitions and methodology, they can still be useful to describe the global fire safety situation and trends for groups of countries, as well as the specific fire safety situation in a given country. Data collection in some countries is performed by private bodies, such as insurance companies, and these data are generally not publicly available. Several studies have used available data to make inter-country comparisons, such as the evaluation of fire death rate trends [29].

In this chapter, data from the “World Fire Statistics” reports [37], published annually by the International Association of Fire and Rescue Service (CTIF), were compiled and analysed for the years between 2009 and 2018. CTIF collects (annual numbers) data from each country on a voluntary basis. Data are usually provided by fire and rescue services or firefighter associations. In some situations, data are provided by two institutions, such as firefighters and national institutes. In these cases, data may differ for the same country. In general, it was observed that the differences reported by the two main institutions range between 5% and 10%. There are also situations where countries do not provide data and we sought in such cases to fill the gaps where possible. We should also note that some countries only provide structure fires, while others provide structure fires, vehicle fires and wildfires. CTIF recommends analysing data by decades (i.e. sequential average over 10 year period) and not by year in order to capture proper trends and to adequately consider potential outliers that may be present in the data. If the data is analysed by year, then every big or exceptional fire event would cause some spikes in the trends, therefore the comparison year by year might be a bit more challenging.

#### **5.1.1. Number of countries part of the study**

This study draws upon CTIF data from European countries and select non-European countries included in the research pool, including Australia, Canada, USA and New Zealand. A total of 37 countries is included in the review.

#### **5.1.2. Population consideration (2009-2018)**

In this analysis, the number of fires, fire deaths and fire injuries were divided by the average population for each country. The averaged population was calculated from the population numbers reported by CTIF over the period from 2009 to 2018.

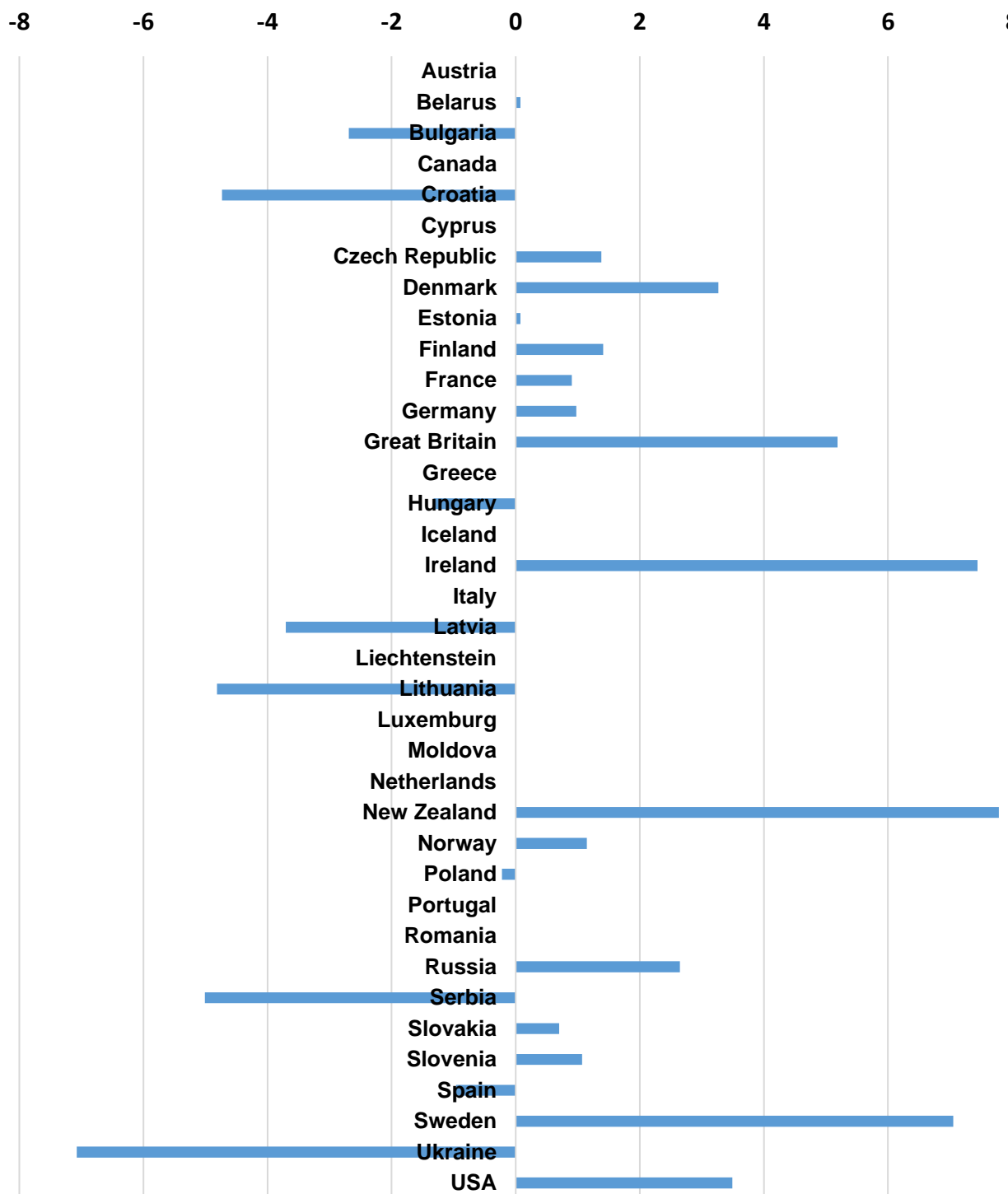


Figure 4 presents the increase percentage of population from years (2009-2013) to years (2014-2018) and shows that the difference is less than 5% for most of the countries. Only in Ukraine, Ireland, New Zealand and Sweden, the variation is between 6% and 8%.

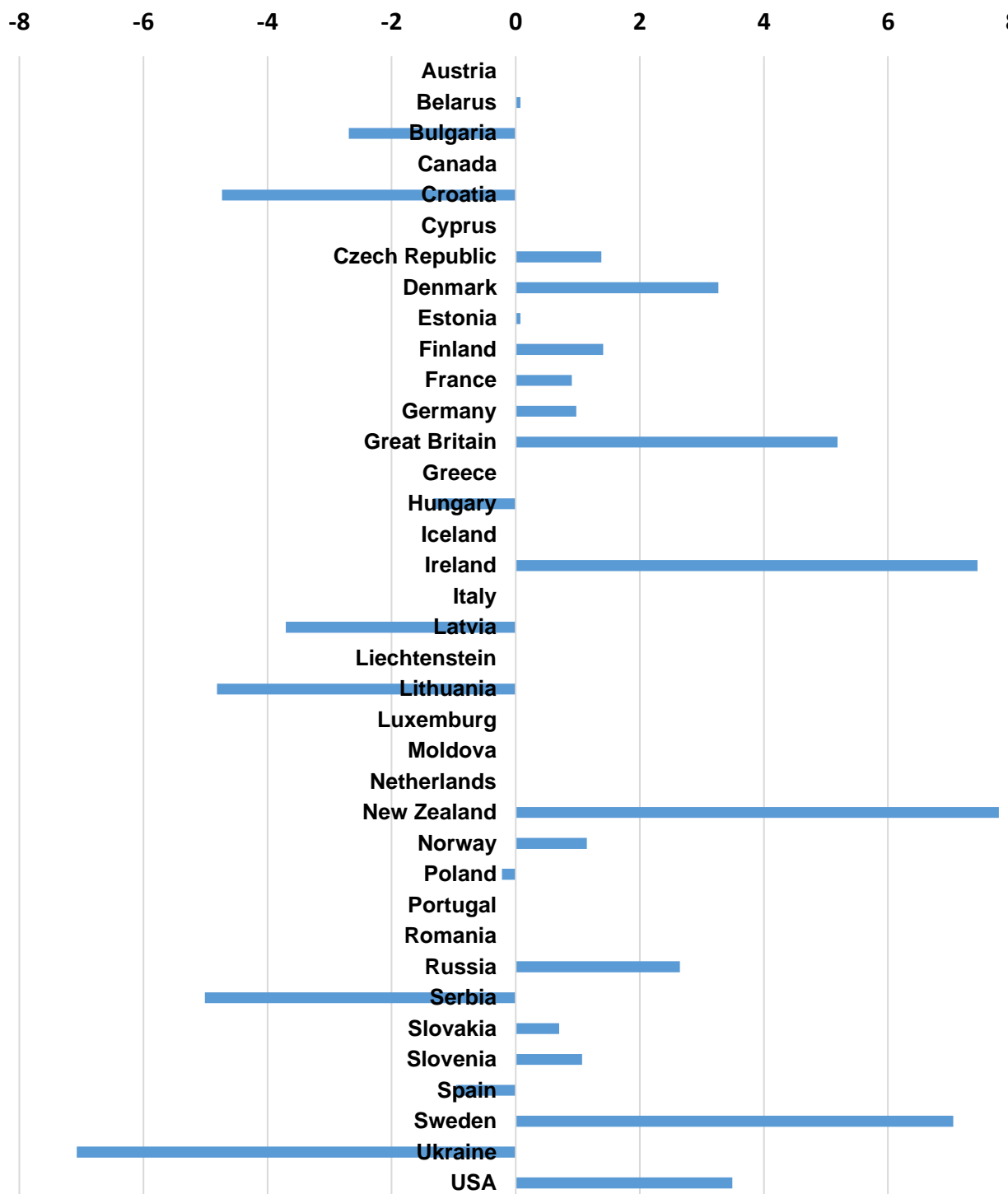


Figure 4. Variation percentage of population from (2009-2013) to (2014-2018).



## 5.2. NUMBERS OF FIRES (NF)

### 5.2.1. Average number of fires per 100 000 inhabitants.

Numbers of fires are shown in the countries whose data were available in CTIF reports [37].. Data for Luxembourg and Germany are derived from annual reports of these countries. In Luxembourg, the data found in the reports are significantly below the number which was given by CTIF [2]. This disparity could be due to a reliance upon different sources of information. However, CTIF had data for Luxembourg covering only one year (2018). Figure 5 gives an overview about the average number of fires between 2009 and 2018 per 100 000 inhabitants (inh.). Large disparities in the numbers of fires can be seen between countries. Those vary from around 50 fires per 100 000 inh. to more than 800 fires per 100 000 inh. in the case of Moldova and Cyprus, respectively.

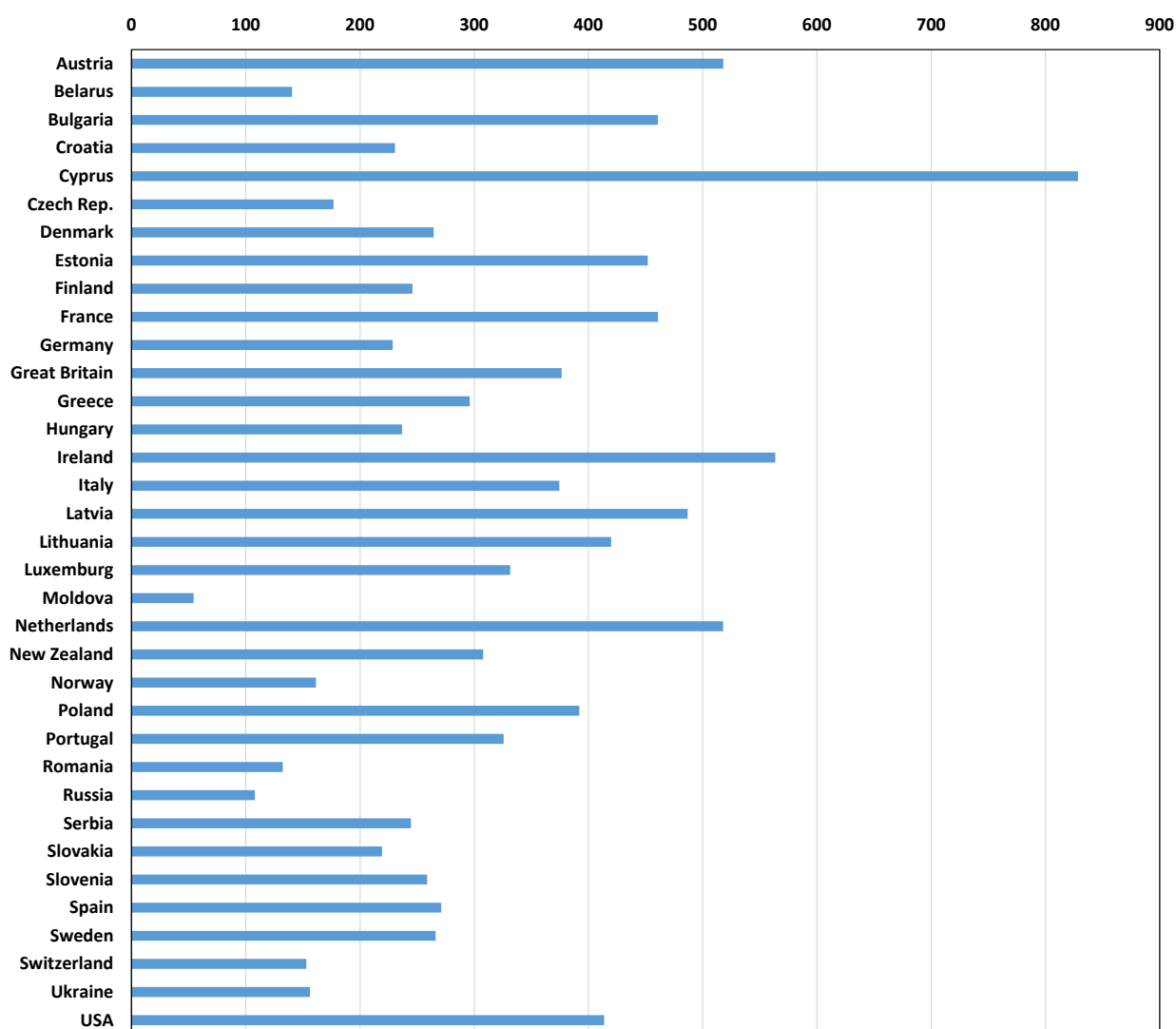


Figure 5. Average number of fires reported per 100 000 inh. (between 2009 and 2018).

5.2.2. Number of fires per 100 000 inh.

Based on the averaged numbers over ten years, presented in Figure 5, the countries are divided into three categories:

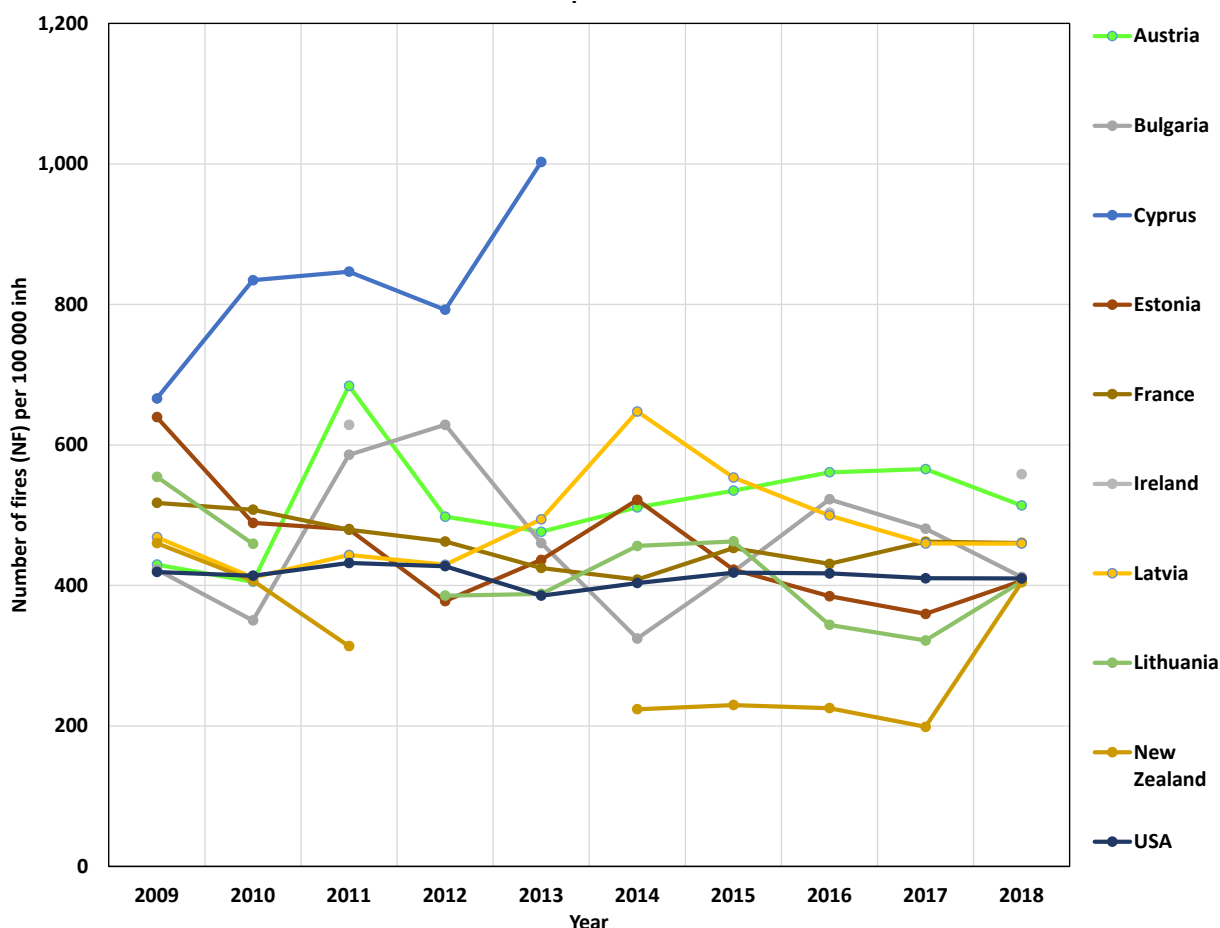
- Category 1: the average NF per 100 000 inh. is greater than 400;
- Category 2: the average NF per 100 000 inh. is between 200 and 400;
- Category 3: the average NF per 100 000 inh. is less than 200;

The grouping of countries into categories in this chapter is done only for the purpose of a better visualization and does not affect the conclusions.

**Table 1: Categories of number of fires per 100 000 inh.**

Category	NF per 100 000 inh.	Countries
1	> 400	Austria, Bulgaria, Cyprus, Estonia, France, Ireland, Latvia, Lithuania, New Zealand, USA
2	200-400	Croatia, Finland, Germany, Great Britain, Greece, Hungary, Italy, Luxembourg, New Zealand, Poland, Portugal, Serbia, Slovakia, Spain, Sweden
3	<200	Belarus, Czech Rep., Moldova, Norway, Romania, Russia, Switzerland, Ukraine

Figure 6, Figure 7 and Figure 8 present the average number of fires per 100 000 inh., for the period (2009-2018). In general, it can be observed that the NF is relatively constant or slightly decreasing. Most spikes in the graphs are related to an extraordinary event.



**Figure 6. NF per 100 000 inh. for the period (between 2009 and 2018) – Category 1.**

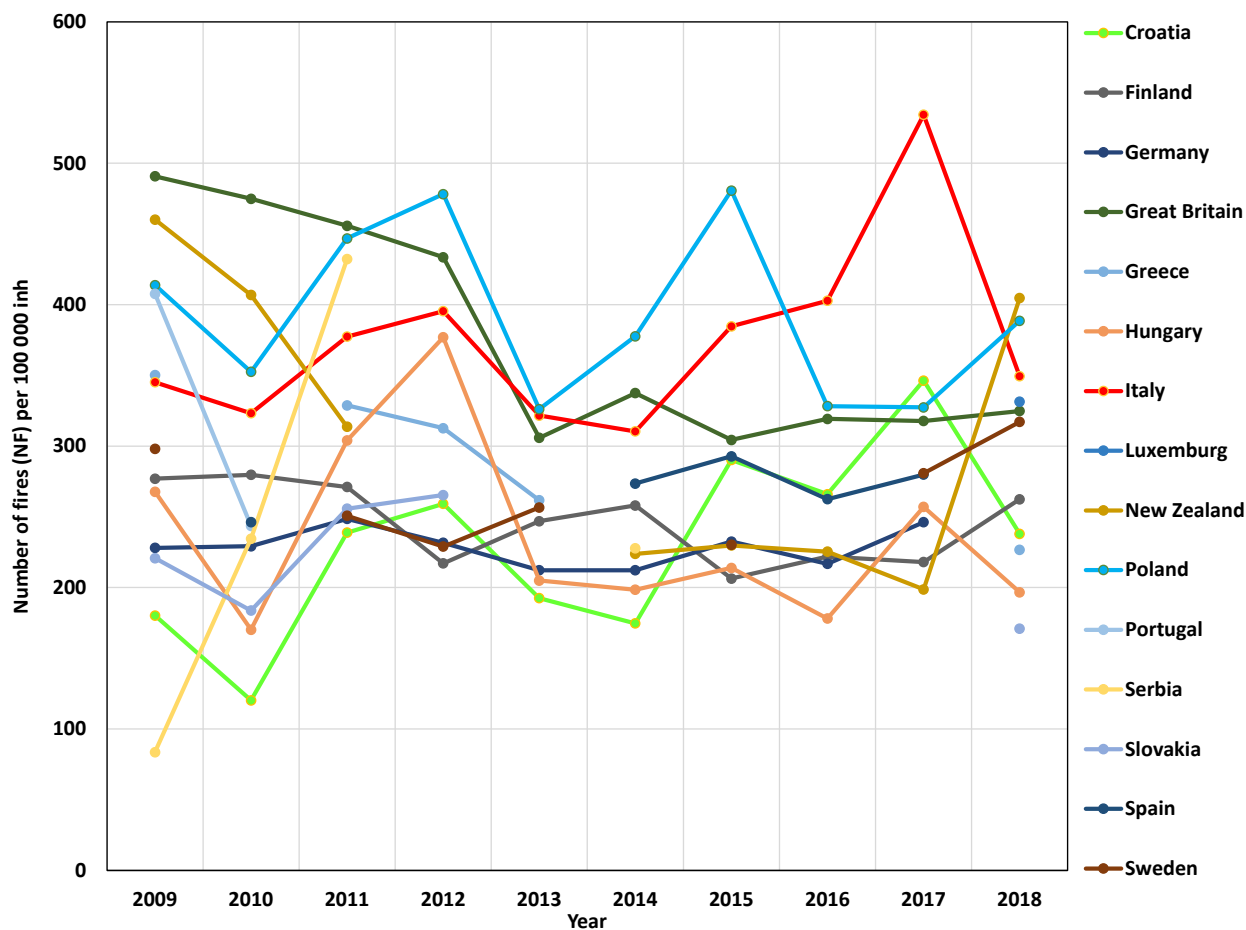


Figure 7. NF per 100 000 inh. for the period (between 2009 and 2018) - Category 2.

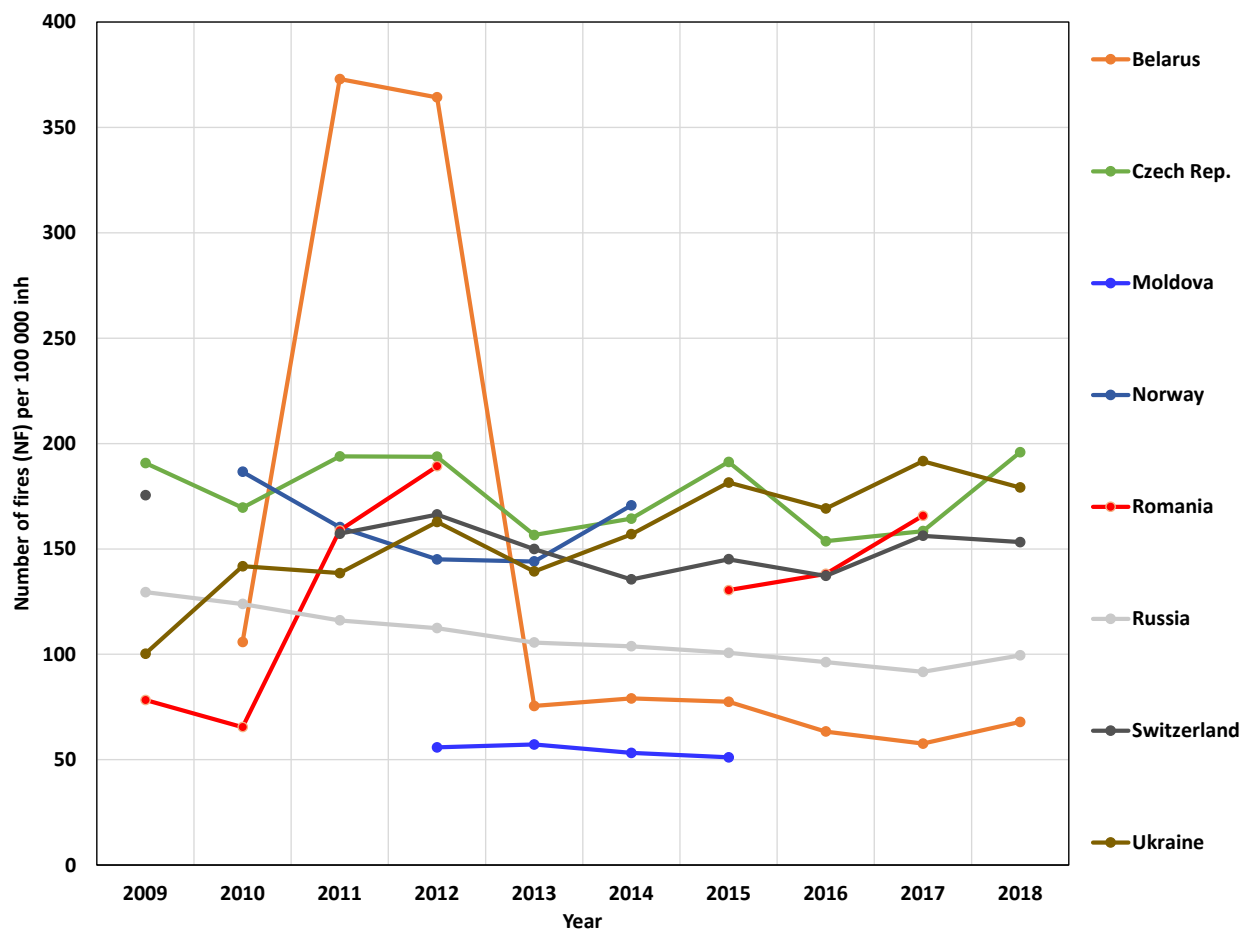


Figure 8. NF per 100 000 inh. for the period (between 2009 and 2018) – Category 3.

### 5.3. NUMBER OF FIRE DEATHS (NFD)

#### 5.3.1. Average number of fire deaths per 100 000 inhabitants.

Figure 9 presents the average number of fire deaths (NFD) per 100 000 inh. for the period (2009-2018).

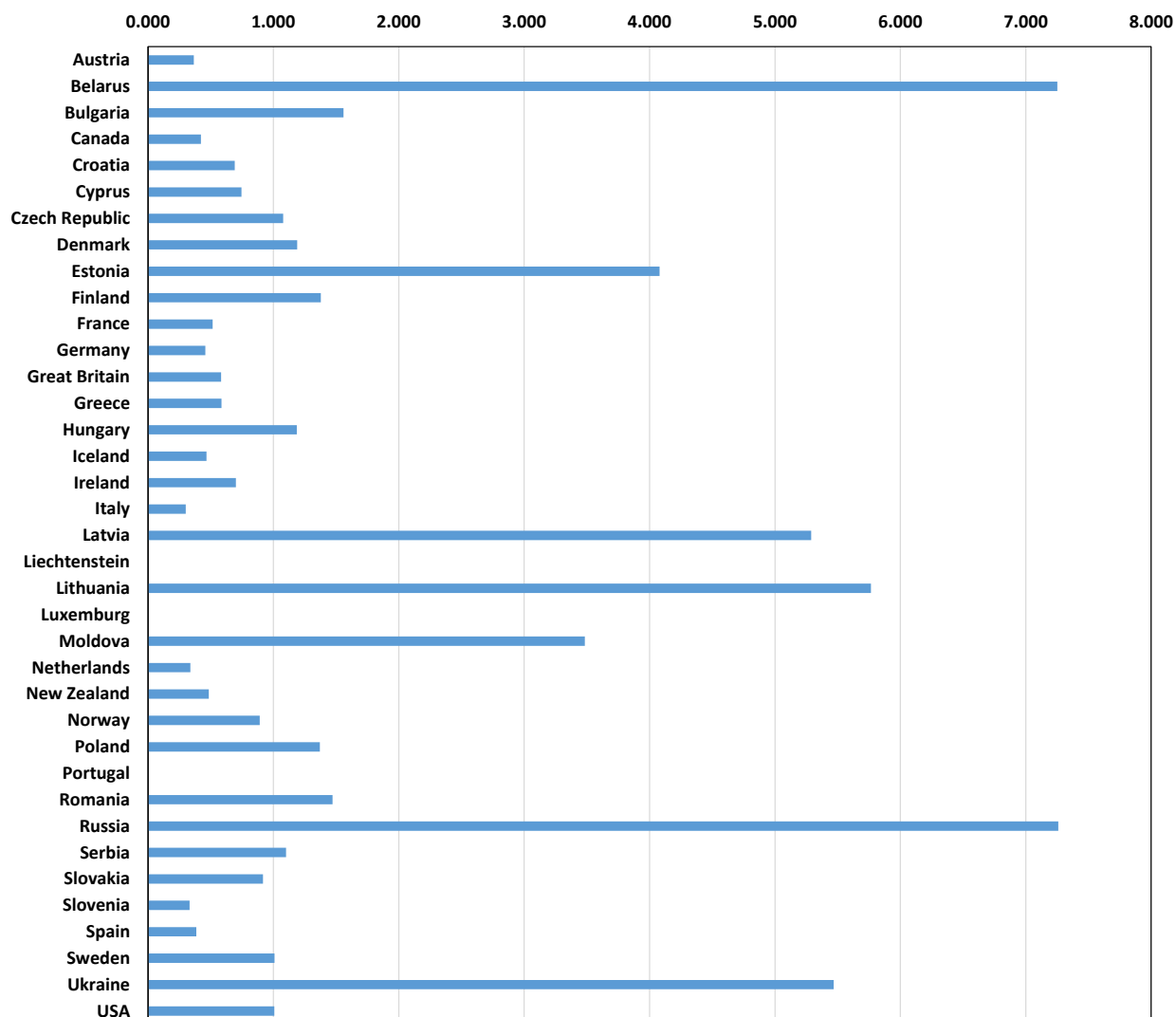


Figure 9. Average number of fire deaths per 100 000 inh. (2009-2018).

#### 5.3.2. Number of fire deaths per 100 000 inh.

Based on the results presented in Figure 9, the countries are divided in four categories:

- Category 1: the average NFD per 100 000 inh. is greater than two;
- Category 2: the average NFD per 100 000 inh. is between one and two;
- Category 3: the average NFD per 100 000 inh. is between 0.5 and one;
- Category 4: the average NFD per 100 000 inh. is less than 0.5;

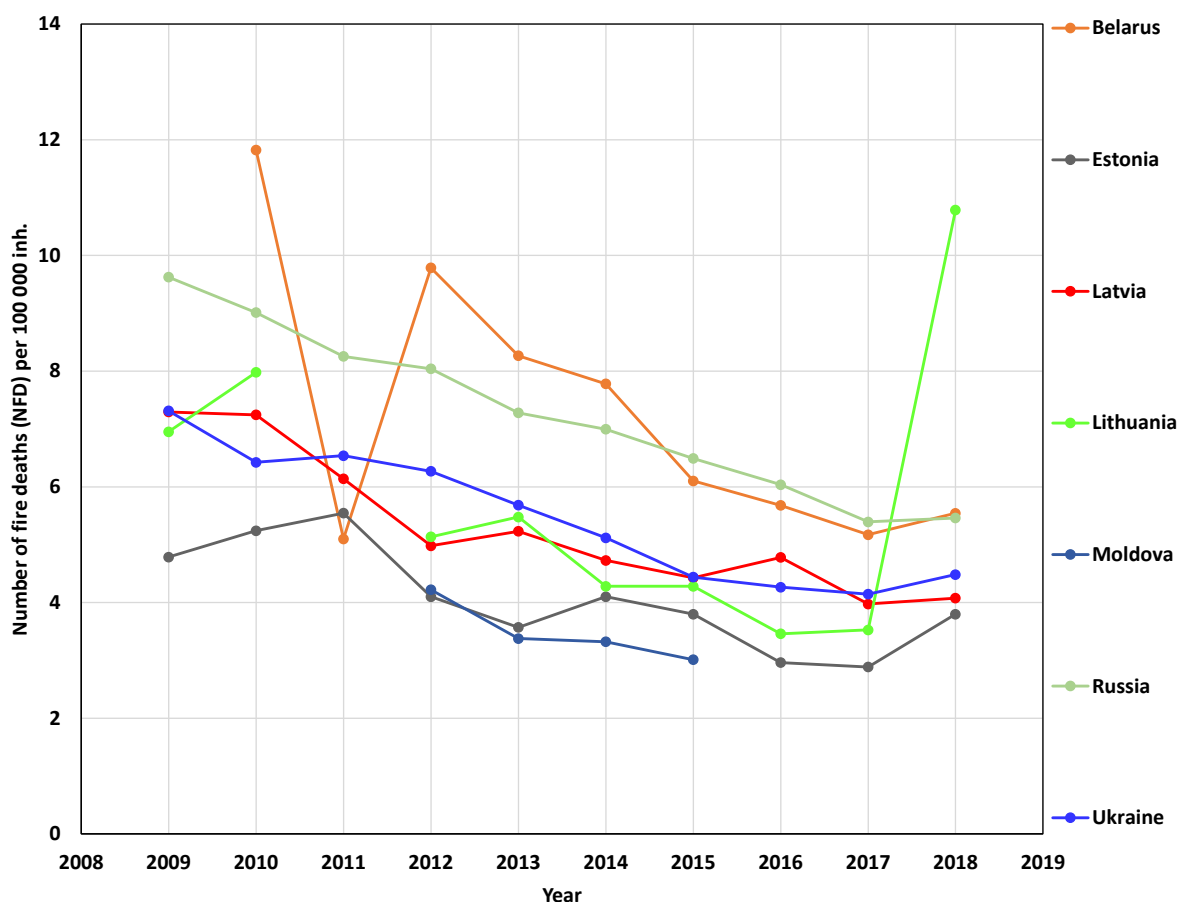
**Table 2: Categories of number of fire deaths per 100 000 inh.**

Category	NFD per 100 000 inh.	Countries
1	> 2	Belarus, Estonia, Latvia, Lithuania, Moldova, Russia, Ukraine
2	1 - 2	Bulgaria, Czech Republic, Denmark, Finland, Hungary, Poland, Romania, Serbia, Sweden, USA
3	0.5 - 1	Croatia, Cyprus, France, Great Britain, Greece, Ireland, Norway, Slovakia
4	< 0.5	Austria, Canada, Germany, Iceland, Italy, Netherlands, New Zealand, Slovenia, Spain, Liechtenstein, Luxemburg, Portugal

A surprising observation from the data is, that for some countries with fewer fires (see Table 1) including Belarus, Czech Rep., Moldova, Norway, Romania, Russia and Ukraine, also have more fatalities. This raises a question about how fires and fire deaths are defined and counted.

Figure 10, Figure 11, Figure 12 and Figure 13 present the NFD per 100 000 inh. for each year between (2009-2018), for the four defined categories, i.e., Category 1, 2, 3 and 4, respectively.

In general, it can be observed that the NFD is decreasing for the Category 1 countries and remaining relatively constant for the Category 2 and 3 countries. All the spikes in the graphs suggest that an extraordinary event (larger scale) has occurred, such as the 2015 Colectiv nightclub fire in Romania (Figure 11). These spikes are mostly noticeable for countries with smaller population.



**Figure 10. NFD per 100 000 inh. for the period (between 2009 and 2018) – Category 1.**

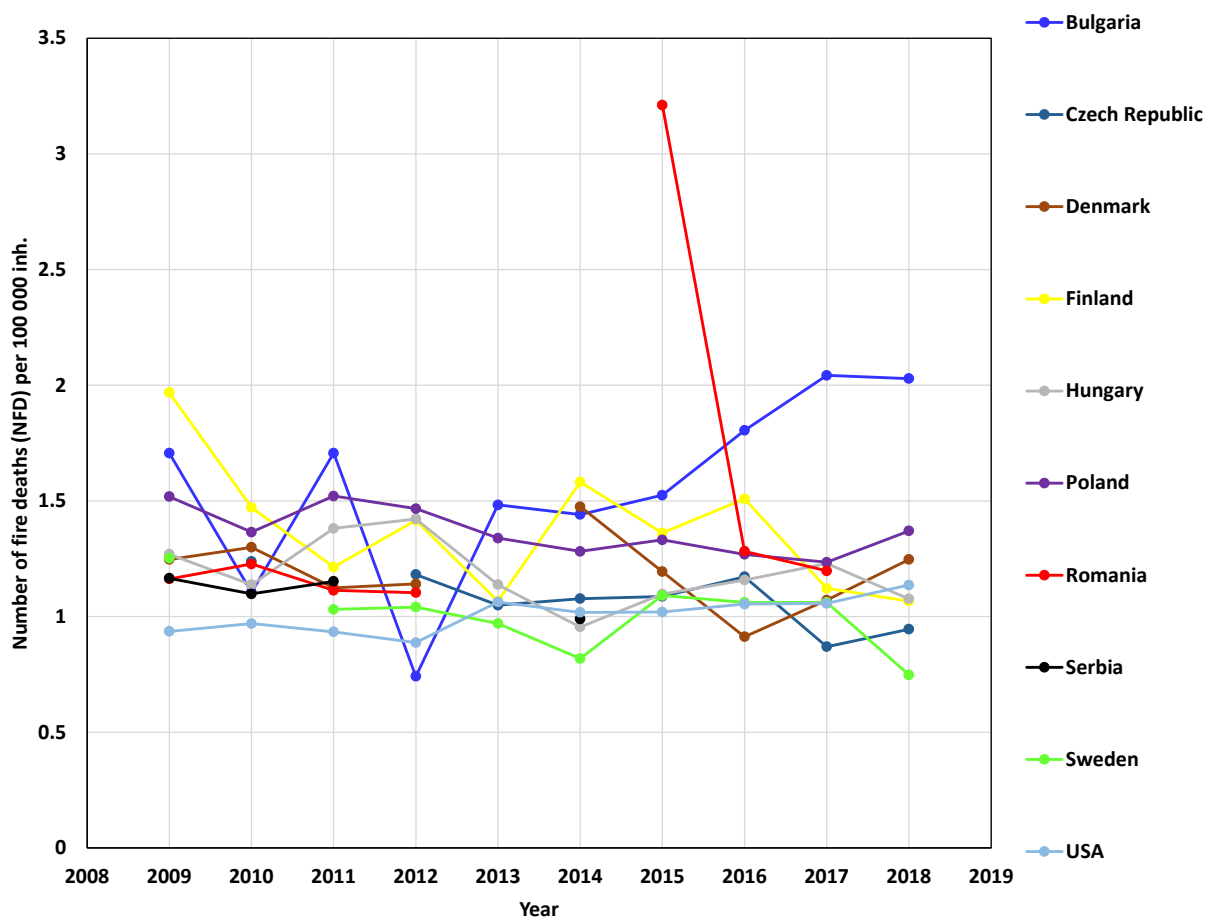


Figure 11. NFD per 100 000 inh. for the period (between 2009 and 2018) – Category 2.

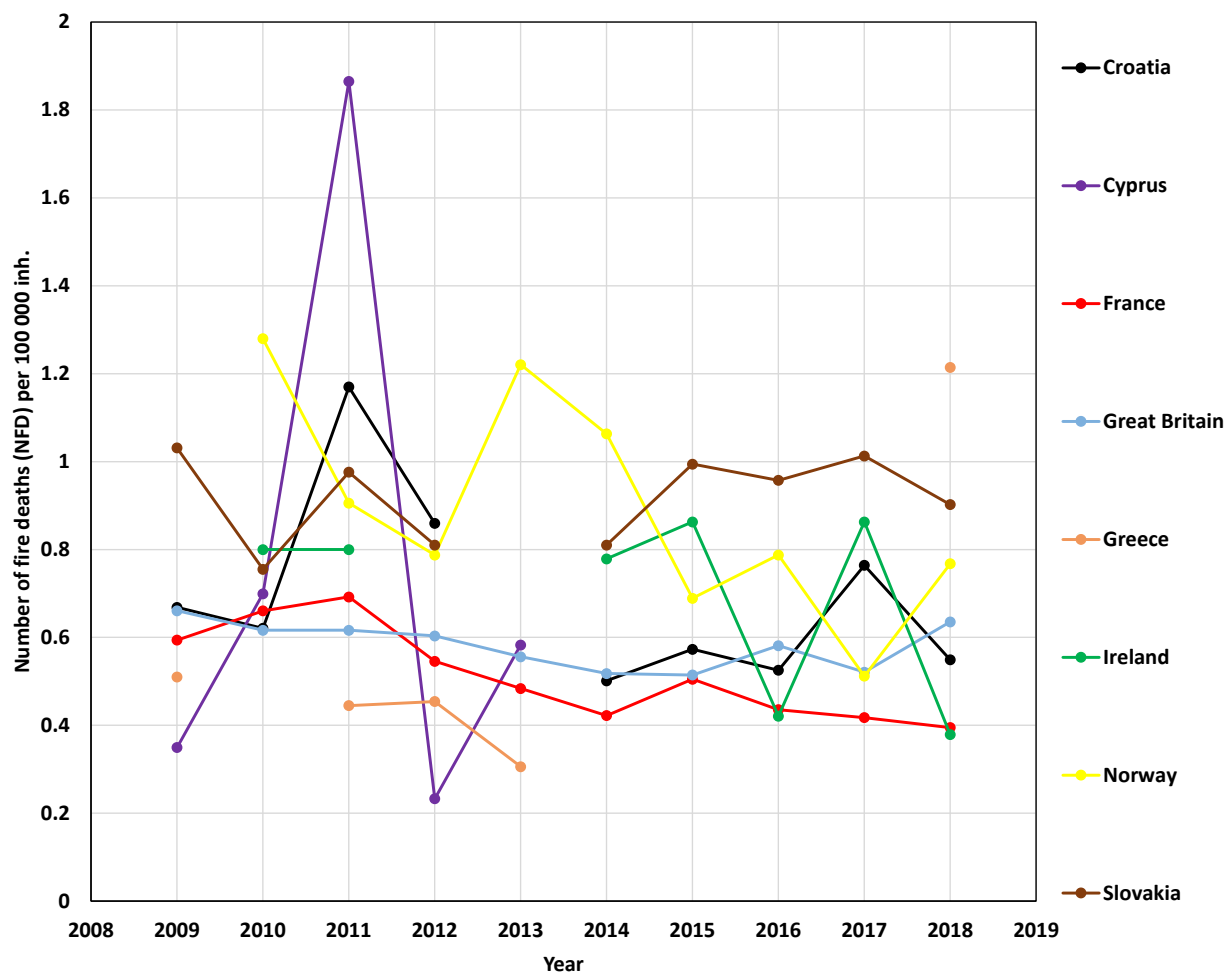


Figure 12. NFD per 100 000 inh. for the period (between 2009 and 2018) – Category 3.



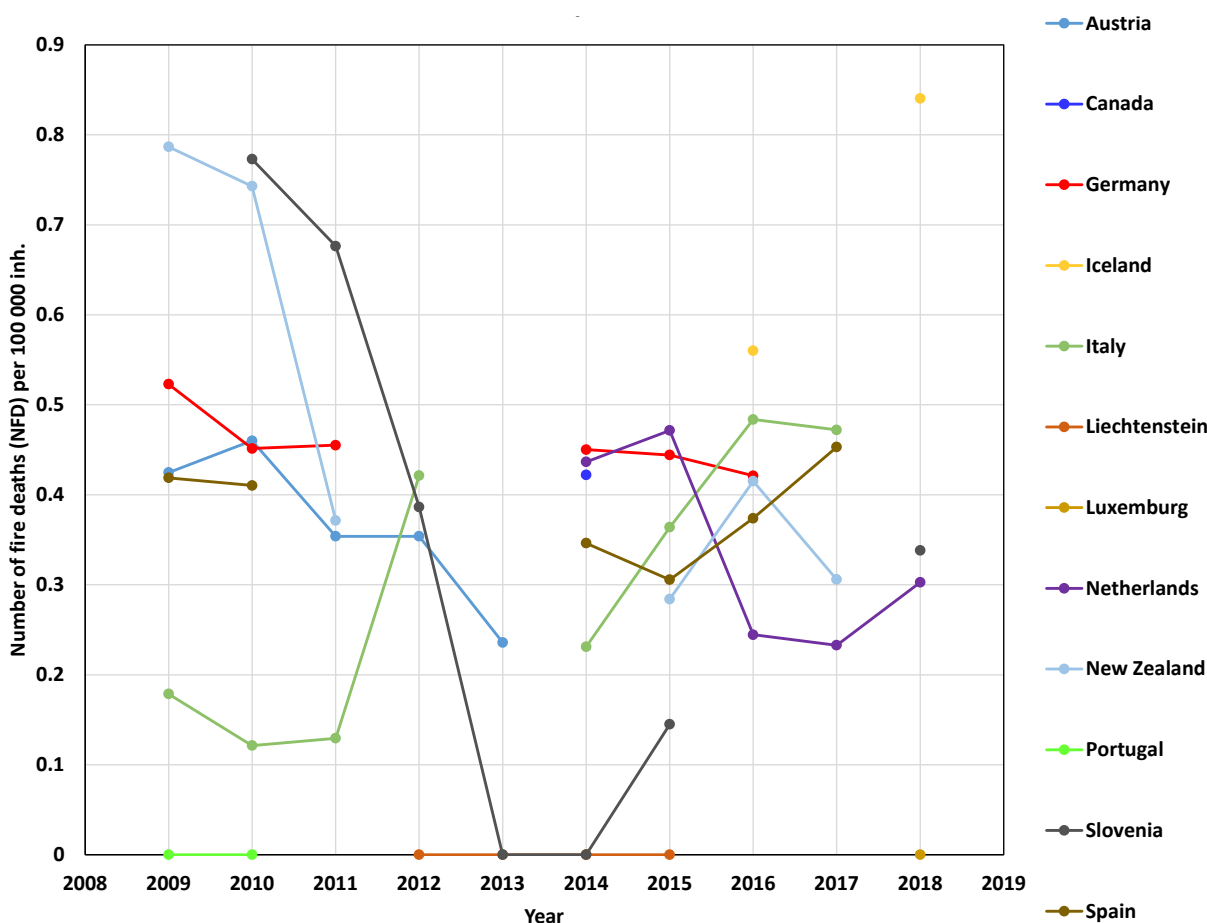


Figure 13. NFD per 100 000 inh. for the period (between 2009 and 2018) – Category 4.

All figures dealing with fire fatalities must be considered carefully since the exact definition of a fire death is rarely specified in documents on fire statistics. Countries have different approaches in how to consider the time elapsed after a fire to record a fire fatality. Many of them, such as Australia, France, Russia, the UK, and the USA, do not fix any time limit for recording a fire death. Canada counts a fire fatality as a result of injuries leading to death within one year and one day after the fire incident. In other countries, “death within 48 hours after fire” is regarded as a fire death. Additionally, some countries do not include fire deaths resulting from arson. France and Switzerland only report fire fatalities at the location of the fire – either those discovered by rescuers, or those declared dead after unsuccessful resuscitation attempts. Therefore, the French and Swiss official database does not consider fire fatalities that occurred at the hospital or during transport of casualties to the hospital. For instance, in France, the number of fire deaths was 6 deaths per million inhabitants in 2008, while figures derived from the French Institut National de la Santé et de la Recherche Médicale (INSERM) data are higher (9 deaths per million inhabitants in 2008) as they take into account not only the victims deceased on the spot, but also those who died in hospital. This is not the case in other countries like Germany, UK and Spain. Therefore, it is possible that a significant number of people with fire injuries died in hospital or during transport, and so may not have been accounted for in the final statement, skewing the final result.

It is surprising that the number of fires and the categories do not correlate with the number of fire deaths. For instance, Russia, Belarus and Ukraine belong to the category 3 for number of fires per 100 000 inh. with less than 200 fires per 100 000 inh. but are in category 1 for fire deaths with more than 2 fire deaths per 100 000 inh. That suggests that fires in these countries are less frequent but deadlier – or it could be a result of different definitions of fires as explained previously. This will be further examined in Task 1 of this project.

## 5.4. NUMBER OF FIRE INJURIES (NFI)

### 5.4.1. Average number of fire injuries per 100 000 inh.

Figure 14 presents the average number of fire injuries (NFI) per 100 000 inh., for the period (2009-2018). One must notice that fewer countries reported the number of fire injuries than the number of fires and number of fire deaths.

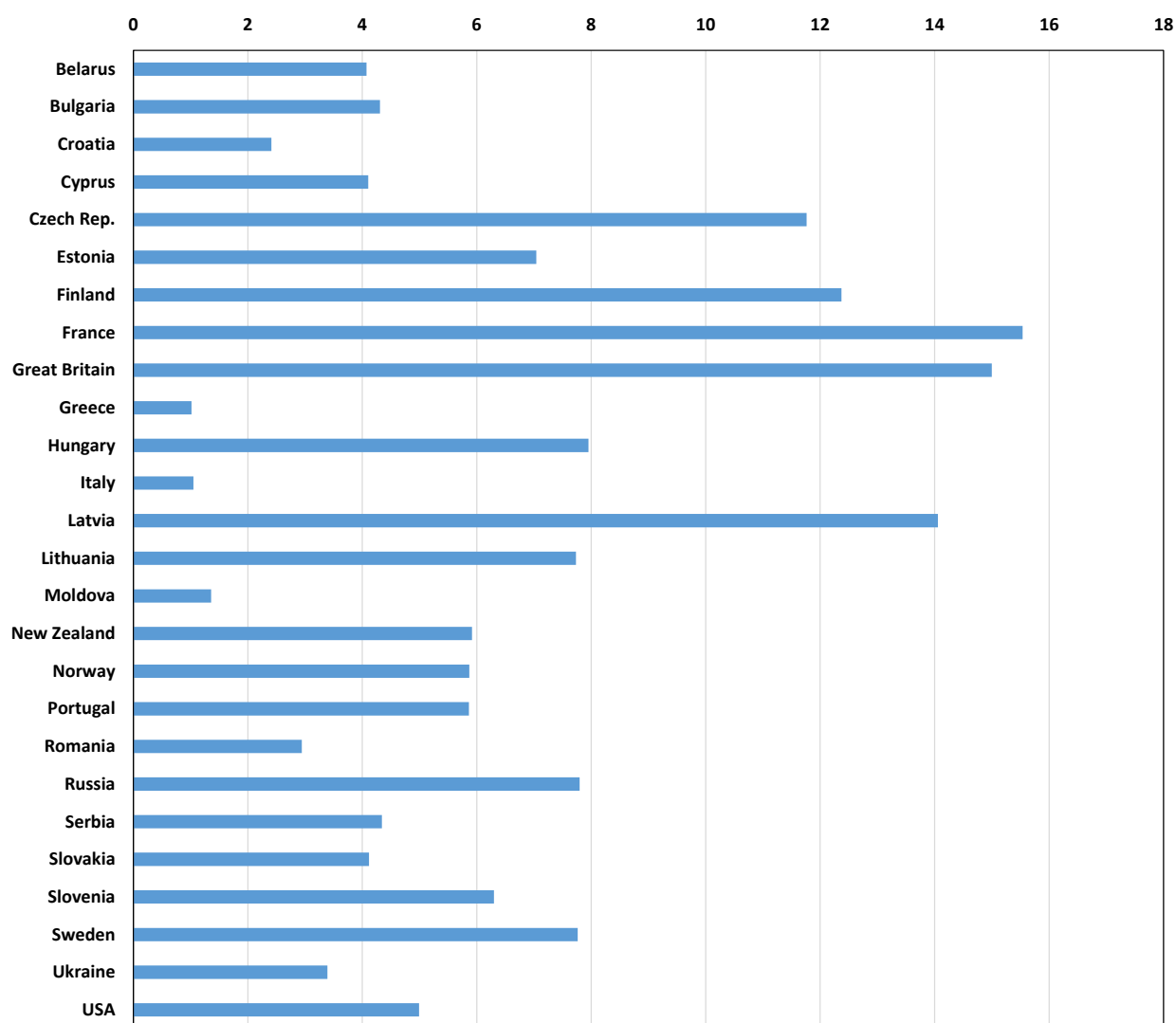


Figure 14. Average number of fire injuries per 100 000 inh. (between 2009 and 2018).

### 5.4.2. Number of fire injuries per 100 000 inh.

Based on the average NFI presented in Figure 11, the countries are divided into three categories:

- Category 1: the average NFI per 100 000 inh. is greater than ten;
- Category 2: the average NFI per 100 000 inh. is between six and ten;
- Category 3: the average NFI per 100 000 inh. is less than six;

Table 3: Categories of number of fire injuries per 100 000 inh.

Category	NFI per 100 000 inh.	Countries
1	> 10	Czech Rep, Finland, France, Great Britain, Latvia, Lithuania, Portugal, Slovenia, Sweden
2	6 – 10	Estonia, Hungary, New Zealand, Norway, Russia
3	< 6	Belarus, Bulgaria, Croatia, Greece, Italy, Moldova, Romania, Serbia, Slovakia, Ukraine, USA

The term of “fire injury” is very difficult to define, and the differences between “minor injury”, “moderate injury” and “severe injury” are numerous between countries – indeed, much more so than for “fire death”. Having highlighted these caveats, the current fire statistics show important differences in trends between countries.

Figure 15, Figure 16 and Figure 17 present the NFI per 100 000 inh. for each year between (2009-2018), for the three defined categories. In general, it can be observed that the NFI are irregular for most countries. In our opinion, this can be due to a lack of definition of an “injury” or due to a change in the methodology, but can also be due to others parameters that we did not identify.

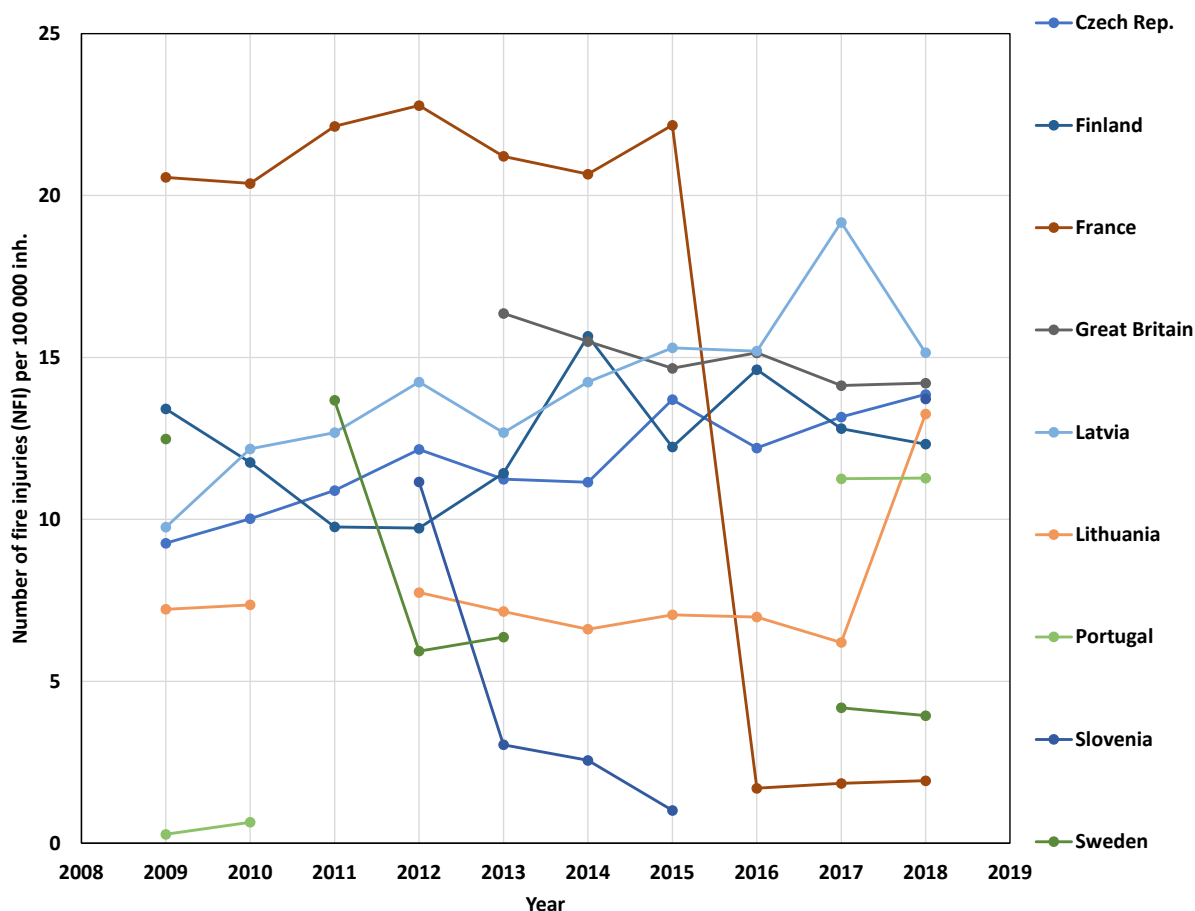


Figure 15 NFI per 100 000 inh. for the period (between 2009 and 2018) – Category 1.

For example, in the case of France, we can notice a steep decline in the number of fire injuries between 2015 and 2016. When investigating the French annual reports [38], we notice that the data for fire injuries prior to 2016 correspond to the number of injuries of “absolute emergency” and “relative emergency”, the former meaning that the injured persons needed medical care whereas the latter means that the injured person did not need medical care. After 2017, the number of injuries reported in the CTIF reports by French officials correspond to the number of absolute emergency only, corresponding to the injuries that needed medical care

only. This explains why the number of injuries dropped promptly. Similarly, when comparing France and Italy, we find that for a relatively similar population and fatality per 100.000 inh. the number of injuries are completely different, leading to a doubt about the difference in the definitions.

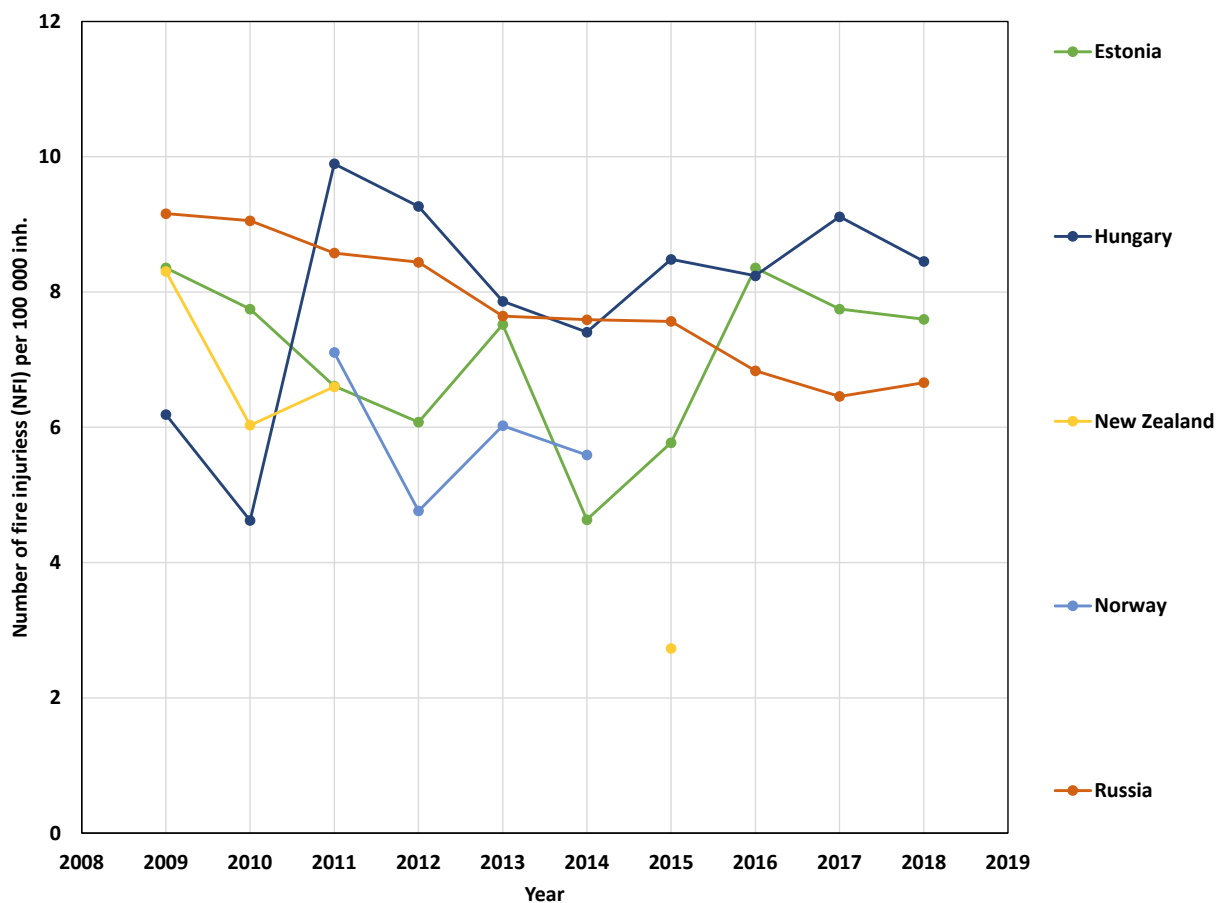


Figure 16. NFI per 100000 inh. for the period (between 2009 and 2018) – Category 2.

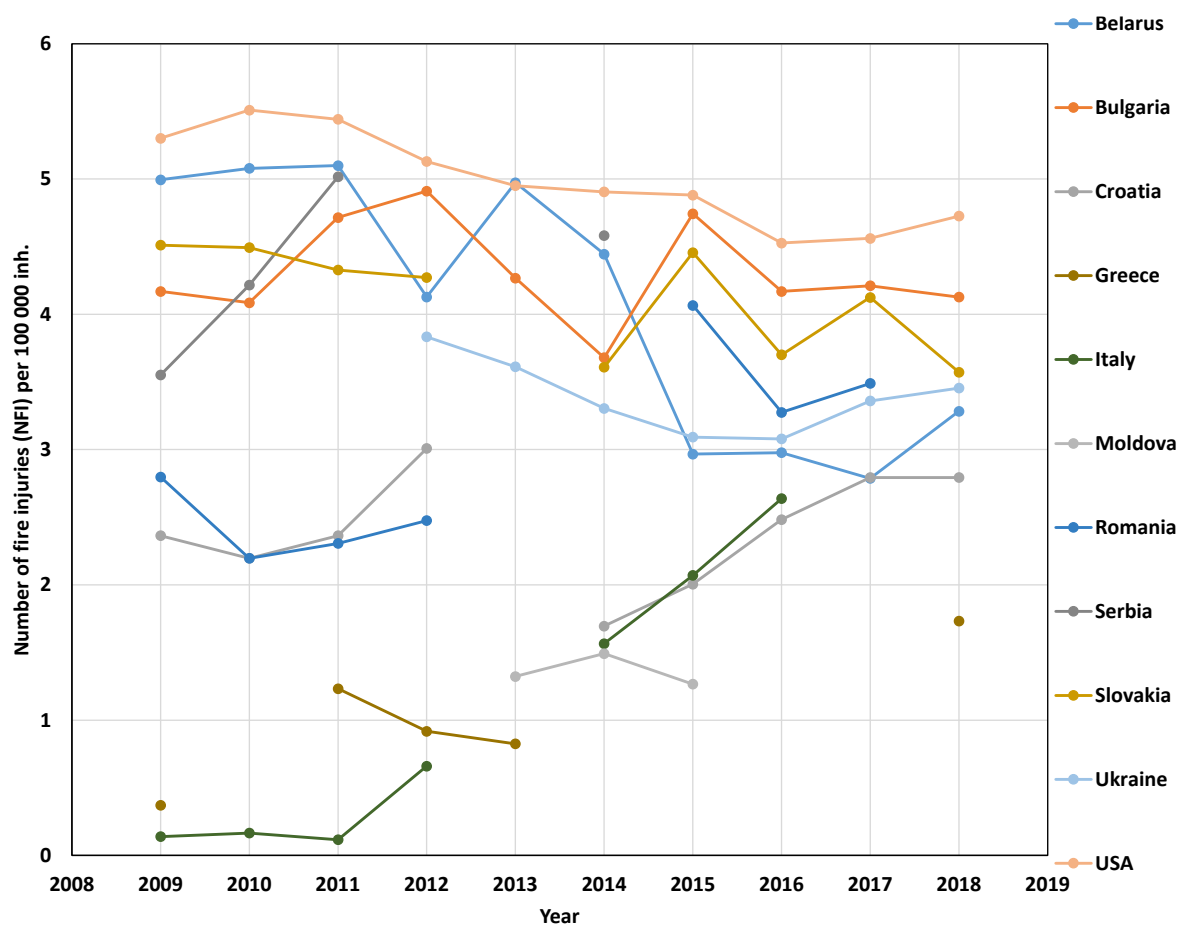


Figure 17. NFI per 100000 inh. for the period (between 2009 and 2018) – Category 3.

### 5.5. COMMENTS ON THE QUALITY OF DATA

The data collection in each country is dependent on the national definitions and collection methodology. Therefore, general trends can give indications, however the direct comparison between countries is not recommended. Here are a few of the most evident aspects, which should be taken into consideration:

- The types of fire included in the statistics should be well defined (e.g. structure fires, vehicle fires, and wildfires).
- The definition of fire deaths or injuries should be stated.
- The evaluation of uncertainties of the data should be included in annual reports of each country.

Most of the times, all of these aspects are not explained in the reports worldwide. However, one should acknowledge the possibility to identify changes and trends within a country (as long as the data collection method is stable), and later on use these trends to make comparisons between countries. Thus, positive or negative trends can be identified for individual countries.

This analysis raises questions on the sampling size of countries with small population and a reduced numbers of fires for which comparison with countries with larger datasets can create issues considering the difference in the statistical data populations examined. Indeed, a reflexion should take place on how to analyse data in these situations and how to properly use their outcome for decision making.

Finally, with the existing fire statistics, it remains difficult to derive useful conclusions from them, especially when wishing to compare the situation in different countries. To provide relevant information regarding the national fire safety situation (number of fires, fire fatalities and fire injuries), fire statistics will have to be internationally improved through common terminology, common methodology, and common training and qualification of the persons reporting data from fire scenes.

## 6. LESSONS LEARNED FROM ISO WORKING GROUPS

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The work of ISO/TC92 - WG13: *Fire safety - Statistical data collection* started in 2015 and resulted with two publications, one presenting an overview of national fire statistics practices [39] and a second document proposing 85 harmonized definitions of certain terms commonly used in fire statistical data [40] which will be further developed in Task 1.

The roadmap of WG13 identifies steps to be completed in the upcoming years with ISO 17755 series: A methodology for collecting fire statistics will be the focus of the third part of the series and a document on data interpretation will be introduced in the fourth part. A work item is also ongoing on intentional fires.

ISO TR 17755:2014 *Fire safety — Overview of national fire statistics practices* [39] assembles data on national fire statistics practices. In the Introduction of the TR it is stated: “In the absence of any proposals for international standards on such practices, it is useful to ISO/TC 92 to have an overview of existing practices and their implications for existing fire statistical data.”, describing the actual worldwide situation on standardization of fire statistics.

The document concentrates on giving an overview over existing fire statistics and fire data collections. To achieve this, a general call to all nations participating in ISO TC 92 was issued and the following 10 countries (in alphabetical order) were asked to complete a survey prepared and distributed by the participating countries of ISO TC 92 WG 8: Australia, Canada, China, France, Japan, Kenya, (Republic of) Korea, Russia, United Kingdom and USA.

The survey which was given to the participating countries can be seen in Annex A of ISO TR 17755. The TR 17755 itself is organized into four sections:

- Basic Aspects of Data Collection and Analysis (Clauses 1 to 7)
- General Characteristics of Fires (Clauses 8 to 10)
- Characteristics Related to Cause of Ignition (Clauses 11 to 20)
- Characteristics Related to Mitigation of Fire Severity (Clauses 21 to 25).

As a *summary of methods of estimation* section 1.1 gives an overview: Only two countries – Japan and the USA – reported use of statistical projection in addition to counting. The survey did not ask how statistical projection is used. Fire statistics based on the national fire database is used for Annual Report of Fire Statistics and White Book on Fire Service annually in Japan. All other countries treat their database as a census, but it is not known whether any of these countries calculate or publish the percentage completeness of their database (for example, by calculating the percentage of total national population represented by reporting jurisdictions).

With the *fires which are subject to reporting* section 2 gives insight. As a summary of this topic the following is given: All countries limit reporting to fires that received a fire department response. Some countries incorporate a minimum-loss threshold for reporting, but far more countries recognize that reporting of very small fires often does not occur, even though there should be reporting under the rules. Some countries permit separate, more limited reporting of certain types of very small fires in order to encourage complete reporting of the existence of these fires. Countries differ on the inclusion of vehicle fires, vegetation fires, and other outdoor fires in their reporting.

*Fire deaths subject to reporting* are addressed in section 3. The following summary is given: Countries differ regarding their use of reports from fire departments and medical records, as well as on their efforts to coordinate both sources into a comprehensive database using consistent definitions. Countries differ regarding the length of time after injury when a death is formally recognized as a fire death. Regardless of the formal length of time defined by a country, actual reporting may depend on the country's ability to capture developments occurring after the victim leaves the fire scene. A delayed death may not become known to the fire authorities and may not be recognized as originating with a fire injury by medical authorities. Countries differ in their treatment of fatal injuries received in an incident involving fire and non-fire harm to the victim, such as an automobile collision followed by fire or a building collapse following fire.

In section 4 *fire injuries subject to reporting* are addressed. As a summary of the situation the following is given: Countries differ regarding their use of reports from fire departments and medical records, as well as on their efforts to coordinate both sources into a comprehensive database using consistent definitions. Countries differ

in their treatment of injuries received in an incident involving fire and non-fire harm to the victim, such as an automobile collision followed by a fire or a building collapse following a fire.

Section 5 deals with *victim characteristics*. Most countries collect information on victim age and gender, and many collect information on other characteristics.

*Property damage subject to reporting* is addressed in section 6. In summary: All countries limit reporting to fires that received a fire department response. Some countries incorporate a minimum-loss threshold for reporting, but far more countries recognize that reporting of very small fires often does not occur, even though there should be reporting under the rules. Some countries permit separate, more limited reporting of certain types of very small fires in order to encourage complete reporting of the existence of these fires. Some countries provide no national reporting of monetary damages but defer to reporting by insurance companies. Some countries (e.g. the USA) have annual published reports with estimated fire losses calculated separately and independently by fire departments and by insurance companies. Some fire departments may take steps to coordinate their own fire damage monetary reports for individual incidents with those of the responsible insurance company. Most countries also collect data on property damage using measures other than monetary damages. These may be counts of damaged objects (such as buildings, rooms, floors, or vehicles), area damaged, percentage of area damaged, or a qualitative confinement scale (such as confined to object or room of origin).

*Other losses subject to reporting* is addressed in section 7. As a summary it can be said: Nearly all countries collect data on firefighter deaths and injuries due to acute fire effects, and most collect data on other firefighter deaths and injuries sustained while on-duty. Only Kenya reports data collection on chronic illness and related death for firefighters. Kenya is also the only country to report data collection on indirect property damage (also called consequential damage, including business interruption and temporary housing), environmental damage, or damage to cultural heritage.

In section 8 the location of fire is addressed. As summary: Nearly all countries collect data so as to distinguish the broad categories of locations used in the survey:

- Buildings
- Structures other than buildings (for example, bridge, tunnel)
- Vehicles
- Crops, commercial forests, or other outdoor vegetation areas for which the vegetation has commercial value
- Other outdoor locations with commercial value (for example, outdoor storage, recreational areas and tourism sites outside structures)
- Outdoor vegetation areas with no commercial value (for example, brush-lands in a developed area)
- Other outdoor locations with no value (for example, trash bins, loose rubbish).

Several countries also provided coding categories for identifying specific types of buildings and structures and for identifying specific rooms or areas within buildings.

The *type of construction* is addressed in section 9. Most countries collect information on type of construction.

In section 10 *Other fire characteristics* are addressed. Many countries collect information on one or more of the other fire characteristics.

Section 11 addresses *Deliberately set fires and playing with fire*. As summary it can be said: Most countries collect information on deliberately set fires. Countries use different approaches to develop what they consider the best estimate of the size of the arson fire (or deliberate fire) problem in their country, which may include any or all of the following:

- Use of “suspicious” as a recognized choice for cause,
- Proportional allocation of fires with unknown cause or fires still under investigation,
- Relative use or non-use of trained arson investigators to declare a fire to be deliberate, and
- Inclusion or exclusion of fires determined to have been set without malicious intent (usually called “playing with fire”).

Several countries identify intentional fires set during or as part of a riot or social disturbance. Some countries can separate juvenile firesetting, both fires coded as playing with fire and intentionally set fires where the fire was set by someone young enough to qualify as juvenile under local laws or conventions. Only the USA reported a more elaborate and detailed reporting of arson motives, and this reporting is only incorporated in the separate Arson Module of NFIRS, a module which is voluntary and often not completed. The United Kingdom was the only country to incorporate designations of homicide and suicide into its reporting categories for deliberate fires. However, all countries participate in the international standard for coding of vital records, which includes separate codes for homicide by fire and suicide by fire. This source of data can be used by any country and will capture fire deaths that were not part of a fire attended by a fire brigade and so not reportable to the country's national fire incident databases. Suicide by fire is a major cause of death in some countries. The death certificate database lacks any other details regarding the circumstances of the intentional fire, although it will include a number of details about the victim.

Section 12 addresses the *Natural cause*. Most countries collect information on natural cause fires. Only Australia and the USA reported subdividing natural cause fires into more specific types.

*Exposure* is addressed in section 13. Most countries collect information on exposure fires. Only Australia, Canada and the USA reported subdividing exposure fires into more specific types, but there is some question whether Canada's more detailed reporting is in current use.

*Heat sources – Cigarettes and other smoking materials*, including lighting implements are addressed in section 14. Most countries collect information on smoking material or open flame fires, but there are usually partially specified categories (which could be either smoking material or open flame) that make it difficult to estimate the two separately. Also, while all countries coding open flame fires include matches, lighters, and candles, there are other open flame categories that are included by some countries but not others or that some countries treat as equipment rather than open flame heat source:

- various types of torches,
- open fires,
- torches used for lighting,
- lamp or lantern excluding electric,
- ash or ember or ashtray contents,
- novelty lighter,
- charcoal or utility lighter,
- oil or incense burner,
- naked flame,
- warning or road flare, and
- backfire from an internal combustion engine.

Section 15 addresses *Equipment involved in ignition – Heating and cooling equipment*. Many countries collect information on heating equipment fires or on HVAC (heating, ventilation and air conditioning) equipment fires generally.

Section 16 addresses *Equipment involved in ignition – Cooking and other kitchen equipment*. Many countries collect information on cooking equipment fires or on kitchen equipment fires generally.

Section 17 addresses *Equipment involved in ignition – Clothes dryer*. Many countries collect information on clothes dryer fires generally.

Section 18 addresses *Equipment involved in ignition – Entertainment equipment*. Many countries collect information on entertainment equipment fires. The rapid changes in popular technologies mean that even the countries that provided extensive detail in coding choices are lagging behind popular usage. For example, there is no distinction of wall-mounted, high-definition or 3D televisions, or even of color versus black-and-white televisions.

In section 19 *Equipment involved in ignition – Office equipment* is addressed. Many countries collect information on office equipment fires. The rapid changes in popular technologies mean that even the countries that provided extensive detail in coding choices are lagging behind popular usage. For example, the different sizes of personal computers are not distinguished and smart phones (combination telephones and portable computers) are not mentioned.



In section 20 *Other characteristics of fires related to cause of ignition* are addressed.

The other characteristics of fires are grouped into seven categories:

- Electrical fires and electrical distribution or lighting equipment (not asked about in survey)
- All appliances and equipment not previously discussed
- Item first ignited defined by form or function
- Item first ignited defined by material composition
- Factors in ignition
- First major fuel package
- Factors in fire growth

First major fuel package was only reported by Kenya, which provided no unsolicited details on how this is reported. This data element is not covered in the detailed tables by country, for that reason.

Of the other countries:

- China and Japan report on equipment involved in ignition, item first ignited, material used in item first ignited, and factors in ignition, but do not report on first major fuel package or factors in fire growth.
- Korea reports on equipment involved in ignition, item first ignited, material used in item first ignited, factors in ignition, and first major fuel package, but not on factors in fire growth, and provided few details on any categories while indicating that they have numerous detailed coding choices for several of the categories.
- Kenya reports on all seven categories of other characteristics but volunteered no coding details on any of them.
- France was undetermined for all seven categories
- Russia did not include any details on its reporting on these characteristics.

In section 21 *Sprinklers and other extinguishing equipment* are addressed. Most countries collect information on presence of automatic extinguishing equipment and separately on type and performance of the equipment.

In section 22 *Detection and alarm equipment* is addressed. Most countries collect information on presence of detection and alarm equipment and separately on type and performance of the equipment.

In section 23 *Fire extinguishers and other manual extinguishing equipment* are addressed. Most countries do not collect information on presence of fire extinguishers and other manual extinguishing equipment. Australia, Canada and the United Kingdom are the countries that report and with some detail.

In section 24 *Smoke management and control equipment* are addressed. Most countries do not collect information on presence of smoke management and control equipment. Australia, Canada and the United Kingdom are the countries that report and with some detail.

In section 25 *Fire doors, fire walls and other elements of compartmentation* are addressed. Most countries collect information on type of construction.

## 7. OVERVIEW OF COLLECTED DATA

The information gathered in Task 0 is the result of the cooperation and collaboration of the consortium members who were able to provide the description of the fire statistics in several countries based on their previous research, experiences, studies investigated in the literature review, public datasets and through a network of contacts. For each country, a detailed diagnostic sheet was filled (see Annexe I for each country), based on the gathered information. We extracted information from all the diagnostic sheets and summarised them in this section and the next ones. Sources and references for the information about each country are often found in the corresponding diagnostic sheet.

The countries covered by Task 0 are subdivided into EU Member States, a number of other European countries (Non-EU) and other countries (International). For the EU Member States, the only countries missing are Belgium, Cyprus, Estonia, Finland, Lithuania, Malta, Portugal, Romania and Slovenia, which will be covered in Task 1 of the project. Information from the specific countries are missing due to the difficult access to their fire statistics. The other European countries investigated are Norway, Russia, Switzerland, Turkey and the UK and the international countries are Australia, Canada, New Zealand and the USA.

The following analysis has been divided into the evaluation of collection methodology and the fields covered. Sheets for all the countries examined in Task 0 and those for which information was not available, have been evaluated and increased in number in Task 1 where summary tables are developed for each nation based on the definitions available, fire statistics methodology and fields covered. Task 1 will be also focused on the recording system used by the relevant authorities and the semantic analysis of the definitions adopted by various countries for what concerns pre- and post-fire variables of real fire incidents affecting buildings.

In Task 0, an overview table has been created providing a summary of the fire statistics for the countries examined covering the relevant bodies responsible for collection and analysis of the data, the frequency of publication of the fire statistics and the language with which it is issued, the years covered in the datasets and the applications of the fire statistics.

In general, the fire statistics are usually published in the language of the country. In a few countries, some data are presented in English, such as for Croatia, Netherlands and Russia where information is available in both the local language and English, while in Italy, the annual report of the fire brigade interventions was translated into English in 2017. All the information obtained during Task 0 is summarized from Table 4 to Table 10 at the end of this section and based on them, the data elaboration has been developed. As seen in Figure 18, the issuing bodies are usually the Fire and Rescue Service or Civil Protection and the Ministry of Interior or Government in the EU Member States considering the 38% of cases for both classes. In Non-EU countries, fire statistics are usually published by Fire and Rescue Service (50%), Ministry of Interior (38%) and Statistics centres (less than 14%). In the International countries, in 75% of cases, fire statistics are issued by Fire and Rescue Service and 35% by Statistics centres.

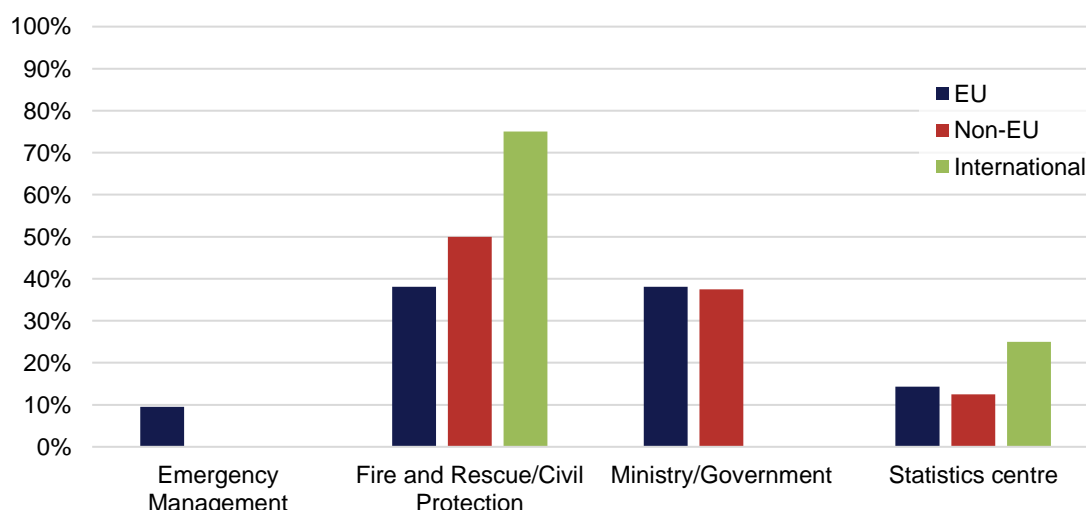
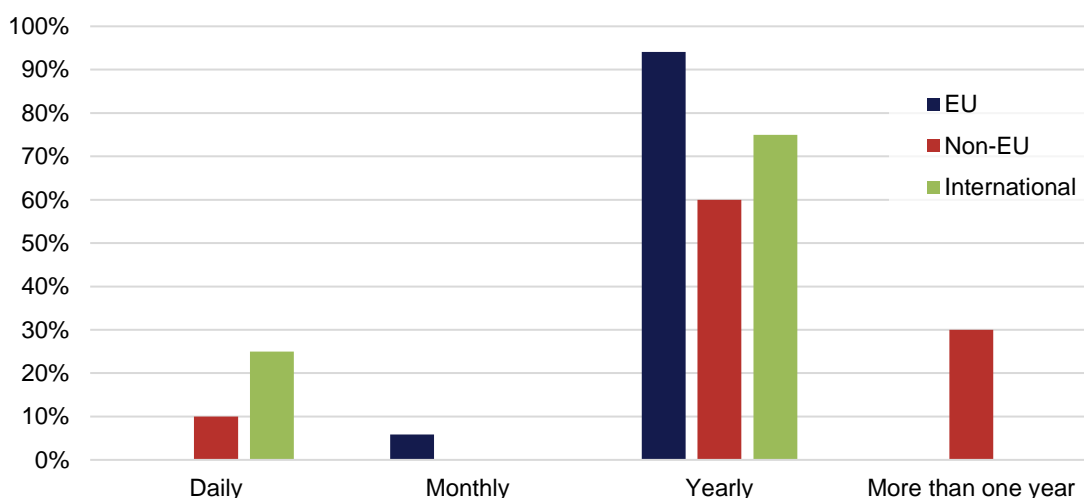


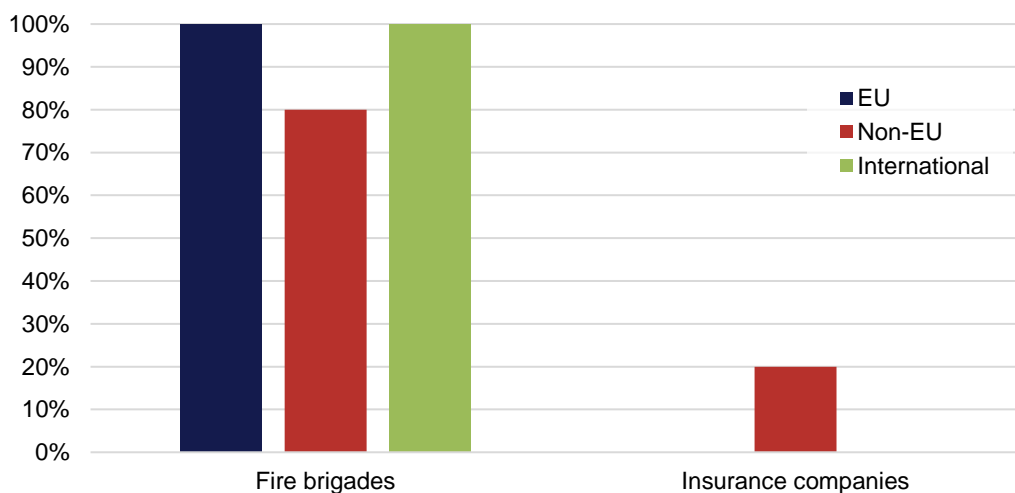
Figure 18: Issuing bodies of fire statistics in EU, Non-EU and International countries

The available datasets for fire incidents affecting buildings are usually dated from 2000 to the current or previous year if the latest publications are referred to the previous calendar year. Despite the large availability of datasets from 2000 to 2019, some countries such as Germany, Hungary and Switzerland have data going back to 1990, while Sweden has data from 1996 onwards and Slovenia from 1985 onwards. However, despite the years covered, usually, the fire statistics are predominantly released yearly in EU (94%), Non-EU (60%) and International countries (75%), as shown in Figure 19. In New Zealand, the Fire and Emergency service publishes on their website all the incidents attended in the previous 7 days and Norway at least every 14 days. The only EU Member State monthly releasing its fire statistics is Croatia. Finally, Switzerland publishes its data yearly and special reports every 10 years and Turkey every 5 years. However, the latter did not publish any national data since 2004.



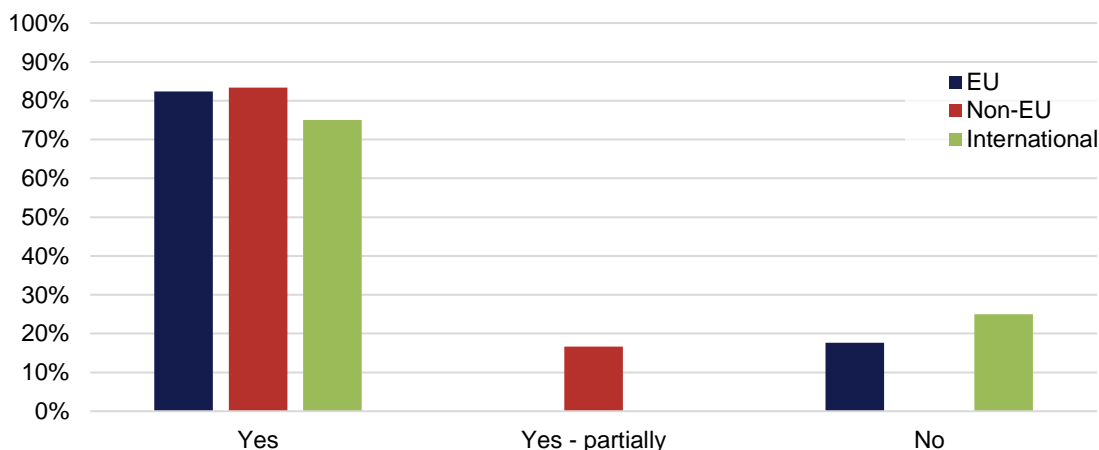
**Figure 19: Publication frequency for fire statistics in EU, Non-EU and International countries**

The fire statistics are almost exclusively collected by the fire brigade attending the fire scene in the aftermath of a fire incident in a building, as presented in Figure 20. The information is usually inserted in a recording system by the fire brigade attending the scene. The quality assurance phase significantly varies in the various countries examined. Potential errors or inconsistencies in the datasets can be reviewed and removed by senior fire brigade officers or authorities publishing the data or developing the analysis. This aspect will be further investigated in Task 1 of this project. There are some countries, for example Switzerland, in which data are provided by insurance companies. It is also worth mentioning that the fire investigation could be developed immediately after the fire incident or within a fixed period of investigation and developed by fire brigades, insurance companies or an investigation team of experts.



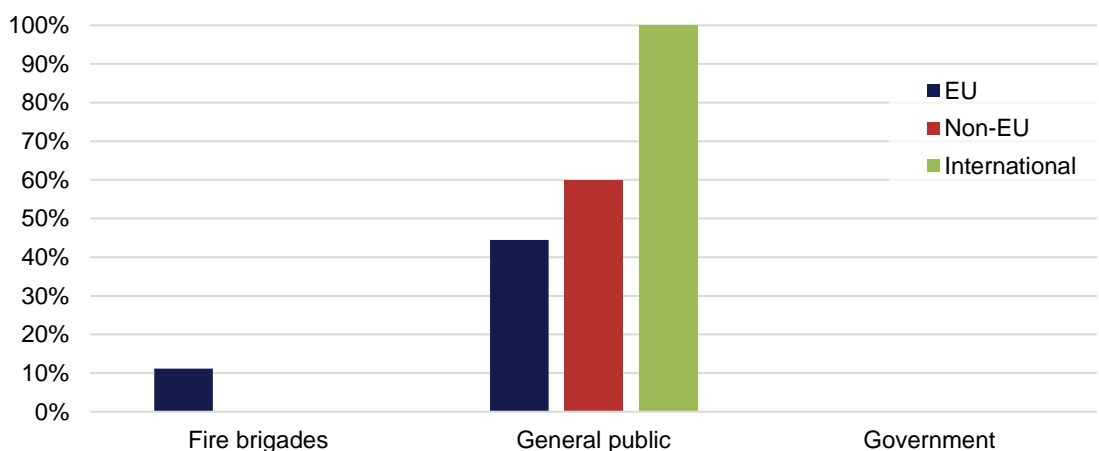
**Figure 20: Data origin for fire statistics in EU, Non-EU and International countries**

The definitions of the various fields collected in the fire statistics are available for more than 70% of the countries investigated herein. However, the data presented in Figure 21 need to be treated with a degree of uncertainty due to the fact that in several countries the definitions are not publicly available or only providing input for specific variables present during the fire incident. Therefore, this aspect will be further discussed and examined by Task 1 where the relevant authorities responsible for the fire statistics will be directly contacted and asked to provide specific definitions for 10 major areas of investigations including fire incident, fire response, fire consequence, fire safety measures, fatalities, casualties and direct and indirect financial costs deriving from fire.



**Figure 21: Availability of definitions for fire statistics in EU, Non-EU and International countries**

The datasets can have various applications. For example, they can inform only the fire services and governments or can be widely used by private or public users. In Figure 22 the class named 'General' represents data used by fire departments to evaluate their performance and optimize their fire safety strategies, governments for decision making regarding fire safety in various building types, industries for the development of specific products or to improve their impact or continuity plans, and public and private users including the international fire safety community. As shown in Figure 22, the data applied in the abovementioned class are given by 44%, 60% and 100% in EU, Non-EU and International countries, respectively. It is also important to highlight that the complete datasets of fire statistics are not always available and often only partially released to the public while fire brigades and governments can have access to extended information.



**Figure 22: Usage of the fire statistics in EU, Non-EU and International countries**

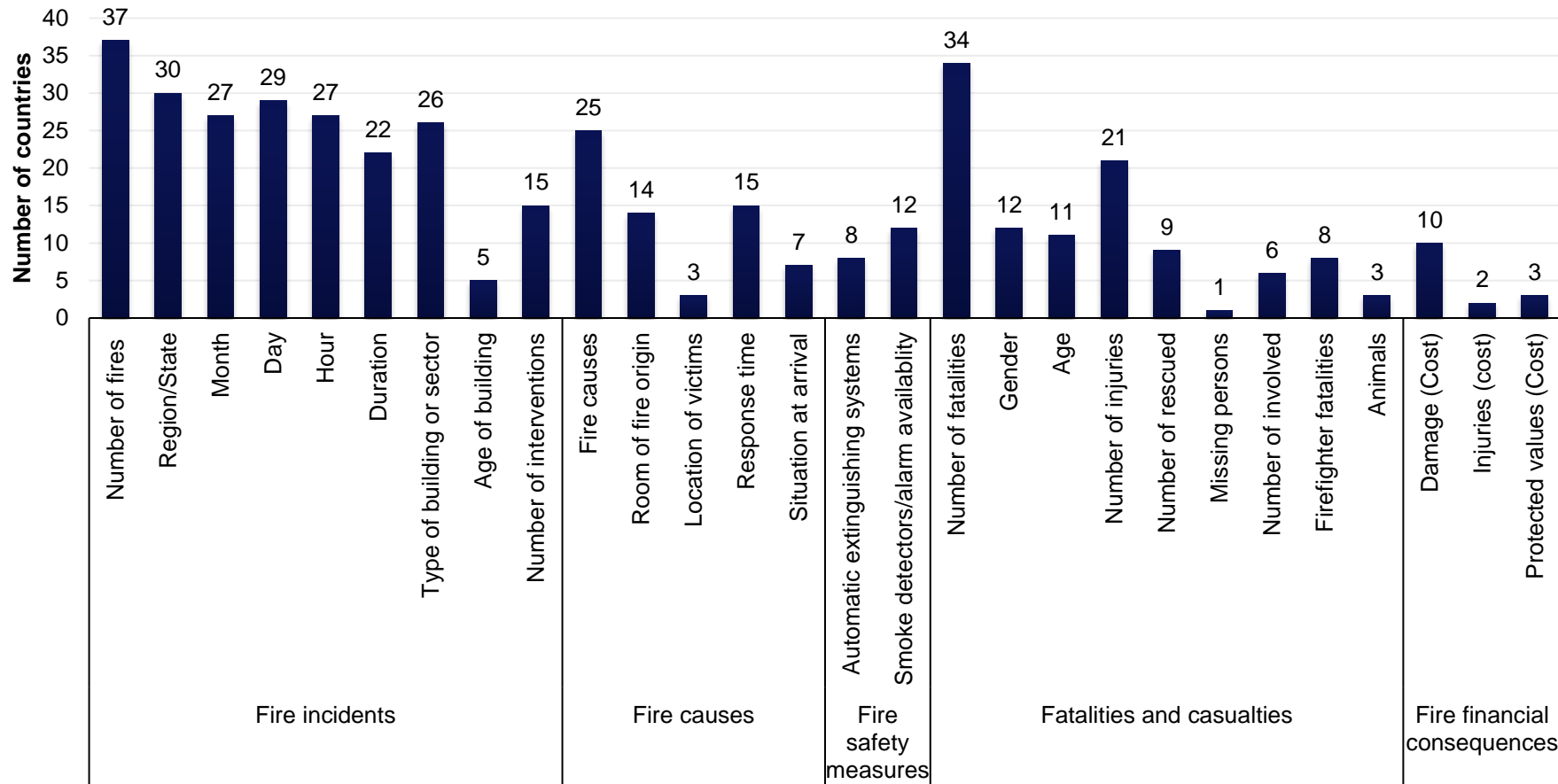
Figure 23 presents an overview of the fire safety fields included in the fire statistics. It appears that the fields related to the description of the fire incident, such as location, time, date and property type, are those collected by the majority of the countries examined, followed by the fire causes, room of origin, the situation at arrival and response time of the fire brigade. The number of fatalities, casualties are often present in the fire statistics

with the description of the people affected by the fire incident. For the fire safety measures, detectors and smoke alarms are recorded more often than automatic extinguishing systems, while the financial cost of the fire is usually evaluated by the cost of the damage caused by the fire event and seldom by the cost of injuries and protected values. The fields recorded in the fire statistics will also be examined in-depth in the summary tables created in Task 1, which will also consider fire consequences in terms of property and type of damage, direct and indirect financial loss, fire response of occupants and an extended number of different fire safety measures.

Finally, “near misses” is an important aspect to consider when attempting to identify common fire safety problems and these may not necessarily be included in official figures. “Near misses” are fire incidents that did not turn into big fires and were extinguished before firefighter arrival or there is no subsequent call to the fire service, therefore will not be included in the national figures but could point the way to go for much more effective fire safety solutions. These could be cooking incidents or fires started by electrics or cigarettes. There are few local initiatives that collect and analyse the “near misses”, such as in [Higher Education Departments in Wales](#).

Collecting data on “near misses” would represent a useful field of investigation for the evaluation of the physical and societal hazards and causes of fire. It would also support the creation of preventive measures and campaigns. Despite the valuable contribution that such analysis could determine, the current project has the goal to provide a clear understanding of the fire statistics related to buildings subjected to fire incidents. Related to fire incidents, the collection of “near misses” implies a detailed and challenging evaluation, as these are never reported to the fire department and hence are never entered into an official data system. To get this type of information, every household in Europe would be required to record the information and submit it to a relevant agency or online through a dedicated platform. Alternatively, it could be accomplished as a sample survey every few years to see how many “near misses” occur. This is outside the scope of this project, but that we highly encourage pursuing it at European and National levels.

**Task 0  
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**Figure 23: Fields covered by the fire statistics of EU, Non-EU and International countries**

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**Table 4: Task 0 Overview table EU Countries 1/4**

EU Countries	Language	Issuing body	Type of data collected	Years covered	Publication frequency	Definitions	Data origin	Collection methodology	Data usage
Austria	German	Sicherheitsinformationszentrum m SlZ / Brandverhütungsstelle für Oberösterreich BVS / fire brigades	No systematic fire data	2008-2019	yearly	Yes, partly	Fire brigades, insurers, fire prevention associations		Ministry, fire brigades, others
Belgium	Dutch	Home Affairs (Federal Government Service)	Fatalities and injured, date, response time, intervention characteristics, object of fire, building and human characteristics	2014-2015	Unknown	Yes			
Bulgaria	Bulgarian	Ministry of the Interior - Directorate-General "fire safety and protection of the population" statistical and graphic information about the activities of gdpbzn - mbp	Number of accidents and fire and rescue equipment from 2015 to 2019. Fires with material losses, distributed by reasons of occurrence. Fires with material losses, distributed by industries. Statistics on fires, deaths and injuries.	2015-2019	Yearly				
Croatia	Croatian and English	Ministry of the Interior	Fire and explosions, killed, seriously injured, slightly injured, material damage (in local currency - Kn)	2000-present	Monthly				
Czech Republic	Czech	Ministry of the Interior – General Directorate of the Fire and Rescue Service of the CR	Total fires, Number of fires per 1,000 people, Cause, type of activity, Direct damage in thousands of CZK, Protected values in thousands of CZK, Killed persons, Injured persons	2010-present	Yearly (N-1)	Yes	National Fire Service of Czech Republic		
Denmark	Danish	DEMA (Danish Emergency Management Agency)	Fatalities and injured, type of municipality, dates, response time, intervention characteristics, cause/room of fire, building and human characteristics, smoke detectors	2011-present	Yearly	Yes	Fire brigades, DEMA	Fire brigade giving input to a database	Used to assess the fire brigade
Estonia	Estonian	Siseministeerium	Fatalities and injured, type of municipality, dates, response time, intervention characteristics, cause/room of fire, building and human characteristics, smoke detectors	2013-2017		Yes			
Finland	Finnish	Finnish Rescue Services	Fatalities and injured, date of reporting, response time, intervention characteristics, cause/object/room of fire, building and human characteristics, smoke detectors	2010-2016 in different forms		Yes	Data on emergency calls		
France	French	Ministry of Interior	Number of fire interventions, fire deaths, fire injuries, number of people involved for different types of buildings, firefighter fatalities	2002-2018	Yearly (N-2)	No	Fire departments	Data extrapolated for counties that did not collect data or partial data.	
Germany	German	Countries Ministries of Interior, DFV	fire interventions, fire deaths, technical and medical help, equipment used, size of fire, fire injuries firefighter fatalities	1990-2017	Yearly (N-3)	No	Fire departments	operation reports,	Fire departments

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**Table 5: Task 0 Overview table EU Countries 2/4**

EU Countries	Language	Issuing body	Type of data collected	Years covered	Publication frequency	Definitions	Data origin	Collection methodology	Data usage
Greece	Greek	Hellenic Fire Corps	Type of incident (fire, assistance, etc), start time – ending time, duration of the incident, kind – type of staff participating in (staff of Hellenic Fire Service, military, volunteers, staff of foreign Fire Services e.g. earthquakes - Athens since 1999, etc.), vehicles, air means, kind of forest area - land (e.g. forest, marsh, agricultural area, etc.), injured persons (personnel, citizens)	2000-present	Yearly		Fire departments, - General Secretariat for Civil Protection - Forest Offices per region - National Observatory of Athens	The Hellenic Fire Corps collects all information. Besides, General Secretariat for Civil Protection and Forest Offices per region collect specific information, which is required by their sections.	
Hungary	Hungarian	National Directorate General for Disaster Management (NDGDM) - not publicly available	Number of fires, Number of victims (deaths, injured, rescued persons, missing persons), Fire causes, Fires by fire objects (buildings types, sectors of industry, etc.)	1990-2019	Yearly	There's a guide how to provide data from incidents	Local fire brigades		
Ireland	English and Gaelic	Department of Housing, Planning and Local Government	Fire service, fire prevention, fire brigade activities, location of fire, causes of fires, fatalities from fires	Fire service from 2013 to 2015 (data also from 1996); fire prevention-causes of fires-fatalities from fires from 2000 to 2018; fire brigade activities from 2000 to 2017; location of fires from 2000 to 2016	Yearly	No	Fire authorities	Every year the Department produces statistics about fire and other emergency calls dealt with by local authority fire brigades during that year. We also produce the fire death statistics for the year. The statistics are based on information supplied by fire authorities	Fire departments, governments, industries, public and private use
Italy	Italian	Corpo Nazionale Vigili del Fuoco (C.N.VV.F)	Fire incidents, location, causes, material ignited, response time, property type	Data from 200 to 2018	Yearly	Yes	Fire departments	STAT-RI - STATistica e Rapporto di Intervento.	Fire departments, governments, industries, public and private use
Latvia	Latvian	State Fire and Rescue Service - Valsts ugunsdzēsības un glābšanas dienests	Cause of fire, Number of fire, fires Victims, Destroyed buildings	2013-2019			Fire departments		



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**Table 6: Task 0 Overview table EU Countries 3/4**

EU Countries	Language	Issuing body	Type of data collected	Years covered	Publication frequency	Definitions	Data origin	Collection methodology	Data usage
Lithuania	Lithuanian	Fire and Rescue Department under the Ministry of the Interior analysis of fire and rescue statistics	Deaths in fires Number of fires and deaths by location Statistics of children killed and injured in fires Causes and places of deaths of people Distribution of deaths in fires by age and sex Number of fires and their dynamics Main causes of fires Number of people rescued in fires Use of respiratory protection equipment Performance of fires Rescue operations	2014-2019	Yearly		Fire departments		
Netherlands	Dutch	Fire Service Academy (IFV)	Fatal residential fire, cause, smoke alarms, materials, response time, location, rooms, characteristics of building/property/victim/fire and fire service actions. Report from 2016 regarding fatal fires is in English.	Data from 2008 till now	Yearly report, dashboard every quarter	Yes	Fire brigades of the 25 safety regions	Survey data from questionnaire sent to fire brigades, data quality check by researcher, nearly 100% response	Fire departments, government researchers, public reports from IFV, media, policy and educational
	English	Central Bureau of Statistics (CBS)	Fire and non-fire incidents	2016 till now	Access to public database	Yes	Fire brigades of the 25 safety regions	Extraction from emergency registration, not checked	Public
	English/Dutch	Central Bureau of Statistics (CBS)	Fire and non-fire incidents, number of alarms, response time, damage by fire, fires by cause and object, indoor (and chimney) fires, outdoor fires, victims, fire equipment, costs	From 1985-2013	Yearly + access to public database	Yes	Fire brigades of the 25 safety regions	Survey data. Data extrapolated for counties that did not collect data or partial data.	Fire departments, government and public
Poland	Polish	This information is found in literature	Fatalities, cause of fire and death, room of fire and victim, age, gender, building type, accidental fires	2003-2011		Yes			
Slovenia	Slovenian	Firefighter's Association of Slovenia	Fatalities, number of injured people, date of intervention, response time of firefighters, building type, cause of the fire, rough estimation of material damage, size of the fire, technical and medical assistance, used equipment for intervention, number of fire brigades required for intervention.	1985-present	Yearly	Yes	Fire brigades are entering the data within the information system that is defined by the government.	Fire brigades are entering the data within the information system that is defined by the government.	Partially available to the public, however, some information is only accessible to the professional audience.

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**Table 7: Overview table EU Countries 4/4**

EU Countries	Language	Issuing body	Type of data collected	Years covered	Publication frequency	Definitions	Data origin	Collection methodology	Data usage
Spain	Spanish	Fundación MAPFRE and Asociacion Profesional de Tecnicos de Bomberos	Number of interventions due to fires and explosions; number of fire and explosion victims. Distribution of fatalities by: Age, Gender, Month, Day, Hour, Region, Type of building	2007-present	Yearly (N-1)	Yes	Fire departments	Working groups within fire departments, then ratification of all input then verification with Institutes of Legal Medicine	
Sweden	Swedish	Swedish Civil Contingencies Agency (MSB)	Fire incidents, location, causes, material ignited, response time, property type and much more	Database from 1996, statistics published in web portal <a href="https://ida.msb.se">https://ida.msb.se</a> from 1998.	Yearly and continuously	Yes	Fire Departments	National data checked and quality controlled by MSB experts	Fire departments, governments, industries, public, private use and researchers

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**Table 8: Overview table Non-EU Countries 1/2**

Non-EU Countries	Language	Issuing body	Type of data collected	Years covered	Publication frequency	Definitions	Data origin	Collection methodology	Data usage
Norway	Norwegian	DSB (The Norwegian Directorate for Civil Protection)	Fire and non-fire incidents, number of alarms, response time, damage by fire, fires by cause and object, indoor (and chimney) fires, outdoor fires, victims, etc.	Data from 2016 - present	70% registered automatically - 30% manual work, but published at least every 14 days	Unknown	Fire departments	BRIS	Fire departments, governments, industries, public and private use
Russia	Russian and English	State (federal) fire service EMERCOM of Russia	100 parameters	<2008 - present	yearly	Yes	Fire departments	Harmonised across the country	
Switzerland	French/German	the Association of Cantonal Insurance Institutions - Kantonale Gebäudeversicherung / Interkantonaler Rückversicherungsverband IRV	Number of fire incidents by day, months, and type of cases, and damage. Gender of fire deaths. Evolution of fire damage rates and the share of damaged buildings in CHF or in %.	1990-present	Yearly and every 10 years	Yes, building type only	Insurances	Data is recorded on site by the damage estimators and communicated to the PIRE claims service. They are entered and managed electronically by the PIREs and transmitted once a year to the APIRE in a standardized format for the preparation of the "Statistics of APIRE damage". Data is from 19 of the 26 cantons covering around 80% of Swiss buildings.	For insurances, Government, public and private use
	French/German		Unknown	Unknown	Yearly	Unknown	Fire departments		Fire departments
Turkey	Turkish	Istanbul Metropolitan Municipality	Fire incident types, structural/non-structural fire types, building/property types and usage areas, response times, causes of fire.	Data from 2008 to 2018	Every 5 years	Yes	Istanbul fire departments		Fire departments, governments, industries, public, private use and researchers
		Turkish Civil Defence - Not available anymore	Types of fire, Number of fires, Loss of life (public, personnel, animal), real injury (in TL), cause of fire	1990-2004	Every 5 years	Unknown	Fire departments		

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**Table 9: Overview table Non-EU Countries 2/2**

Non-EU Countries	Language	Issuing body	Type of data collected	Years covered	Publication frequency	Definitions	Data origin	Collection methodology	Data usage
UK - England	English	Home Office	fire incidents, causes, consequences, fatalities/casualties, response time, alarms and automatic extinguishing systems	Most updated datasets from 2010/11 to 2019/20	Yearly	Yes	Fire departments	Incident recording system (IRS). The Home Office filters the data removing potential errors and inconsistencies before publishing the datasets.	Fire departments, governments, industries, public and private use
UK - Northern Ireland		Northern Ireland Fire and Rescue Service	No publicly available datasets		Yearly		Fire departments		
UK - Scotland		Scottish Fire and Rescue Service	Incident type, property type, fatalities and casualties, fire stations and workforce	Data from 2009 to 2019	Yearly	Yes	Fire departments	Incident recording system (IRS). The Home Office manages the IRS, though SFRS has access to the Scottish data.	Fire departments, governments, industries, public and private use
UK - Wales		Welsh Government	Fire incident, location, cause, motive, casualties, response time, smoke alarms	Data from 2015 to 2019	Yearly (April-March)	Yes	Welsh Fire and Rescue Services collect data. Welsh Government publishes the datasets	The Welsh Government compiles the statistics in this bulletin from reports submitted by FRAs to the Home Office.	Fire departments, governments, industries, public and private use

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**Table 10: Overview table for international countries**

International Countries	Language	Issuing body	Type of data collected	Years covered	Publication frequency	Definitions	Data origin	Collection methodology	Data usage
Australia - Queensland	English	Queensland Fire and Emergency Service	Fire incident, fire causes, attendance time of fire brigades, type of building	from 2016 to 2019	Yearly	Yes	Queensland Fire and Emergency Service	Information gathered by fire service	Fire departments, governments, industries, public and private use
Canada	English	Statistics Canada	Fire incidents, property type and casualty are available. The other fields are not publicly available.	Data from 2005 to 2014	Yearly	Yes	The data were collected by the Canadian Centre for Justice Statistics (CCJS) in collaboration with provincial/territorial Fire Marshals and Fire Commissioners Offices across Canada.	National Fire Information Database	Fire departments, governments, industries, public and private use
New Zealand	English	Fire and Emergency New Zealand	Fire incident, location, duration	Last 7 days. A full incident report can be provided on request under the Official Information Act	Every day	No	Fire departments	Fire Awareness & Intervention Programme (FAIP) Survey Data	Fire departments, governments, industries, public and private use
USA	English	US Fire Administration, NFPA	Fire incidents, causes, associated losses and injuries by type of property; firefighter deaths and injuries	1977-present	yearly for previous calendar year	Yes	Fire departments	incident reporting from fire departments; stratified random sampling of fire departments for fires, losses, injuries; census of firefighter deaths	Fire departments, governments, general public, industries

## **8. TERMINOLOGY ISSUES**

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### **8.1. DIFFERENCES WITHIN THE SAME COUNTRY**

Most fire services in the investigated countries centralise their data into one unique database. That is the case for at least Bulgaria, Croatia, Czech Republic, Denmark, France, Greece, Hungary, Italy, Luxembourg, Norway, Poland, Romania, Russia, Slovakia and Spain. However, in France, Spain and other countries, due to the lack of official definitions and national fire statistical collection, it is possible that differences exist in the terminology adopted by the various fire departments when the data are gathered after attending fire incidents. More details are provided in the diagnostic sheets (see annexe I for each country).

Other investigated countries display differences with respect to how data is collected and maintained, which data elements are collected, and how variables are coded in different regions, states or even within a state. Those are Australia, Austria, Canada, Germany and the Netherlands.

Regarding the Netherlands, the regional registration methods have also changed for a number of regions between 2013 and 2014. This has had a particular impact on the 2013 figures for some regions.

In Sweden, since different fire services report to Swedish Civil Contingencies agency (MSB) there will be some differences. However, MSB has developed documentation and an online education to support individual fire and rescue services and reporters in the reporting [41]. Prior to 2018 there were three systems (Alamos, Core or Daedalus) used by the fire and rescue services when reporting incidents. Nowadays all fire and rescue services in Sweden report their incidents into the same system.

In the UK, fire safety data are separate for England, Northern Ireland, Scotland and Wales. English statistics appears to provide the highest number of fields publicly available after a fire incident while Scottish fire statistics do not have data on the quantification of damage and presence of alarms or automatic extinguishing systems. Welsh fire statistics have additional fire safety data also on fire causes and motive and only on smoke alarms. Finally, Northern Ireland Fire and Rescue Service statistics do not use the Incident Recording System (IRS) and do not publish comparable statistics.

In the USA, Incident reports and data elements are standardized and can be found online [42] and will be presented in Task 1. However completeness of data entered into incident reports may vary by locality, creating differences in interpretation. For example, "Burnt food" may be considered a fire, excessive heat, a smoke scare, or a false alarm.

Similarly, many non-fatal civilian injuries are not captured by the fire service [43]. It is estimated that in the USA 21,174 of 48,202 civilian non-arson fire injuries resulted from residential or consumer-product fires attended by fire departments from July 1, 2002 to June 30, 2003. NFPA estimated totals of 18,425 civilian injuries in 2002, and 18,125 in 2003, including injuries caused by arson. This means that some of the injured may have left the scene before the fire department arrived or been transported by a non-fire department organization.

Last but not least, in Switzerland, in addition to the Fire service database, the Public Insurance Companies for Real Estate (PIRE) collect fire data using a specific codification. Data are then gathered by the insurance association (APIRE) who analyses said data. The latter collects data from 19 out of 26 Cantons; this covers 80% of the country's buildings. Private insurances that cover buildings in the other seven cantons do not use this code.

## 8.2. DIFFERENCES AND CONTRADICTIONS WITH OTHER DOMAINS

### 8.2.1. General observations

In general, there are four main sources of fire databases in most countries, those are originated from fire services, medical field, insurance and police departments.

Regarding the fire service data, in some countries like France, Germany and Norway, due to the current lack of official definitions of terms and expressions for fire statistics, it is most likely that differences and contradictions with the aforementioned domains exist. While in other countries such as Germany and Sweden, it is clear that the fire service, police and insurers organise their data very differently, hence an overall picture cannot be built. Particularly, classifications in fire statistics from insurance companies do not correspond to those used by the fire and rescue services. For example, one fire incident according to the fire services could result in multiple fire claims from the insurance.

Finally, there are discrepancies between fire service data and the medical data, which is usually based on ICD-10 coding of death certificates, detailed in the next section (8.2.2).

### 8.2.2. Medical field

The World Health Organization's (WHO) 10th Edition of the International Classification of Disease (ICD) is used by health care systems and coroners for medical records, billing, and death certificates. ICD is a global classification system and tool for different diagnoses. The primary purpose of ICD is to enable classification and statistical description of diseases and other health problems that result in human death or contact with the health care system in a country. In addition to traditional diagnoses, the classification includes a wide range of symptoms, abnormal findings, ailments and social conditions.

The ICD system was first launched in the late 1800s and the World Health Organization (WHO) has been responsible for the maintenance of the system since 1948. The current version of ICD is ICD-10; however, according to the WHO [44], the 11<sup>th</sup> edition (ICD-11) was adopted by the World Health Assembly in May 2019 and is scheduled to come into effect on January 1, 2022.

The coding for lethality due to exposure to smoke, fire and flames is included in Chapter 20 in the 2016 edition of ICD-10 [45] and is expressed with the codes X00-X09 (see Table 11). External causes of injury codes on death certificates can be used to obtain fire death data. Separate categorizations are used for unintentional, intentional self-harm, assault, and undetermined intent. It is important to separate this coding from the section X10-X19 which is related to contact with heat and hot substances that are not related to smoke, fire and flames. It is also important to note that Chapter 20 in ICD-10 is intended to be used as secondary to a code from another chapter, indicating the nature of the condition. Most often, the condition will be classifiable to according to Chapter 19, "Injury, poisoning and certain other consequences of external causes" [46].

**Table 11: Sub-sections for lethality due to exposure to smoke, fire and flames in ICD-10.**

<b>Code</b>	<b>Description</b>
X00	Exposure to uncontrolled fire in building or structure
X01	Exposure to uncontrolled fire, not in building or structure
X02	Exposure to controlled fire in building or structure
X03	Exposure to controlled fire, not in building or structure
X04	Exposure to ignition of highly flammable material
X05	Exposure to ignition or melting of nightwear
X06	Exposure to ignition or melting of other clothing and apparel
X08	Exposure to other specified smoke, fire and flames
X09	Exposure to unspecified smoke, fire and flames
	<b>Subsection for other intents</b>
X76	Intentional self-harm by smoke, fire, and flames
X97	Assault by smoke, fire, and flames
Y26	Exposure to smoke, fire, and flames, undetermined intent

Except for X01 and X03, it is not easy to separate building fires from non-building fires, since X04-X09 do not distinguish if the exposure occurs indoors or outdoors. An additional code addresses wartime fires. Y36.3, "War operations involving fires, conflagrations and hot substances."

Codes for different methods of terrorism were added to ICD-10 after the attacks in the US on September 11, 2001. The fire-related code is U01.3 "Terrorism involving fires, conflagration, and hot substances."

Codes T20-32 "Burns and corrosions" identify burns on different parts or percentages of the body. Code T58 "Toxic effect of carbon monoxide" and T59- "Toxic effect of other gases, fumes, and vapors" may be combined with external cause of injury codes indicating fire to obtain the share of fires with deaths from burns only, smoke inhalation only, or both.

In the USA, the Centers for Disease Control and Prevention (CDC) [47] have two query tools that access fatal injury data. WISQARS™ — Web-based Injury Statistics Query and Reporting System [48] is the simpler of the two. Users may select intent, and fire and burn injuries, fire injuries only, or residential fatal injuries. Although not shown on the query page, residential includes unintentional only. CDC's Wonder [49] is harder to use but allows more flexibility. Users may select multiple causes of death such as fire, with burns and or smoke inhalation.

The CDC provides additional information about what should be included in this category [50]:

- Asphyxia – originating from fire caused directly by a fire-producing device or indirectly by any conventional weapon
- Burns – originating from fire caused directly by a fire-producing device or indirectly by any conventional weapon
- Other injury – originating from fire caused directly by a fire-producing device or indirectly by any conventional weapon
- Petrol bomb
- Collapse of – burning building or structure
- Fall from – burning building or structure
- Hit by object – burning building or structure
- Falling from – burning building or structure
- Jump from – burning building or structure
- Conflagration
- Fire – of fittings or furniture
- Melting – of fittings or furniture
- Smouldering – of fittings or furniture

In a Swedish study [51], three different sources of information on fire fatalities were compared, and one of these sources, the cause of death register, uses the ICD-10 coding system. The study showed that the cause of death registry underestimates the number of fire fatalities by about 25%, and the authors argue that none of the single sources are sufficient to assess how many people actually die in fires.

Since the introduction of the ICD system, classifications have been changed several times and this needs to be accounted for when comparing data over longer periods. Jonson et al. [52] have used the ICD data for Sweden to conduct this type of study of temporal trends. The codes for unintentional fire fatalities from ICD-6 to ICD-10 are presented in Table 12.

**Table 12: Codes for unintentional fire fatalities in ICD-6 to ICD-10**

<b>Years</b>	<b>ICD-version</b>	<b>Codes for unintentional fire fatalities</b>
1952-1957	ICD-6	E916
1958-1968	ICD-7	E916
1969-1986	ICD-8	E890-E899
1986-1997	ICD-9	E890-E899
1997-present	ICD-10	X00-X09



Finally, there are discrepancies between fire service data and the ICD-10 coding of death certificates. For instance, NFPA counted the fatalities in the World Trade Center and Pentagon attacks as fire deaths, while the death certificates called them terrorism. It can also be unclear to determine when vehicle fire deaths should be counted as transportation events rather than fires in the ICD-10 codes. There are other cases where ICD-10 codes do not show if they are due to fire or not, such as defenestration, suicide and collapses or collisions by a falling object.

While ICD codes have their issues and limitations, they are widely used and usually managed by national statistic institutes. A way to determine the reliability of fire service data is to conform said data with those of ICD.

## 9. COLLECTION ISSUES

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### 9.1. WHO IS RESPONSIBLE FOR COLLECTION OF FIRE STATISTICS?

Fire departments are responsible for entering data with key details from the incidents for which they are dispatched, which in some countries include not only fires, but also emergency medical services, severe weather and natural disasters, and other incidents. Reports are filed for incidents and, if applicable, casualties (fatal and non-fatal). Firefighter casualties and civilian casualties generally utilize separate reports. Fire departments are in most cases composed of civilian professional firefighters and civilian volunteer firefighters. In some cases, military professional firefighter units can be responsible for cities or areas (e.g. Paris and Marseille).

Volunteer, professional, military and mix usually participate in filling the fire response reports. In particular, they are filled and signed by the firefighter in charge of the operation. The information is then collected by the fire department then is sent to the regional or national body (e.g. Ministry of interior), where all data are compiled. Since data is collected at local levels - which vary by resources, staffing, and leadership – there are substantial opportunities for disparities between jurisdictions related to the completeness and accuracy of data. Moreover, different fire departments provide different levels of quality control. For instance, in the Netherlands, fire investigators report for deadly fires and the report is then reviewed, whereas, other fires are reported by firefighters. It is certain that the difference in the level of training for reporting will result in different data quality. That does not mean that firefighters need more training, but that as the main goal of firefighters is to rescue, tackle fires and other activities, they will have less time to spend on filling sheets during their shifts.

Another striking example is for Austria where, the Austrian Fire Prevention Associations collect data from the police stations and insurers for each federal state and publish them yearly.

### 9.2. MISSING DATA, ISSUES AND LIMITATIONS

Missing data is a serious issue which compromises the quality and completeness of fire incident data. In the United States, the National Fire Protection Association (NFPA) employs a “national estimates approach” to correct for data that goes unreported in data collected by the National Fire Incident Reporting System (NFIRS), the national database of fire incidents sponsored by the United States Fire Administration (USFA). No other countries appear to employ a methodology for dealing with missing data, although some countries do acknowledge that missing data is a potential problem that compromises data quality.

Several issues were identified in the current data reporting systems and publications; those are presented for each country listed below. Not all countries have been included in this list due to a lack of information for certain countries.

#### EU Member States

##### Austria

- It is difficult to get an overall picture as data is collected differently in separate regions.

##### Bulgaria

- There is a lack of definitions for collected terms, statistics fields, as well as a lack of training for the firefighters in charge of the fire response report.
- The database from the fire brigade does not take into account the fire casualties occurring at the hospital or during their transportation to the hospital by emergency medical services (EMS).

##### Denmark

- Lack of training for the firefighters on how to fill information in the fire response report.
- The police are responsible for the fire investigation and there is no feedback-loop into the database from their investigation.
- The database from the fire departments is not taking into account the fire casualties, which are not reported or are reported in a separate database.

##### France

- The lack of definitions for fields collected and expressions.

- The lack of methodology to fill the gaps where information is missing.
- The lack of training for the firefighters in charge of the fire response report.
- The database from the fire departments does not take into account the fire casualties occurring at the hospital or during their transportation to the hospital by EMS

#### **Germany**

- No uniform fire statistic has been enforced in Germany. Hence, disparity between the practices in different regions makes it difficult to obtain an overview of the country's statistics.
- All fire service interventions and statistics are obtained with different criteria in Germany. Due to this situation, there is a lack of statistical information on extensive fire service interventions and reasonable statistical findings on fire service intervention, on the fire phenomenon and on the effectiveness of fire protection measures.
- Much detailed information (building / first burning item / smoke detector us etc.) is missing.
- The link between fire causes and fire consequences is missing.
- The link between the different sources of data is missing. For instance, it is not possible to link data from insurer, police or fire service to gain information.

#### **Hungary**

- Data is not publicly accessible, hence difficult to assess its quality and limitations.

#### **Italy**

- Limitations are given by the limited fields recorded in terms of pre- and post-fire conditions of buildings subjected by fire incidents.

#### **Luxemburg**

- The fire services use two main databases: One database with all the operational information from the coordination center and one database with the reports of the incident commanders. Both databases are not linked yet, so the full data cannot be compared and analyzed automatically. To get all the information, the data has to be combined manually.

#### **Netherlands**

- Only a limited number of incidents are extensively registered.

#### **Norway**

- The lack of definitions for fields
- Most data is missing in the official reports. For instance, police only report about 25-30% of the fires and insurance, who investigate most fires, do not report to the DSB (The Norwegian Directorate for Civil Protection).

#### **Romania**

- Data is not publicly accessible, hence difficult to assess its quality and limitations.

#### **Spain**

- There are no official statistics since 1994 due to lack of funding. Currently in Spain, the only available data covers only fires with fatalities and is funded by a private initiative (insurance). Fire investigation results are excluded from the database, which means that in many fire reports, there is not enough information to include the cause of fire or the reason for the fire deaths, which are determined later.

#### **Sweden**

Regarding data published by the Swedish Civil Contingencies agency (MSB):

- There have been issues with missing data when different systems (Alamos, Core or Daedalos) were used at different fire and rescue services. There have previously been some double counting of incidents when several fire and rescue services from different municipalities/regions are involved. This has been corrected in the yearly quality control done by MSB. The routines at joint incidents have been improved in 2020 and MSB expect this to more or less eliminate problems with double counting.
- Due to incident report content revisions and changes in local routines for recording data, there is a potential to over-interpret discontinuities in some time series.

## **Other European countries**

### **England**

- Despite the review process, there are likely to be some inaccuracies in the data due to reporting or keying errors, such as misclassification or missing cases.

### **Switzerland**

Regarding data collected by public insurance companies:

- Fire deaths at the hospital or in the ambulance are not accounted.
- Some codifications are very vague, for example in the causes of fire; there is no category for fires from PV panels or from Li-ion batteries.
- Anyone can fill the inspection sheet; can be made by investigators, architects, police or firefighter.

### **Scotland**

- There may be some miscategorisation which has yet to be addressed, or is not possible to address, without access to another data source.

## **International**

### **Australia**

- It appears that a significant amount of fires is not recorded and not all Australian fire services contribute to the database.
- Not all the fields are required or need to be completed and the compulsory fields are based on the nature of the call.

### **Canada**

- A number of tables contain a relatively high proportion of unknown values. Although these counts are removed from the calculation of proportions for other categories in the table, the proportion of known values is artificially inflated.
- National database is incomplete, this is due to the fact that not all jurisdictions provide data for national consolidation and not all local fire departments provide data to the office of the fire commissioner or fire marshal.

### **USA**

- Some jurisdictions refuse to report dollar loss. Some have policies that require causal information to be reported as undetermined when fires are referred for investigation.
- To make it easier for firefighters, information about causal factors and details on fire protection are not required for six types of building fires, collectively called confined fires. These include confined cooking fires, confined chimney or flue fires, confined fuel burner or boiler fires (mostly oil burner blowbacks), confined compactor fires, confined incinerator fires, and rubbish trash fires in or on a building that did not extend to the building or other contents. Some data elements were left optional. "None" is a choice in some data elements such as factor contributing to ignition and equipment involved in ignition that can seem like an easy out. The United States Fire Administration (USFA) places a heavy reliance upon states as cooperative partners in administering the NFIRS program but much of the cost burden for NFIRS is carried by the states. No federal funding is provided to states for personnel, and USFA provides no guidelines for the staffing of state NFIRS programs. Consequently, the levels and form of staffing and the resources available to NFIRS programs varies from state to state. Funding and resource limitations can undermine support for data collection, including participation in training and access to computer and software support.
- The reliance on firefighters as primary data collectors is a recognized barrier in as much as firefighters are not trained researchers and have substantial responsibilities that can diminish attention to data collection and reporting. Liability concerns can also discourage complete reporting of information.
- Little attention has been paid to the reliability of the data. It is clear that many firefighters who are doing their best to complete the reports disagree about how the reports should be coded [53].
- With respect to the completeness and accuracy of reporting is that NFIRS codes are seen to be overly complex, resulting in frustration that can deter reporting. Because the list of code choices is so long for many data elements, many fire departments use cheat sheets (short set of notes) with the most commonly used code choices. Rarely used codes may be completely forgotten.

## **10. INTERPRETATION ISSUES**

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### **10.1. WHO IS INTERPRETING THE STATISTICS?**

Many differences exist among who is interpreting the fire statistics, depending on the purpose. First of all, how many organizations within a country are interpreting it? To which purpose?

It is notable that in smaller countries (in terms of number of buildings and population) the interpretation of the collected statistics is done by a single institute or organization. Examples of countries in which one or two organizations interpret the statistics are: the Netherlands, Switzerland, Denmark and Hungary. In Austria, The purpose is to provide data for research and scientifically reasons as well as for performance-based fire prevention measures.

For the USA, both forms of interpretation are present, due to the differences between states. States with fewer resources may rely upon a single person. Some state programs include full-time research analysts, while others rely upon administrators, information technology staff, or investigators to run their programs, often on a part-time basis. The UK (Wales, Scotland, England and Northern Ireland) has different organizations that interpret as well. Other countries that have several organisations interpreting the statistics are Sweden and Russia.

Secondly, almost all countries differ in which organization/who is interpreting the data. Organizations that have been mentioned as responsible for interpreting the statistics are: insurance associations, governmental organizations, universities, research institutes, individual municipalities (represented through the local fire and rescue service), departments of State fire service, scientific and educational organizations, ministries, General Inspectorate for Emergency Situations, Directorate for Civil Protection, the fire corps, first responders and technical experts.

A remarkable practice regarding who is interpreting the data was seen in Sweden and in Russia. Everyone can interpret it because fire statistics are presented in an open access database.

Having so many different organizations interpreting the data makes it difficult to exchange fire statistics. Not only because different organizations have different interests and objectives but also because different sorts of organizations interpret based on different languages, definitions and terminologies.

### **10.2. PURPOSE FOR WHICH DATA IS COLLECTED**

The purpose of collecting fire statistics is the same despite all the differences between countries. When comparing all the diagnostic sheets for all countries, we find that there are eleven main purposes that are important for most countries (listed in no particular order):

1. Evaluate effectiveness of emergency responses
2. Define volume of personnel and equipment
3. Help with decision making for organizations of fire rescue services
4. Justify budgets for policymakers
5. Support legislation related to fire issues
6. Fire prevention in general
7. Education to increase fire safety for civilians.
8. Identify trends relative to the severity of fire incidents
9. Assess fire risks
10. Identify the main causes of fire
11. Reduce the number of fires, victims and its damage and costs.

### **10.3. ISSUES WITH ANALYSING THE EXISTING DATA**

When discussing issues with analysing data, the most important issue mentioned is dealing with missing data. This could be due to the lack of reported cases of fire or different databases exist that do not correspond or complement each other. Different databases from insurances, police, fire service, hospitals that are not possible to link with each other makes it very difficult to gain complete information about a fire and its corresponding damage or victims. An illustrating example of this issue is when fire deaths at the hospital or in the ambulance are not accounted for. If an organization that interprets the data has only small parts of databases available and therefore lacking the whole picture of a fire incident, it is an issue to learn from fire statistics.

Unfortunately, many other issues arise when analysing data. The following are mostly mentioned.

1. Some codifications are very vague
2. Anyone can fill the incident sheet, e.g. fire investigators, police or firefighter. The answers could therefore be inconsistent while discussing the same incident.
3. Not enough data to establish the cause of the fire or the reason for the fire deaths
4. Heavy reliance upon states as cooperative partners, especially when the partners are not obligated to cooperate (for example insurance companies with additional information).
5. Double counting, breaks in time series, missing data
6. Misclassification by the data provider or analyst
7. Lack of definitions
8. Constant updates
9. Integration of data with other data of ministries

### **10.4. FOLLOW UP TO DATA COLLECTED**

Some countries use, at least to some extent, a method to follow up on the collected data. This method mostly consist on reviewing and correcting the data, ensuring the data is complete and if possible crosschecking one database with another. Giving fire services the chance to comment or reconsider data is also current practice. All countries have in common that updates are carried out regularly (often once a year), depending on the needs of the Fire Rescue Service.

## **11. CONCLUSION**

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This first task of the project is established to assemble all the knowledge of the consortium members regarding fire statistics in European countries and other non-European countries of interest. The review of the literature shows that fire data collection systems have been instrumental in reducing building fires and their associated deaths, injuries, and economic damage. The utility of information about these fires is apparent in the design of many fire safety interventions and policy initiatives. Data on fire incidents can inform firefighting strategies, building codes, educational and training programs, and technical innovations, to cite just a few applications. For example, with populations aging more than ever before, we might expect higher death rates among senior citizen, despite early fire detection. It is logical to assume that safety efforts can benefit from strategies that have worked in other places. However, there is substantial agreement in the literature that differences between fire data collection systems in different countries complicate the ability to make comparisons that could be useful in evidence-based planning and prevention efforts.

While national fire data collection systems are likely to share certain core features and to gather some fire incident data in common, there appears to be considerable variation in the type and scope of information collected, the way that data elements are defined and levels of detail they seek, as well as the types of training and resources dedicated to collection efforts. In addition, literature suggests that fire data are influenced by differences between data collection procedures and practices. Some data collection systems appear to provide opportunities to update information that may not be available at the time an incident record is first created, such as the cause of a fire or deaths that occur sometime after the incident. The amount and quality of information in different data collection systems also appear to be influenced by whether they include information from sources outside the fire service, such as insurers or medical authorities, through data linkage or other means. Literature suggests that the issue of how much information to collect is an important area for consideration in the design of fire data collection systems. Data collection systems that collect too little or wrong kind of information may not produce data that are useful, while overly detailed data collection systems may overwhelm data collectors, and thereby compromise data quality, as suggested by studies from the United States.

In many respects, the issue of how much information to collect appears to be driven by available resources, as well as the capacities of data collectors, who mainly are fire service personnel, to collect and record information. Concise data collection records will require less support and fewer resources than those that are more complex. To that end, recent literature on fire data collection in Canada emphasizes that such factors as funding, resources, personnel, and stakeholder acceptance are critical considerations in the design and sustainability of national fire data collection systems.

In general, it appears that the fire data collection systems in most countries are presumed to provide an accurate representation of their respective experiences with fire incidents. However, information gathered through the initial phase of research suggest that they may be unaware of important limitations of their data due to missing information, differences in the way terms are defined or interpreted, and other identified issues.

We identified significant issues with fire data from Australia, Bulgaria, Canada, Denmark, France, and Germany which complicate confidence in the data, particularly for their use in inter-country comparisons. Most of the issues stem from the lack of definitions for collected terms, lack of training, dispersed data, missing information and low coverage.

USA, Italy, and the Netherlands have very different systems while having each separate advantages and drawbacks. The fire data collection system in the USA has an existing terminology, includes a large number of data fields, and has vast experience in this field, but also appears to have a significant problem with missing fire incident. However, because the EU is in a comparable situation to the USA, there are many lessons from the experience of the USA that can be directly applied to the EU. Italy has adopted a quality control system to ensure the integrity of all data treated but is missing important fire data. The approach of the Netherlands has been to reduce the problems posed by uncertainties by focussing data collection efforts on fatal residential fires.

We estimate that Austria, Russia, Sweden and the UK (in particular England, Wales and Scotland) provide data with high confidence level due to the existing definitions, important covered areas and collected terms and existing quality safeguards.

For the other countries that were not mentioned, we do not have enough details to evaluate the level of confidence in their data.

It is important to note that none of the consulted reports included uncertainty estimations. However, it will be important to introduce uncertainty estimates to be able to analyse the relevance of the collected data and their trends.

Due to the lack of terminologies and precise collection methodologies and other issues identified, it is clear that current fire statistics cannot be compared from one country to another (with a few exceptions). They can only be useful to describe the global fire safety situation and trends to some extent for a group of countries, or the specific fire safety situation. To provide relevant information regarding the national fire safety situation (number of fires, fire fatalities, fire injuries, fire losses), fire statistics will have to be internationally improved through common terminology, common methodology, and common training and qualification of persons in charge of filling in the fire report, including uncertainty estimation methods. The findings of this task will be used as preliminary groundwork for all the discussions that will occur during this project and as an output for all the following tasks.



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## **ANNEX I – DIAGNOSTIC SHEET PER COUNTRY**

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The information gathered in Task 0 is the result of the collaboration of the consortium members who were able to provide the description of the fire statistics in several countries based on their previous research, experiences, and studies investigated in the literature review, public datasets and through a network of contacts. For some countries there are missing data, which will be complemented in the following tasks of the project, when it is necessary. For each country, a detailed diagnostic sheet was filled, based on the gathered information. The standard structure of the diagnostic sheet is presented hereafter:

### **1. TERMINOLOGY ISSUES**

Information from ISO 17755-1 & -2

References of existing database/studies

Existing definitions

Are there differences within the same country?

Are there differences and contradictions with other domains?

Identification of missing information

### **2. STATISTICS COLLECTION ISSUES**

Fire department responsibilities

Fire response organization

Who collects data?

Who issues the data?

Are there different levels of collection?

Identify disparities in data feedback

Where is the data stored?

### **3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

Purpose for which data is collected

Is there follow up to data collected?

Analyse potential cause and consequences in trends

### **4. ANALYSE EXISTING DATA**

Determining the level of confidence

Pinpointing issues and limitations

Examples

## A. DIAGNOSTIC SHEET FOR AUSTRALIA

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### A1. TERMINOLOGY ISSUES

Information from ISO 17755-1 & -2

#### **Methods of estimation, by country** (ISO 17755:2014, page 1)

The Australian Incident Reporting System (AIRS) is based on separate reports on each incident requiring a response by a fire brigade. There is a national standard for coding of incidents, overseen by the National Data Management Group.

All fire brigades are participants, and all are required to report on all incidents regardless of size of loss or other characteristics; therefore, the design is a census and there is no adjustment for missing data. Not all fire services in Australia contribute to the national database. Of the fire services that do contribute, some do not include responses from the rural component of their service. Also, not all fires that occur in the community are included in the AIRS National Database. Analysis is by counting only.

Most reports are completed by firefighters who lack extensive training in fire investigation and who obtain most of their information from non-professionals such as the owners and occupants of places where fire occurred.

#### **Fires subject to reporting, by country** (ISO 17755:2014, page 4)

Fires not responded to by fire crew are not required to be reported to the national database.

The data on fires and emergencies do not represent 100 percent coverage. An AIRS report is required whenever a fire brigade resource responds to an incident regardless of the size of the incident or the method of notification. Most fires are not reported to fire services. These are usually small fires in the home or in workplaces which go out by themselves or are extinguished by an occupant. We do not have sufficient information to be able to estimate the number of unreported fires.

#### **Fire deaths subject to reporting, by country** (ISO 17755:2014, page 6)

The Australian Incident Reporting System (AIRS) Standard defines fire fatalities as “those people who died from injuries that are attributable to the incident or the action of handling the incident”.

The number recorded is based on data which is the best available at the time of the incident.

However, in recent years, fire fatality information has been sourced from the Australian Bureau of Statistics for reporting to Government and fire brigade databases.

Annual fire death rate represents all deaths where the underlying cause of death is fire related to smoke, fire and flames including all (structure and landscape) fires — as recorded in Causes of Death, Australia (ABS cat. no. 3303.0). Fire deaths are identified from cause of death information supplied by the medical practitioner certifying the death or by a Coroner.

Fire deaths are reported by year of registration of death at State and Territory Registrars of Births, Deaths and Marriages.

#### **Fire injuries subject to reporting, by country** (ISO 17755:2014, page 9)

The Australian Incident Reporting System (AIRS) Standard defines injuries as those people who received injuries that are attributable to the incident or the action of handling the incident.

For the purposes of incident reporting, an injury is defined as requiring:

- treatment by a medical practitioner or;
- at least one day of restricted activity immediately following the incident.

However, for reporting purposes in recent years fire injury information has been sourced from the Australian Institute of Health and Welfare. Fire injuries are represented by hospital admissions (excluding emergency department non-admitted casualties) and are reported by the State or Territory where the admission occurs. A person injured by fire may be treated more than once, and in more than one State or Territory. Deaths from fire injuries after hospitalization are removed from the fire injury data for the time series because these are counted in the fire death rate.

In fire department systems, fire injuries where the victim has been transported to hospital prior to brigade arrival may be missed in fire injury reporting.

#### **Reporting on victim characteristics by country** (ISO 17755:2014, page 10)

Not included in reporting.

#### **Property damage subject to reporting, by country** (ISO 17755:2014, page 26)

Australian fire departments define damage to property as the estimated monetary value of the damage to property and contents caused by fire and fire fighting operations. They don't include land value. Measures used are:

— Monetary value of loss

— Percentage of total area that was damaged, estimated separately at arrival of fire brigade and at extinguishment

— Other: confinement rate

Some other comments related to dollar loss, source limitations and quality.

Recently, one Australian fire department conducted a review of the dollar loss data. They found:

a) 17% of building fires had a recorded value of zero fire dollar loss, and an additional 18% had no dollar loss value reported. It is unclear as to what a zero value for dollar loss means: it could mean no or minimal fire dollar loss or it could mean that the dollar loss cannot be determined. Of the building fires categorized as medium to large where the confinement rate extended beyond the room of origin 3% fires had a recorded value of zero fire dollar loss, and an additional 14% had no dollar loss value reported.

b) A comparison of dollar loss data with dollar loss data from insurance companies and other external sources revealed significant variability in the estimated dollar loss values reported by fire-fighters.

Feedback from focus group workshops with fire-fighters revealed widely varying practices and inconsistencies in estimating and reporting the dollar loss some firefighters included direct and indirect losses; some included relocation and business disruption costs others did not.

Firefighters felt it easier to estimate damage for white goods and small household items than for items such as art, jewelry and other high value items.

#### **Other losses subject to reporting, by country (ISO 17755:2014, page 29)**

Not included in reporting.

#### **Locations of fires based on survey responses, by country (ISO 17755:2014, page 32)**

Separate reporting of single family dwellings, buildings with multiple private housing units, and commercial residential properties, such as hotels, dormitories.

#### **Specific types of buildings and other structures, by country providing detailed attachment (ISO 17755:2014, page 33)**

##### **CLASS 1**

Class 1a - a detached house

Class 1a - (i) one or more attached dwellings, each being a building, separated by a fire resisting wall, including a row house, terrace house, town house or villa unit; or (ii) two attached dwellings, neither of which is located above the other or above or below another

Class of building other than its appurtenant private garage

Class 1b - (i) a boarding house, guest house, hostel or the like with a total floor area not exceeding 300 m<sup>2</sup> and in which not more than 12 persons would ordinarily be resident which is not located above or below another dwelling or another Class of building other than a private garage; or (ii) a boarding house, guest house, hostel or the like with a total floor area not exceeding 300 m<sup>2</sup> in which not more than 12 persons would ordinarily be resident, which is not located above or below another Class or building other than a private garage

##### **CLASS 2**

A building containing 2 or more sole-occupancy units each being a separate dwelling Class 2

##### **CLASS 3**

A residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons

A boarding house, guest house, hostel, lodging house or backpackers accommodation

A residential part of an hotel or motel

A residential part of a school

Accommodation for the aged, disabled or children

A residential part of a health care building which accommodates members of staff

A residential part of a Detention Centre for the accommodation of the inmates of the center

##### **CLASS 4**

A dwelling in a building that is Class 5,6,7,8 or 9 if it is the only dwelling in the building

##### **CLASS 5**

An office building used for professional or commercial purposes excluding buildings of Class 6,7,8 or 9

##### **CLASS 6**

A shop or other building for the sale of goods by retail or the supply of services direct to the public

An eating room, cafe, restaurant, milk or soft drink bar  
A dining room, bar, shop or kiosk part of a hotel or motel  
A hairdressers or barbers shop, public laundry, or undertakers establishment  
A market or sale room, showroom, or service station

**CLASS 7**

A public car-park  
Storage, or display of goods or produce for sale by wholesale

**CLASS 8**

Factories, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or produce is carried on for trade, sale or gain  
Laboratory other than in health care buildings

**CLASS 9**

A health care building, including those parts of the building set aside as a laboratory  
An assembly building, including a trade workshop laboratory or the like in primary or secondary school, but excluding any other parts of the building that are of another Class  
A non-habitable building or structure:  
Class 10a - a non habitable building being a private garage, carport or shed  
Class 10b - a structure being a fence, mast, antenna, retaining or free-standing wall, or swimming pool

**Specific types of rooms and other areas, by country providing detailed attachment (ISO 17755:2014, page 43)**

**Means of Egress**

- Hallway, corridor, mall
- Exterior stairway, including fire escapes and exterior ramps
- Interior stairway, including interior ramps
- Escalator
- Lobby, entrance way
- Fire-isolated escape route
- Means of egress not classified above

**Assembly or Sales Areas**

- Large assembly areas with fixed seats (100 or more persons).
- Large open room without fixed seats (100 or more persons).
- Small assembly area with or without fixed seats (less than 100 persons).
- Lounge area, including living rooms, common rooms, dens, recreation rooms, family rooms.
- Sales, show-room area.
- Library.
- Swimming pools
- Assembly, sales areas not classified above
- Assembly, sales area with insufficient information available to classify further

**Functional Areas**

- Sleeping room for under five persons, including patient rooms, bedrooms, cells
- Sleeping area for five or more persons.
- Dining area, lunchroom, cafeteria.
- Kitchen, cooking area.
- Lavatory, locker room, cloakroom.
- Laundry room, area.
- Office
- Personal service area
- Laboratory
- Printing or photographic room, area
- First aid, treatment room.
- Operating room.
- Electronic equipment room/area.
- Performance, stage area.
- Projection room, area.
- Process, manufacturing area
- Functional areas not classified above
- Functional areas insufficient information available to classify further

**Storage Areas**

- Product storage room or area, storage tanks, storage bin.
- Closet and small storage area
- Supply storage room or area.
- Records storage room, vault
- Shipping, receiving, loading area, loading dock.
- Waste or rubbish area, container.
- Garage, carport, vehicle storage area
- Storage areas not classified above
- Storage areas; insufficient information available to classify further
- Service Facilities
- Lift, dumbwaiter.
- Utility shaft.
- Light shaft
- Chute.
- Duct.
- Display window
- Chimney/flue.
- Conveyor
- Service facilities not classified above
- Service facilities with insufficient information to classify further
- Service, Equipment Areas
- Machinery room/area.
- Heating equipment room or area, water heater area
- Switchgear area, transformer vault, switchboard
- Incinerator room/area.
- Maintenance shop/area.
- Test cell (a testing area or unit that simulates a condition)
- Enclosure with pressurized air
- Enclosure with enriched oxygen atmosphere
- Service, equipment areas not classified above
- Service, equipment areas; insufficient information available to classify further
- Structural Areas
- Crawl space, substructure space
- Exterior balcony, open porch or veranda
- Ceiling and floor assembly, concealed floor/ceiling space
- Ceiling and roof assembly, concealed roof/ceiling space
- Wall assembly, concealed wall space
- Exterior wall surface
- Exterior roof surface
- Awning
- Structural areas not classified above
- Structural areas; insufficient information available to classify further
- Other areas are specified for vehicles and for outdoor locations

**Reporting of type of construction by country (ISO 17755:2014, page 51)**

Need clarification. Survey says this is included in reporting and refers reader to attachment, but attachment has no details on type of construction.

**Reporting on building height and other building characteristics, by country (ISO 17755:2014, page 53)**

- Level or floor where fire began
- Structure status, such as vacant, under construction, or under demolition
- Age of building

**Reporting and estimation of deliberately set fires by country (ISO 17755:2014, page 55)**

Yes, recorded as “incendiary” and “suspicious” as choices under Ignition Factor.

All four loss measures reported.

Classification as deliberate – no information on who provides classifications; presumably Australia practices cited in 1.2 apply here as well.

No mention of use of unknown cause fires in estimates



Reporting of fireplay, and no fires are categorized as both deliberate and fireplay; fireplay incidents are subdivided by age of person starting fire – 5 and under, 6 to 12, 13 to 16; no provision for fireplay but persons older than 16.

Intentional fires are categorized as to motive or circumstances.

- During social disturbance
- Not during social disturbance

**Reporting and estimation of natural cause fires by country** (ISO 17755:2014, page 60)

Yes, recorded as any of six choices under Ignition Factor:

- High wind
- Earthquake
- High water, including floods
- Lightning
- Unclassified natural condition or event
- Unknown-type natural condition or event

**Reporting and estimation of exposure fires by country** (ISO 17755:2014, page 60)

Yes, recorded as any of five choices under Ignition Factor:

- Separate, removed exposure, at least 18m distance
- Separate, detached exposure, more than 200mm but less than 18m distance
- Separate, adjoining exposure, less than 300mm distance or separated by an unpierced wall
- Attached, protected exposure
- Attached, unprotected exposure

**Reporting and estimation of smoking material and open flame fires by country** (ISO 17755:2014, page 64)

Unclear. The parts of the coding manual provided with the survey response do not provide details under Heat Source, but an early 1990s report on Australian fire statistics, prepared by CSIRO, indicated that Form of Heat of Ignition had 10 relevant choices with 4 partially undefined categories and one irrelevant choice linked to some of the partially undefined categories (backfire):

- Cigarette
- Cigar
- Pipe
- Smoking material, unclassified
- Smoking material, unknown type
- Cutting torch
- Welding torch
- Torch other than cutting or welding
- Candle or taper
- Match
- Lighter
- Open fire
- Backfire from internal combustion engine
- Open flame or spark, unclassified
- Open flame or spark, unknown type

This coding arrangement was modeled on the USA's NFIRS codes of the time, and NFIRS has since changed (see USA). It is not clear what the current coding choices are for this in Australia.

**Reporting and estimation of heating and cooling equipment fires by country** (ISO 17755:2014, page 66)

Unclear. The parts of the coding manual provided with the survey response do not provide details under Equipment Involved in Ignition, but an early 1990s report on Australian fire statistics, prepared by CSIRO, indicated that Equipment Involved in Ignition had 12 relevant choices and 2 partially relevant choices with 4 partially undefined categories and 2 possibly irrelevant choices linked to some of the partially undefined categories (water cooling device; fixed, stationary local refrigeration unit):

- Central heating system
- Water heater
- Fixed, stationary local heating unit
- Indoor fireplace
- Portable local heating unit

- Chimney or gas vent flue
- Chimney or vent connector
- Heat transfer system
- Unclassified heating system
- Unknown-type heating system
- Fixed, stationary local air conditioning unit
- Central air conditioning or refrigeration equipment
- Portable air conditioning or refrigeration unit
- Unclassified air conditioning or refrigeration equipment
- Unknown type air conditioning or refrigeration equipment

This coding arrangement was modeled on the USA's NFIRS codes of the time, and NFIRS has since changed (see USA). It is not clear what the current coding choices are for this in Australia.

#### **Reporting and estimation of cooking and kitchen equipment fires by country (ISO 17755:2014, page 70)**

Unclear. The parts of the coding manual provided with the survey response do not provide details under Equipment Involved in Ignition, but an early 1990s report on Australian fire statistics, prepared by CSIRO, indicated that Equipment Involved in Ignition had 10 relevant choices and 2 partially relevant choices with 4 partially undefined categories and 2 possibly irrelevant choices linked to some of the partially undefined categories (water cooling device; fixed, stationary local air conditioning unit):

- Fixed, stationary surface cooking unit (such as stovetop)
- Fixed, stationary oven
- Fixed, stationary food warming appliance
- Deep fat fryer
- Portable cooking or warming unit
- Open fired grill
- Grease hood or duct
- Unclassified cooking equipment
- Unknown-type cooking equipment
- Fixed, stationary local refrigeration unit
- Central air conditioning or refrigeration equipment
- Portable air conditioning or refrigeration unit
- Unclassified air conditioning or refrigeration equipment
- Unknown type air conditioning or refrigeration equipment

This coding arrangement was modeled on the USA's NFIRS codes of the time, and NFIRS has since changed (see USA). It is not clear what the current coding choices are for this in Australia.

#### **Reporting and estimation of clothes dryer fires by country (ISO 17755:2014, page 74)**

Unclear. The parts of the coding manual provided with the survey response do not provide details under Equipment Involved in Ignition, but an early 1990s report on Australian fire statistics, prepared by CSIRO, indicated that Equipment Involved in Ignition had 2 relevant choices and 2 partially undefined categories and 7 irrelevant choices linked to the partially undefined categories (television or radio; floor care equipment; separate motor or generator; hand tool; portable appliance designed to produce controlled heat; portable appliance not designed to produced controlled heat):

- Dryer
- Washing machine
- Unclassified appliance or equipment
- Unknown type appliance or equipment

This coding arrangement was modeled on the USA's NFIRS codes of the time, and NFIRS has since changed (see USA). It is not clear what the current coding choices are for this in Australia.

#### **Reporting and estimation of entertainment equipment fires by country (ISO 17755:2014, page 75)**

Unclear. The parts of the coding manual provided with the survey response do not provide details under Equipment Involved in Ignition, but an early 1990s report on Australian fire statistics, prepared by CSIRO, indicated that Equipment Involved in Ignition had 1 relevant choice and 2 partially undefined categories and 8 irrelevant choices linked to the partially undefined categories (dryer; washing machine; floor care equipment; separate motor or generator; hand tool; portable appliance designed to produce controlled heat; portable appliance not designed to produced controlled heat):

- Television, radio, or phonograph
- Unclassified appliance or equipment

— Unknown type appliance or equipment

This coding arrangement was modeled on the USA's NFIRS codes of the time, and NFIRS has since changed (see USA). It is not clear what the current coding choices are for this in Australia.

**Reporting and estimation of office equipment fires by country (ISO 17755:2014, page 78)**

Unclear. The parts of the coding manual provided with the survey response do not provide details under Equipment Involved in Ignition, but an early 1990s report on Australian fire statistics, prepared by CSIRO, indicated that Equipment Involved in Ignition had 4 probably relevant choices and 2 partially undefined categories and 4 irrelevant choices linked to the partially undefined categories (biomedical device or equipment; separate pump or compressor; internal combustion engine; conveyor):

- Electronic equipment
- Vending machine or drinking fountain
- Office machine
- Unclassified special equipment
- Unknown type special equipment

This coding arrangement was modeled on the USA's NFIRS codes of the time, and NFIRS has since changed (see USA). It is not clear what the current coding choices are for this in Australia.

**Reporting of electrical and electrical distribution or lighting equipment fires by country (ISO 17755:2014, page 81)**

Australia is not present in this table.

**Reporting of other appliance and equipment fires by country (ISO 17755:2014, page 85)**

Australia is not present in this table.

**Reporting of item first ignited in terms of form and function by country (ISO 17755:2014, page 92)**

Australia is not present in this table.

**Reporting of item first ignited in terms of material composition by country (ISO 17755:2014, page 101)**

Australia is not present in this table.

**Reporting of factors in ignition by country (ISO 17755:2014, page 104)**

Australia is not present in this table.

**Presence and type of sprinkler or other extinguishing equipment by country (ISO 17755:2014, page 112)**

Yes, included in reporting. No coding for different types of sprinklers or for different types of automatic extinguishing equipment. Coding refers to "sprinklers", which suggests that non-water based systems are not captured here.

**Performance of sprinkler or other extinguishing equipment by country (ISO 17755:2014, page 115)**

Sprinkler performance

- Extinguished fire
- Prevented spread, but did not extinguish
- Did not prevent spread
- Equipment operated, performance not classified above
- Equipment should have operated but did not
- Equipment present but fire too small to require operation
- No equipment present in room or space of fire origin
- Performance of equipment not classified above
- Sprinkler performance; insufficient information available to classify further
- Performance of equipment undetermined
- Sprinkler performance not reported

Factors degrading effectiveness

- High severity of fire
- System disconnected
- Inadequate water supply (at the time of fire)
- Obstruction of system
- Faulty component in system

- Premature closure of valve
  - Fire started in un-sprinkled area
  - Not applicable
  - Factor degrading sprinkler effectiveness not classified above
  - Factor degrading sprinkler effectiveness undetermined
  - Factor degrading sprinkler effectiveness not reported
- Number of sprinkler heads that operated.

**Presence and type of detection or alarm equipment by country** (ISO 17755:2014, page 117)

Yes, included in reporting. No mention of fire detectors that are not smoke detectors (for example, heat detectors).

Smoke Alarms/Detector Presence

- Smoke alarm present
- Unable to determine presence of smoke alarm
- No smoke alarm present

Smoke Alarms/Detector Power Source

- Battery only
- Hard wire only
- Plug in
- Hard wire with battery
- Plug in with batter
- Mechanical
- Multiple alarms and power supplies
- Alarm power supply not applicable
- Other power supply not classified above

**Performance of detection or alarm equipment by country** (ISO 17755:2014, page 121)

Operation

- Failed to operate
- Operated properly
- Operation of smoke alarm not applicable

Effectiveness

- Alerted occupants
- Occupants failed to respond
- There were no occupants
- Failed to alert occupants
- Effectiveness of smoke alarm not applicable
- Other not classified above

Reasons for Failure

- Hard wire power failure, shutoff or disconnect
- Improper installation or placement
- Defective
- Lack of cleaning
- Battery missing or disconnected
- Battery discharge or dead
- Fire not within designed range of smoke alarm
- Reason for smoke alarm failure not applicable
- Other reason for alarm failure not classified above

**Presence of extinguishers or other manual extinguishing equipment by country** (ISO 17755:2014, page 125)

Yes, included in reporting.

Extinguishers Installed

- Yes
- No
- Undetermined

Separate data element reports number of extinguishers used by occupants (non-fire personnel).

Hose Reels Installed

- Yes

— No

— Undetermined

Separate data element reports number of hose reels used by occupants (non-fire personnel).

Hydrants Installed

— Yes

— No

— Undetermined

Separate data element reports number of hydrants used by occupants (non-fire personnel).

**Presence of smoke management or control equipment by country** (ISO 17755:2014, page 127)

Probably not, although there is information on “Air Handling System”.

**Reporting on fire doors, fire walls and other compartmentation by country** (ISO 17755:2014, page 127)

Need clarification. Survey says this is included in reporting and refers reader to attachment, but attachment has no details on compartmentation

#### References of existing database/studies

Fire statistics:

- Queensland: <https://www.data.qld.gov.au/organization/queensland-fire-and-emergency-services>
- South Australia: <https://data.sa.gov.au/data/dataset/fire-service-incidents>
- Western Australia: <https://www.dfes.wa.gov.au/annualreport2020/year-in-review/>

#### Summaries of existing database

The fire statistics in Australia is subdivided into the six states: Queensland, New South Wales, South Australia, Tasmania, Victoria and Western Australia. However, the Australian Incident Reporting System (AIRS) is a national standard for reporting. It has an electronic form and the data recorded can vary between states and within a state [1].

#### Existing definitions

The AIRS includes definitions and it is composed of 10 parts as follows:

- A. Incident report header
- B. False alarm
- C. Hazardous materials
- D. Casualties, rescue and evacuation
- E. Ignition (all fires)
- F. Firefighting
- G. Bush, Forest, Grass fires
- H. Dollar loss fires
- I. Mobile property
- J. Structure fires [1].

#### Are there differences within the same country?

Yes, despite the AIRS is a national standard of reporting there could be differences in the data collected by the various states and within a state [1].

#### Identification of missing information

A significant amount of fires is not recorded and not all the Australian fire service contribute to the national database.

Not all the required fields need to be completed and the compulsory fields are based on the nature of the call [1].

## **A2. STATISTICS COLLECTION ISSUES**

### Fire department responsibilities

It is the responsibility of the officer of the first appliance to fill the report. The officer can contact the other station to require some information or access the rosters [1].

### Fire response organisation

The fire organization is subdivided into the 6 states:

- Queensland Fire and Emergency Service
- New South Wales Fire and Rescue Service
- Metropolitan Fire Service South Australia
- Tasmania Fire Service
- Fire Rescue Victoria
- Department of Fire and Emergency Service Western Australia

### Who collects data?

It is the responsibility of the officer of the first appliance to fill the report. The officer can contact the other station to require some information or access the rosters [1].

### Who issues the data?

Each state yearly publishes some information of the dataset. The fire statistics dataset of Queensland are publicly available while for South Australia and Western Australia data are partially available:

- Queensland: <https://www.data.qld.gov.au/organization/queensland-fire-and-emergency-services>
- South Australia: <https://data.sa.gov.au/data/dataset/fire-service-incidents>
- Western Australia: <https://www.dfes.wa.gov.au/annualreport2020/year-in-review/>

### Are there different levels of collection?

The AIRS is an incident standard of reporting. However, national statistics is not available and each state has its fire statistics dataset.

## **A3. STATISTICS INTERPRETATION ISSUES**

### Purpose for which data is collected

The collection of data is used to identify trends in fire and incidents and the AIRS is adopted to evaluate the effectiveness of emergency responses to community [1].

There is currently a research project funded by Australian Building Codes Board to review the national fire statistics and reporting in Australia. The ultimate goal would be to harmonise the fire data and to provide valuable information for regulators and fire safety engineers.

## **A4. ANALYSE EXISTING DATA**

### Determining the level of confidence

It is the responsibility of the officer of the first appliance to fill the report. The officer can contact the other station to require some information or access the rosters. However, the rosters may not accurately reflect the fire fighters present at the fire scene. Moreover, higher alarm levels may increase the risk of inaccurate personnel reporting increases [1].

### Pinpointing issues and limitations

- Several fires are not recorded
- Not all Australian fire service contribute to the database
- Firefighters exposure to toxins not recorded

- Only some fields are compulsory
- The data recording is based on the visible to the officer at the scene [1].

#### Examples

##### **QUEENSLAND:**

Fire statistics datasets are available in the following link:

<https://www.data.qld.gov.au/organization/queensland-fire-and-emergency-services>

##### **NEW SOUTH WALES:**

Fire and rescue annual review reports from 1999/2000 to 2018/2019 are available in the following link:

<https://www.fire.nsw.gov.au/page.php?id=453>

The report of 2018/2019 contains information about:

- Overview of Fire and Rescue NSW
- Capabilities
- Building Organisational Capability.

No data related to fire in buildings.

##### **SOUTH AUSTRALIA:**

Fire service incidents datasets are available from 2014 to 2020 in the following link:

<https://data.sa.gov.au/data/dataset/fire-service-incidents>

The Fire Service Incidents database from 1/7/2015 to 30/6/2020 contains data about:

- Date
- Brigade
- Situation found.

##### **TASMANIA:**

Tasmania Fire Service website:

<http://www.fire.tas.gov.au/>

No data available.

##### **VICTORIA:**

Fire Rescue Victoria:

<https://www.frv.vic.gov.au/>

No data available

##### **WESTERN AUSTRALIA:**

<https://www.dfes.wa.gov.au/Pages/default.aspx>

Structure fire (suggestions but no data available on previous incidents):

<https://www.dfes.wa.gov.au/safetyinformation/fire/fireinthehome/Pages/default.aspx>

Annual Report 2019/2020 – Department of Fire & Emergency Service:

[https://www.dfes.wa.gov.au/publications/Annual%20Reports/DFES\\_Annual\\_Report\\_2019-2020.pdf](https://www.dfes.wa.gov.au/publications/Annual%20Reports/DFES_Annual_Report_2019-2020.pdf)

It contains:

- Executive summary
- Corporate structure
- Financial Statements and Performance Indicators
- Compliance and Other Disclosures

No data about previous fire incidents in buildings.

##### **REFERENCES:**

[1] United Firefighters Union of Australia, "Sub\_19 UFUA supp," 2011.

## B. DIAGNOSTIC SHEET FOR AUSTRIA

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### B1. TERMINOLOGY ISSUES

References of existing database/studies

#### Databases

In general, the Austrian Fire Prevention Associations collect data from the police stations and insurers for each federal state (excepting Vienna) and publish them yearly. The several fire statistics are gathered by the Upper Austrian Fire Prevention Association for creating and publishing an Austrian Fire Statistic, which is also published once a year. These statistics provide data in a superficial way only (number and loss by ignition source and federal state, number and loss by risk group and federal state, trend of lethal fire injuries, long-term statistic over 10 years).

<https://www.bvs-ooe.at/services-und-leistungen/brandschadenstatistiken/>

#### Data Management-System in Fire Investigation:

In the years 2014 to 2017 a group of experts in fire investigation created a database-system to collect fire data in a structured way (Datenmanagement in der Brandursachenermittlung – DMBUE). Six of nine Austrian federal states participate in this data management-system up to now.

Since 2017 the participating Austrian Fire Prevention Associations collect information the fires including information of police stations and fire investigations conducted by the fire prevention associations.

#### Studies

Brandverhütungsstelle Voralberg, several studies (uploaded):

<https://www.brandverhuetung.at/brandstatistik/>

Harsch, G. (2015): Data management in fire investigation operated by the Austrian Fire Protection Associations for exploitation in approval processes of commercial facilities. August 2015, Danube-University Krems.

#### Summaries of existing database

Sources are based on several different entities who publish fire data, which are predominantly based on the Austrian Fire Statistics, provided by the Austrian Fire Prevention Associations. Several are more focused on property losses and fire causes, others seem to collect data about fatalities and injuries as well.

In addition, the Austrian Fire Brigade Association (Österreichischer Bundesfeuerwehrverband) provides statistical data focussing fire service interventions.

Several local systems seem to be in place.

The DMBUE is a web-based tool to collect information about fire incidents. Primarily, the surveyors of the Austrian Fire Prevention Associations, that conduct fire investigations, feed data into the system. System-members connect to [www.brandursache.or.at](http://www.brandursache.or.at)

The gathered data are available topically to create statistics or requests.

The data management-system uses terms and definitions provided by national and European standards and national regulations (see Task 1.4).

Information gathered by the Data management in fire investigation operated by the Austrian Fire Protection Associations:

#### 1. Identification

1.1. ID-Number (reference number, file number,...)

1.2. Incident location

1.2.1. Federal state



- 1.2.1.1. District
- 1.2.1.1.1. Municipality
- 1.2.1.1.2. Postal Code

- 1.3. Incident date
  - 1.3.1.Date (dd.mm.yyyy)
  - 1.3.2.Time
- 1.4. Date of Investigation

## **2. Fire Loss**

- 2.1. Insurer
- 2.2. Amount of Damage
  - 2.2.1.Known amount OR
  - 2.2.2.Estimated amount
- 2.3. Damage to Persons
  - 2.3.1.Personal injury
    - 2.3.1.1. Gender
    - 2.3.1.2. Age
    - 2.3.1.3. Type of injury
  - 2.3.2.Dead Person
    - 2.3.2.1. Gender
    - 2.3.2.2. Age
    - 2.3.2.3. Cause of Death
- 2.4. Killed Animals
  - 2.4.1.1. Kind
  - 2.4.1.2. Number

## **3. Alerting/ Fire detection**

- 3.1. Alerting of Fire Brigade
- 3.2. Internal Alarm

## **4. Fire Data**

- 4.1. Risk-Group (Civilian, Farming, Commerce, Industries, Other)
- 4.2. Ignition Source (according to ignition-source-code)
- 4.3. Primary ignited Material
- 4.4. Location of Ignition Source
  - 4.4.1.Inside a Building
    - 4.4.1.1. Building type
    - 4.4.1.2. Building key data
      - 4.4.1.2.1. Construction of the entire Building
      - 4.4.1.2.2. Fire Resistance of major part of the bearing structure
        - 4.4.1.2.2.1. Walls
        - 4.4.1.2.2.2. Ceilings
        - 4.4.1.2.2.3. Roof construction
      - 4.4.1.2.3. Number of Floors (above and underground)
      - 4.4.1.2.4. Approximate gross floor area
      - 4.4.1.2.5. Approximate area of the affected fire compartment
      - 4.4.1.2.6. Approximate area of the fire room
    - 4.4.1.3. Technical fire-protection appliances

- 4.4.1.3.1. Type
    - 4.4.1.3.1.1. Plant type
      - 4.4.1.3.1.1.1. Scope of protection
        - 4.4.1.3.1.1.1.1. Fire location within the scope of protection
          - 4.4.1.3.1.1.1.1.1. Effectiveness and reason for ineffectiveness
- 4.4.1.4. Organisational fire protection measures
- 4.4.1.5. Course of the fire
  - 4.4.1.5.1. Location of the area where the fire started
  - 4.4.1.5.2. Room use of fire breakout
  - 4.4.1.5.3. Main content of the room
- 4.4.1.6. Way of fire spread
- 4.4.2. Outdoors
  - 4.4.2.1. Use of the open area
  - 4.4.2.2. Course of the fire
  - 4.4.2.3. Way of fire spread

Are there differences within the same country?

Yes, the regions seem to have different ways to collect fire data.

The federal countries of Austria developed different systems for data-collection over decades. For example:

- BUE-Statistik OÖ (Fire Investigation statistics of Upper Austria)
- Fire Investigation Statistics of Vorarlberg

In addition, the federal fire brigade associations are collecting specific data about fire fighting operations.

Since 2017 a process to harmonize data collection was started. Today most of the federal countries in Austria (six of nine) use DMBUE.

Identification of missing information

It is difficult to get an overall picture for Austria as data is collected in regions.

Some fire data seem to be detailed but this seems to be not the case for all collected data.

DMBUE does not collect data about fire fighting operations. It focusses on preventative fire protection measures.

## **B2. STATISTICS COLLECTION ISSUES**

Fire department responsibilities

Fires and technical incidents.

(Red and green cross is responsible for ambulance.)

Fire response organisation

In Austria nearly every village has a fire service, in total there are 4.500 voluntary fire services (not personnel but services) and 300 company fire services and 6 professional fire services.

The Austrian Fire Prevention Associations are organized in different ways. They are organized as nonprofit associations, companionships or as a part of the federal fire brigade association.

In general, the Fire Prevention Associations are civilian organisations.

#### Who collects data?

Fire Investigation Data are collected in Austria by the Fire Prevention Associations (DMBUE), by Police departments, which also provide data for DMBUE, and the fire-insurers. The information from all these institutions is gathered and published in the Austrian Fire Statistic, provided by the Austrian Fire Prevention Associations.

#### Who issues data?

The yearly fire statistics are published by each federal Fire Prevention Association. The Upper Austrian Fire Prevention Association consolidates the federal statistics and publishes the combined Austrian Fire Statistic. Special reports are provided primarily for research and scientifically reasons.

#### Where is the data stored?

The DMBUE is hosted on a high-level security server.

### **B3. STATISTICS INTERPRETATION ISSUES**

#### Who is interpreting the statistics

The Austrian Fire Statistic is publicly available. Special reports from DMBUE are interpreted by surveyors and fire safety experts.

#### Purpose for which data is collected

The purpose is to provide data for research and scientifically reasons as well as for performance-based fire prevention measures.

#### Is there follow up to data collected?

Experts of the Austrian Fire Prevention Associations make a revision of DMBUE once a year. The system DMBUE includes a function to implement new data-types by general-administrators.

#### Analyse potential cause and consequences in trends

Yes, new keywords are displayed on a dashboard automatically to be controlled by one of the general-administrators.

### **B4. ANALYSE EXISTING DATA**

#### Determining the level of confidence

Data-collection is conducted by surveyors for fire-investigation and -prevention. So the level of confidence seems to be very high.

#### Pinpointing issues and limitations

Six of nine Austrian federal states participate in this data management-system up to now.

#### Examples

Trends in fire statistic data

- Fatalities due to smoke inhalation, smoke is hazardous for inhabitants and fire fighters (smoke layer ignition, back draft etc.) (Brandschutzforum Austria- Heisse Zahlen)
- High property loss in a few numbers of industrial fires, these are not the fires with the most fatalities
- Property loss is increasing over recent years

## C. DIAGNOSTIC SHEET FOR BULGARIA

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### C1. TERMINOLOGY ISSUES

References of existing database/studies

All information is available at <https://www.mvr.bg/gdpcbzn>

Summaries of existing database

The annual reports contain the following chapters and describe all the activities of fire services in Bulgaria:

- Number of accidents and exits of fire and rescue equipment
- Fires with material losses, distributed by reasons of occurrence
- Fires with material losses, broken down by industry
- Statistics on fires, deaths and injuries
- Information on the performed activity
- Information on the performed activity in the field of preventive control
- Training and preparation
- Document flow and administrative services
- Current state of the voluntary formations
- Participation of the bodies of the General Directorate for Combating Organized Crime in the work related to the Council of Ministers, NATO, the EU and humanitarian operations

Existing definitions

The definitions of the terms used in fire statistics are set in internal regulations.

Are there differences within the same country?

The fire statistics in Bulgaria are organized uniformly across the country.

### C2. STATISTICS COLLECTION ISSUES

Fire department responsibilities

National emergency management authority: Fire Safety and Civil Protection Chief Directorate, Ministry of Interior

According to Art. 52 g of the Law on the Ministry of Interior (last amendments in Official Gazette No 88 of 9 November 2010) „The Fire Safety and Civil Protection Chief Directorate is a national specialized structure of the Mol for ensuring fire safety, rescue and protection in case of disasters under the terms and provisions of this Law and the Disaster Protection Law”.

Main tasks:

- Firefighting and rescue activities;
- Emergency recovery activities, operational protection in case of floods and search and rescue operations;
- CBRN protection in case of incidents and accidents with HAZMAT and dealing with ecological incidents;
- State fire safety control;
- Prevention activities and control;
- Early-warning and alert of the state executive bodies and the population in case of disaster;
- Protection of the population in case of “wartime” or “emergency situation” in compliance with the Geneva Conventions;
- Assistance in the activities of the Interagency Commission for recovery and relief to the Council of Ministers;
- Methodical and expert support for disaster protection to the territorial executive authorities;

- Operational cooperation with the EU and NATO structures and other international organizations/initiatives in the field of fire safety and protection of the population, humanitarian aid and civil-military emergency planning.

#### Fire response organisation

As for the years 2001-2016, the following information is available. With a population of around 7.2 million, the country has 243 fire stations. There are around 690 fire engines or fire tenders and 66 ladder engines in service. The state's fire departments have around 6,000 professional firefighters and 2,600 volunteer firefighters.

#### Who collects data?

The fire statistics are compiled by the responsible Ministry of the Interior. There the directorate for fire protection is responsible.

#### Who issues the data?

Ministry of the Interior

#### Are there different levels of collection?

The fire statistics are collected at the local level according to standardized criteria. So there are no differences between urban and rural settlements.

#### Where is the data stored?

In the Ministry of the Interior

### **C3. STATISTICS INTERPRETATION ISSUES**

#### Who is interpreting the statistics

- Ministry of Interiors
- Fire Service
- Technical Experts

#### Purpose for which data is collected

- Reducing the number of fires
- Reduction in the number of fire victims
- Reducing fire damage
- Elimination of the main causes of fire
- Increasing fire safety in the most important fire objects
- Reducing the environmental damage caused by fires
- Creation of stable fire-resistant infrastructure
- Increasing fire safety for children and the elderly

#### What are the methods used to fill the gaps where information is missing?

There is no a particular method due to the fact that all the required information is collected by each region and stored in the platform mentioned above.

#### Is there follow up to data collected ?

The data will be reviewed and the corrections published in the following year.

Analyse potential cause and consequences in trends

The Interior Ministry is analyzing the statistics and taking measures to improve the situation with the fires.

#### **C4. ANALYSE EXISTING DATA**

Pinpointing issues and limitations

- The lack of definitions for fire statistics words and expressions.
- The lack of methodology to fill the gaps where information is missing.
- The lack of training for the firefighters in charge of the fire response report.
- The database from the fire brigade does not take into account the fire casualties occurring at the hospital or during their transportation to the hospital by EMS

Examples

- The fire statistics of the state of Bulgaria are organized centrally.
- Particular attention is paid to the issue of fire damage.
- The fire statistics of Bulgaria describe the causes of the fire in a good way. It is particularly noticeable that the causes of fire due to electricity are to be found in the first place. In second place, a lot of actions by people when dealing with open fire can be seen.
- The statistics of the state distribute the fires to the various economic sectors. The residential sector accounts for a particularly large proportion of the fires. The transport sector also has comparably high numbers of fires.
- A general distinction is made between fires with and without material losses.
- The number of fire victims is divided into age groups. One can clearly distinguish between children, adults and older people.
- The Bulgarian fire statistics also show the development of the number of fire victims by year and age group. Since 1995 the number of fire deaths has been increasing.

Table 1: Fires by Year and Losses

Year	Fires		
	FIRE WITH MATERIAL LOSSES	FIRE WITHOUT MATERIAL LOSSES	TOTAL FIRE
2019	8422	33719	42141
2018	7961	21487	29448
2017	9120	26362	35482
2016	9058	28304	37362
2015	8656	21353	30009

Table 2: Fires by Year and Causes

Fire Causes	TOTAL				
	2019	2018	2017	2016	2015
SHORT CIRCUIT	2074	2265	2326	2216	2306
INCORRECT USE OF HEATING APPLIANCES 1	285	334	386	335	335
INCORRECT USE OF HEATING APPLIANCES 2	364	330	353	351	347
NEGLIGENCE WHEN HANDLING WITH OPEN FIRE	2138	1510	2013	2090	1907
TECHNICAL FAULT	1066	1007	1088	989	973
DISTURBED TECHNOLOGY	19	28	29	28	32
NATURAL PHENOMENA	42	64	50	44	63
INTENTION	392	402	508	534	504
IN THE PROCESS OF ESTABLISHMENT	1294	1315	1541	1692	1401
OTHERS	231	225	247	212	223
CONSTRUCTION FAULT	151	171	192	193	201
FIRE WORKS	51	64	70	57	55
SELF-IGNITION	225	168	202	212	201
CHILDREN'S GAME	81	70	112	98	104
POOR QUALITY REPAIR	9	8	3	7	4
<b>TOTAL FIRE WITH LOSSES</b>	<b>8422</b>	<b>7961</b>	<b>9120</b>	<b>9058</b>	<b>8656</b>

Table 3: Fires by Year and Sectors of Economy

Fires by Sectors of Economy	TOTAL				
	2019	2018	2017	2016	2015
ENERGY	273	267	288	276	311
PROCESSING INDUSTRY	142	148	150	132	154
CONSTRUCTION	16	16	26	32	22
AGRICULTURE AND FISHERIES	702	563	848	860	650
FORESTRY	330	94	231	277	147
TRANSPORT, STORAGE AND MAIL	2166	2229	2427	2353	2278
TRADE AND REPAIR	213	198	228	235	240
HOTELS AND RESTAURANTS	192	175	210	228	228
HOUSING	3535	3391	3756	3503	3426
EDUCATION	35	47	44	41	26
CULTURE, SPORT AND ENTERTAINMENT	31	26	20	33	18
HUMAN HEALTH AND SOCIAL CARE	32	27	25	31	32
GOVERNMENT	15	18	27	14	17
WATER SUPPLY, SEWERAGE, GARBAGE COLLECTION	575	601	664	790	919
OTHER INDUSTRIES AND ACTIVITIES	165	161	176	253	188
<b>TOTAL FIRE WITH LOSSES</b>	<b>8422</b>	<b>7961</b>	<b>9120</b>	<b>9058</b>	<b>8656</b>

Table 4: Fires by Year and Number of Fire Deaths

Years	fires with material losses	fires without material losses	Total fires	Fire Deaths							Total
				Up to 7	8-14	15-18	19-60	61-70	Over 70	Unknown	
1995	7621	7437	15058	14	1	-	56	9	27	-	107
1996	7357	9486	16843	11	1	2	41	10	30	-	95
1997	6982	7793	14775	10	1	-	37	11	33	-	92
1998	8137	14256	22393	7	1	-	51	9	27	-	95
1999	8165	10921	19086	10	2	1	44	12	25	-	94
2000	11670	26802	38472	1	1	1	40	21	34	-	98
2001	9244	21778	31022	8	2	-	45	14	35	-	104
2002	7647	10803	18450	11	1	3	34	11	37	-	97
2003	8553	17382	25935	15	-	1	39	11	42	-	108
2004	7980	15846	23826	7	2	1	41	15	38	-	104
2005	7540	11430	18970	6	1	-	46	16	33	-	102
2006	8548	20542	29090	8	-	-	27	16	44	-	95
2007	10501	27686	38187	8	2	-	38	20	37	-	105
2008	9659	28439	38098	5	2	-	50	19	36	-	112
2009	8970	21249	30219	9	-	-	49	25	36	3	122
2010	8136	16894	25030		3	-	32	11	32	1	79
2011	9487	32403	41890	5	-	-	37	18	60	2	122
2012	9728	35203	44931	2	-	-	35	20	60	4	121
2013	8503	24401	32904	5	1	-	39	19	40	2	106
2014	7781	15417	23198	4	1	-	30	22	42	4	103
2015	8656	21353	30009	1	-	-	33	19	55	1	109
2016	9058	28304	37362	10	1	1	38	24	55	-	129
2017	9120	26362	35482	4	-	-	30	39	73	-	146
2018	7961	21487	29448	7	2	-	38	42	56	-	145
2019	8422	33719	42141	4	1	0	36	42	51	-	134





Table 5: Number of Fire Injuries by Years and Age

	Up to 7	8-14	15-18	19-60	61-70	Over 70	Unknown	Total
1995	14	7		86	9	11	-	127
1996	9	7	6	151	11	20	-	204
1997	23	8	8	142	18	15	-	214
1998	11	28	10	190	31	23	-	293
1999	12	3	6	192	30	26	-	269
2000	12	5	4	147	36	33	-	237
2001	22	8	12	166	28	27	-	263
2002	6	6	4	143	26	25	-	210
2003	9	4	8	170	30	43	-	264
2004	10	6	5	168	30	36	-	255
2005	9	11	4	134	15	50	-	223
2006	21	7	7	168	29	45	-	277
2007	18	8	7	168	31	43	-	275
2008	15	5	5	208	40	47	-	320
2009	15	4	10	176	40	52	3	300
2010	14	6	3	160	47	54	8	292
2011	14	10	7	185	45	73	3	337
2012	21	7	8	190	48	72	3	349
2013	3	7	6	168	35	76	10	305
2014	7	2	3	144	41	63	3	263
2015	10	9	9	185	44	78	4	339
2016	5	4	8	189	39	53	-	298
2017	9	7	2	170	45	68	-	301
2018	10	6	5	149	44	71	-	285
2019	5	4	4	149	48	83	-	293

## D. DIAGNOSTIC SHEET FOR CANADA

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### D1. TERMINOLOGY ISSUES

Information from ISO 17755-1 & -2

#### **Methods of estimation** (ISO 17755-1, page 1)

Canada's databases begin as individual-incident databases at the local fire department level. Data may be aggregated before passing from provincial level to national level. The national level is a council of provincial fire commissioners. There is no mention of any adjustments for missing fire departments or other missing data. There is no mention of an incident-specific database at the national level. Analysis is by counting only. All or nearly all reports are completed by firefighters who lack extensive training in fire investigation.

#### **Fires subject to reporting** (ISO 17755-1, page 4)

All fires that result in Fire Department (FD) response should be reported.

#### **Fire deaths subject to reporting** (ISO 17755-1, page 6)

The Canadian definition of a fire fatality is "**a person who dies as a result of injuries sustained during a fire incident**". Examples of fire-related deaths that are likely to be recorded as non-fire deaths and not included in the database include people who die by fire resulting from vehicle accidents and deaths from a fire that is otherwise controlled (e.g. death by CO poisoning) and so does not receive a fire department response. As for fire deaths likely to be missed, as opposed to captured but not reported under fire, some jurisdictions in Canada (ON) count a death as a result of injuries sustained that must occur within one year and one day of the incident. There are differences between jurisdictions.

#### **Fire injuries subject to reporting** (ISO 17755-1, page 9)

A fire injury is a person who is injured as a result of a fire incident.

#### **Reporting on victim characteristics** (ISO 17755-1, pages 11-13)

In the Canadian databases, on the basis of the document named "Canadian Code Structure (CCS) on Fire Loss Statistics", the following characteristics are reported:

**Age** (if exact age is not known, give an estimate to the nearest 10 years),

**Gender**

**Status:**

— Firefighter

— Civilian

**Nature (severity) of casualty**

— Death

— Minor injury (less than 1 day hospital or off work)

— Light injury (1-2 days hospital or 1-15 days off work)

— Serious injury (3 days and more hospital or 16 days and more days off work)

**Probable/possible cause of casualty:**

— Smoke inhalation

— Burn

— Physical injury

— Other

**Condition of casualty:**

— Asleep at time of fire

— Bedridden or other physical handicap

— Impairment by alcohol, drugs or medication

— Awake and no physical or mental impairment at the time of fire

— Under restraint or detention

— Too young to react to fire emergency

— Mental handicap – includes senility

— Child left unattended

— Condition of casualty – unclassified

**Action of casualty:**

— Injured while attempting to escape

— Over-exertion, heart attack

- Entered or remained for rescue purposes
- Entered or remained for fire-fighting
- Entered or remained to save personal property
- Loss of judgment or panic
- Received delayed warning
- Did not act
- Action of casualty – unclassified

**Cause of failure of escape:**

- Trapped by rapid spreading of fire/smoke – through vertical openings, stairways, elevators
- Trapped by rapid spreading of fire/smoke – through horizontal openings
- High flame spread of combustible interior finish
- Building collapse
- Falling debris
- Explosion
- Exit blocked, locked, or obstructed
- Outdoor fire – includes forest/brush fires
- Cause of failure to escape – unclassified

**Ignition of clothing or other fabrics:**

**Type of clothing or other fabric**

- Outer clothing
- Sleepwear
- Underclothing
- Costume
- Bedding or bed linen (includes pillow)
- Mattress
- Rugs
- Unclassified fabric
- Unknown type fabric

**Type of material ignited:**

- Cotton
- Wool
- Other natural fibre
- Other synthetic fibre
- Mixture of fibres
- Rubber
- Plastics or plastics foam
- Unclassified fabric
- Unknown type fabric

**Property damage subject to reporting (ISO 17755-1, page 26)**

Loss shall be recorded as the estimate of the damage caused by the fire. The loss includes damage to property and contents. Loss shall only include direct loss caused by the fire, including salvage, but not indirect loss due to “use and occupancy” or business interruption. Measures used are:

- Monetary value of loss

Damage likely to be missed includes damage present but not reported by fire departments and damage that is not visible during investigation and reporting.

**Other losses subject to reporting (ISO 17755-1, page 29)**

- Deaths and injuries of firefighters, fire officers, fire brigade personnel, and other emergency responders due to acute fire effects.

**Locations of fires based on survey responses (ISO 17755-1, page 32)**

- Separate reporting of single family dwellings, buildings with multiple private housing units, and commercial residential properties, such as hotels, dormitories
- All residential properties reported together but distinguished from other buildings
- All buildings with private housing units reported together but distinguished from other Buildings

**Specific types of buildings and other structures (residential only) (ISO 17755-1, page 35)**

Residential use:

- Residential – row, garden, town housing, condominium
- Residential – apartment, tenement
- Hotel, motel, lodge, hostel, boarding house, dormitory
- Residential – single detached
- Residential – duplex, 3-plex, 4-plex, semi-detached
- Educational Institution (residential)
- Camp site/RV park
- Residential – mobile home/ trailer park
- Residential- with business/mercantile, up to 3 stories

**Reporting of type of construction (ISO 17755-1, page 52)**

**General Construction**

- Combustible Construction - open wood joist
- Protected Combustible Construction - wood protected by plaster
- Heavy Timber Construction
- Non-Combustible Construction - exposed steel
- Protected Non-Combustible Construction - protected steel or concrete
- General Construction - not applicable
- General Construction - unclassified

Possibly relevant when used in combination with the general construction codes would be the reporting of **year of construction**, because specific requirements, materials, and methods of construction might be correlated with different periods in recent history.

**Method of Construction**

- Stick Built – Constructed On Site
- Manufactured – Assembled/Placed On Site

**Reporting of building height and other characteristics (ISO 17755-1, page 54)**

- Height of building
- Level or floor where fire began
- Structure status, such as vacant, under construction, or under demolition
- Age of building

**Reporting and estimation of deliberately-set fires (ISO 17755-1, page 56)**

Recorded under Act or Omission using any of following categories

- Incendiary
- Suspicious
- Incendiary/riot or civil disturbance
- Incendiary/unclassified
- Incendiary/additional details unknown

The last three categories presumably include incendiary and suspicious fires.

All four loss measures reported as well as fire brigade deaths and injuries

Classification as deliberate – some by trained arson investigators, some by insurance investigators or other insurance personnel

Statistical analysis of deliberate fires includes some fires with unknown cause or cause still under investigation

Reporting of fireplay, and no fires are categorized as both deliberate and fireplay, but practices appear to vary from province to province, based on last national statistics report published (2007). Ages are distinguished as

- 11 or younger
- 12 to 17
- 18 or older
- Playing but age unknown

The same age breakdowns can be reported for incendiary fires and for suspicious fires.

Intentional fires are categorized as to motive or circumstances.

- Arson for profit (reported in survey but not clear in 2002 coding manual where or how this point is covered)
- Arson during riot or social disturbance
- Arson by juveniles (children).

**Reporting and estimation of natural cause fires** (ISO 17755-1, page 60)

Details appear to be limited to a coding entry for lightning under Fuel or Energy Associated with Igniting Object

**Reporting and estimation of exposure fires** (ISO 17755-1, page 62)

Recorded as any of the following choices under Igniting Object

- Structure attached
- Structure detached
- Lumber yard
- Outside storage container or tank
- “Open” fire
- Forest or trees
- Grass, shrub, brush or scrub
- Vehicle
- Unclassified or unknown

**Reporting and estimation of smoking material and open flame fires** (ISO 17755-1, page 64)

Recorded as any of the following choices under Igniting Object

- Cigarette
- Pipe (contents)
- Cigar
- Ashtray (contents)
- Match used as lighting implement
- Lighter used as lighting implement
- Smoker’s material of unknown type
- Match not used as smoker’s implement
- Lighter not used as smoker’s implement
- Match or lighter (not clear which) not used as smoker’s implement
- Lamp or lantern (not electric)
- Candle or taper
- Cutting torch
- Welding torch
- Torch other than cutting or welding
- Hot ash or ember
- Unclassified or unknown type smoker’s material or open flame

These coding choices include a number of categories that cannot be confidently allocated to smoking materials versus open flames.

**Reporting and estimation of heating and cooling equipment fires** (ISO 17755-1, page 67)

recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices (unclassified or unknown appliance or equipment not further specified)

- Central heating unit
- Water heater
- Stationary space heater not further specified
- Stationary space heater – wood stove
- Portable space heater
- Fireplace not further specified
- Zero clearance fireplace
- Fireplace (with) insert
- Free-standing fireplace
- Masonry or brick fireplace
- Chimney not further specified
- Factory built chimney
- Masonry chimney
- Metal chimney
- Flue pipe or vent connector
- Radiant heating system not further specified
- Radiant heating system ceiling
- Radiant heating system floor

- Unclassified or unknown type heating equipment
- Central air conditioning *or refrigeration* equipment (partially relevant)
- Individual air conditioner or dehumidifier
- Vehicle related heater not further specified
- Vehicle related heater – interior
- Vehicle related heater – block heater
- Vehicle related heater – battery blanket
- Sauna heater (under unclassified or unknown appliance or equipment)
- Waterbed heater (under unclassified or unknown appliance or equipment)

These coding choices include a number of categories that cannot be confidently allocated to smoking materials versus open flames.

#### **Reporting and estimation of cooking and kitchen equipment fires** (ISO 17755-1, page 71)

Recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices (unclassified or unknown appliance or equipment not further specified)

- Stove or range – involving fire in pan
- Stove or range – involving fire in pot used as a deep fat fryer
- Stove or range – involving other circumstances
- Oven or stove or range
- Chafing dish or fondue
- Deep fat fryer, separate appliance
- Commercial cooking equipment – non-turbulent medium (older units)
- Commercial cooking equipment – turbulent medium (new high efficiency units)
- Domestic/household temperature controlled deep fat fryer
- Smoker for meat, fish, etc.
- Fry pan or grill not on stove
- Other portable cooking unit, including hot plate and camp stove
- Open fired broiler, fixed type
- Open fired broiler, portable type, including barbecue
- Portable food warming appliance, including steam table, warming drawer, warming table
- Toaster or waffle iron
- Electric kettle, coffee maker or urn
- Microwave oven
- Unclassified or unknown cooking equipment
- Central air conditioning *or refrigeration* equipment (partially relevant)
- Individual refrigeration unit, including refrigerator or freezer
- Electric barbecue starter

#### **Reporting and estimation of clothes dryer fires** (ISO 17755-1, page 74)

Recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices (unclassified or unknown appliance or equipment not further specified)

- Clothes dryer
- Washing machine

#### **Reporting and estimation of entertainment equipment fires** (ISO 17755-1, page 76)

Recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices (unclassified or unknown appliance, unclassified or unknown electrical equipment, or equipment not further specified)

- Television or computer monitor (partially relevant to entertainment equipment and partially relevant to office equipment)
- Radio, stereo, phonograph, tape recorder, video cassette recorder
- Video game equipment

#### **Reporting and estimation of office equipment fires** (ISO 17755-1, page 78)

Recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices (unclassified or unknown appliance, unclassified or unknown electrical equipment, or equipment not further specified)

- Television or computer monitor (partially relevant to entertainment equipment and partially relevant to office equipment)

- Electronic communications equipment
- Electronic data processing equipment, including computers
- Photocopier, facsimile machine, or computer printer

**Reporting of electrical and electrical distribution or lighting equipment fires (ISO 17755-1, page 81)**

Recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices (unclassified or unknown appliance, unclassified or unknown electrical equipment, or equipment not further specified)

- Generator
- Permanent electric wiring or cable, including junction box and power line, excluding copper or aluminum conductors
- Copper conductor
- Aluminum conductor
- Transformer
- Switchgear
- Panelboard or switchboard, including fuse or circuit breaker
- Switch, outlet, receptacle or socket
- Temporary electric wiring excluding next three more specific types
- Extension cord
- Construction site or field wiring
- Power bar
- Low voltage wiring
- Battery or rectifier
- Unclassified or unknown electrical distribution equipment
- Incandescent lamp or light bulb
- Halogen lamp
- Grow lamp or light
- Fluorescent lamp including ballast
- Unclassified or unknown electrical equipment (also linked to other electrical equipment, including office equipment)

**Reporting of other appliance and equipment fires (ISO 17755-1, page 85)**

Recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices

- Pressing iron
- Lawn mower
- Snow blower
- Electric blanket or heating pad
- Incinerator
- Vacuum cleaner
- Paint sprayer
- Motor (separate reporting for over or under 1 horsepower)
- Internal combustion engine
- Heat treatment equipment
- Industrial oven including kiln
- Tar pot
- Bearing, belting, conveyor or brake
- Commercial or industrial machinery or equipment
- Miscellaneous igniting object
- Unknown igniting object

**Reporting of item first ignited in terms of form and function (ISO 17755-1, pages 92-95)**

recorded as any of the following choices under Igniting Object; some of these choices are linked to partially specified choices

- Wood roof covering
- Non-wood roof covering
- Exterior wall covering, surface or finish
- Exterior trim or appurtenance including door, porch or balcony
- Wood floor covering



- Tile or plastic floor covering
- Carpet or rug floor covering
- Building component – floor, ceiling or roof
- Building component – wall
- Interior wall covering excluding plastic
- Interior wall covering – plastic
- Wood or high density fibreboard as ceiling covering
- Low density fibreboard as ceiling covering
- Plastic ceiling covering
- Wood or wood product insulation
- Plastic insulation
- Mineral insulation
- Unclassified building components
- Undetermined building components
- Upholstered furniture
- Non-upholstered wood furniture
- Non-upholstered plastic furniture
- Ironing board
- Mattress
- Bedding
- Drapery
- Broom, mop or brush
- Unclassified furniture or furnishing
- Undetermined furniture or furnishing
- Cotton clothing
- Wool clothing
- Synthetic fibre clothing
- Cotton fabric
- Wool fabric
- Synthetic fibre fabric
- Fur
- Tarpaulin
- Unclassified clothing or textile
- Undetermined clothing or textile
- Wood excluding wood products listed elsewhere and excluding felled timber
- Wood shavings
- Paper or packing material
- Paper decoration
- Wastepaper
- Cardboard
- Paper stock
- Unclassified wood or paper product
- Undetermined wood or paper product
- Gasoline
- Fuel oil not further specified
- Diesel
- Kerosene
- Fondue fuel
- Lighter fluid
- Combustible liquid not further specified
- Power steering fluid
- Transmission fluid
- Brake or hydraulic fluid
- Motor grease
- Crude oil
- Motor oil
- Contact cement
- Glue
- Flammable liquid not further specified excluding gasoline

- Paint or varnish
- Cooking oil or fat
- Vegetable oil
- Animal fat
- Deep fat synthetic frying oil
- Tar or asphalt
- Polish or wax
- Undetermined flammable or combustible liquid
- Natural gas
- Propane
- Anaesthetic gas
- Acetylene
- Hydrogen
- Unclassified flammable gas
- Undetermined flammable gas
- Cellulose nitrate
- Plastic
- Oxidizing material
- Magnesium and alloys
- Titanium, zirconium and alloys
- Natural or synthetic rubber including tires and belts
- Ammonium nitrate
- Unclassified chemical, plastic or metal
- Undetermined chemical, plastic or metal
- Natural or synthetic fibre
- Grain or flour
- Food – starch
- Food – protein
- Food – fruit
- Hay
- Tree or shrub
- Felled timber
- Grass, brush or leaves
- Manure
- Natural Christmas tree
- Unclassified agricultural or forestry product
- Undetermined agricultural or forestry product
- Coke or coal
- Barbecue starter stick
- Fire log
- Barbecue starter briquette
- Peat
- Creosote
- Sulphur or gunpowder
- Wood treatment oil
- Electrical insulation
- Garbage, trash or rubbish
- Oily rags
- Artificial tree
- Unclassified material first ignited
- Undetermined material first ignited

**Reporting of item first ignited in terms of material composition (ISO 17755-1, page 101)**

All coding is integrated into coding for item first ignited in terms of form and function

**Reporting of factors in ignition (ISO 17755-1, pages 104-105)**

Specific codes below omit codes previously listed for intentional fires and child-playing fires.

- Misuse of smoker's material
- Thawing

- Inadequate control of open fire
- Welding or cutting too close
- Torch too close
- Unclassified misuse of source of ignition (also links to playing with fire choices)
- Undetermined misuse of source of ignition (also links to playing with fire choices)
- Fuel spilled accidentally
- Improper fuelling technique
- Flammable liquid used to kindle fire
- Cleaning or washing part
- Improper container
- Overheated cooking oil, grease or wax
- Combustible placed too close to heat
- Improper storage
- Unclassified misuse of material ignited
- Undetermined misuse of material ignited
- Part failure, leak or break
- Automatic control failure
- Manual control failure
- Electrical short circuit (can also be used to identify electrical fires)
- Part worn out
- Backfire of engine
- Unclassified mechanical or electrical failure or malfunction
- Undetermined mechanical or electrical failure or malfunction
- Design deficiency
- Construction deficiency
- Installed too close to combustible
- Other installation deficiency
- Over-fusing (can also be used to identify electrical fires)
- Suspected faulty connection involving aluminum wiring (can also be used to identify electrical fires)
- Suspected faulty connection involving copper wiring (can also be used to identify electrical fires)
- Unclassified construction, design or installation deficiency
- Undetermined construction, design or installation deficiency
- Over-fueling
- Wood-burning appliance
- Log rolled out
- Screen not closed
- Glass doors exploded or shattered
- Paper fell out
- Flying embers
- Unclassified misuse of equipment
- Undetermined misuse of equipment
- Asleep
- Temporary loss of judgment suspected
- Physical or mental disability
- Accident
- Suspected impairment by alcohol, medication or other drugs
- Asleep due to suspected use of alcohol, medication or other drugs
- Fatigued
- Ignorance of hazard
- Distracted or preoccupied
- Unclassified human failing
- Undetermined human failing
- Eight categories of vehicle accident
- Tampering with safety devices
- Unclassified miscellaneous act or omission
- Hot exhaust or catalytic converter
- Act or omission not applicable
- Undetermined act or omission

**Reporting of factors in fire growth** (ISO 17755-1, page 108)

Through several data elements defined primarily as descriptions of the path of flame spread or smoke spread

- Flame spread via interior finish
- Flame spread via vertical openings, including factors of unenclosed stairwell or elevator shaft, inadequate firestopping, or failure of rated assembly
- Flame spread via horizontal openings, including burn-through or doors left open in rated assembly
- Smoke spread, including through openings in construction

**Presence and type of sprinkler or other extinguishing equipment** (ISO 17755-1, pages 112-113)

Coding refers to presence in building and not relevance to fire.

Separate coding for sprinklers versus other types of automatic extinguishing equipment.

**Sprinkler Codes – complete versus partial**

- Complete Sprinkler Protection - supervised or watchman service
- Complete Sprinkler Protection - alarm to fire department
- Complete Sprinkler Protection - unsupervised, local alarms only
- Partial Sprinkler Protection - supervised or watchman service
- Partial Sprinkler Protection - alarm to fire department
- Partial Sprinkler Protection - unsupervised, local alarms only
- No Sprinkler Protection
- Not Applicable - vehicle, outside area, etc.
- Sprinkler Protection - unclassified
- Cannot Be Determined

**Sprinkler Codes – type of sprinkler**

- Wet Pipe System - includes central station supervised, standard watchman service, or alarm connection to fire department
- Wet Pipe System - local alarm only
- Dry Pipe System - includes central station supervised, standard watchman service, or alarm connection to fire department
- Dry Pipe System - local alarm only
- Pre-Action System - includes central station supervised, standard watchman service, or alarm connection to fire department
- Pre-Action System - local alarm only
- Deluge System - includes central station supervised, standard watchman service, or alarm connection to fire department
- Deluge System - local alarm only
- Sprinkler System – unclassified

**Fixed System Other Than Sprinkler – Presence and Relationship to Alarm Provisions:**

- Fixed System Other Than Sprinkler - supervised or watchman service
- Fixed System Other Than Sprinkler - alarm to fire departments
- Fixed System Other Than Sprinkler - unsupervised, local alarms only
- No Fixed System
- Not Applicable - vehicle, outside area, etc.
- Fixed System Other Than Sprinkler – unclassified

**Fixed System Other Than Sprinkler – Type of Extinguishing Agent**

- Carbon Dioxide System
- Dry Chemical System
- Halon System
- Conventional (Protein) Foam System
- High Expansion Foam System
- Foam-Water System
- Water Spray System
- Wet Chemical System
- Fixed System Other Than Sprinklers – unclassified

**Performance of sprinkler or other extinguishing equipment** (ISO 17755-1, page 115)

**Performance of Automatic Extinguishing Equipment:**

- Equipment Operated
- Equipment Should Have Operated But Did Not

- Equipment Present but Fire too Small to Require Operation
- No Equipment Present in Room or Area of Origin of Fire
- Performance of Automatic Extinguishing Equipment - unclassified
- Performance of Automatic Extinguishing Equipment – unknown

**Presence and type of detection or alarm equipment (ISO 17755-1, page 118)**

Coding refers to presence in building and not relevance to fire.

**Presence of Detection/Alarm System:**

- No central alarm
- Single stage central alarm
- Single stage central alarm, connection to remote monitoring agency (See Section H2)
- Two stage central alarm
- Two stage central alarm, connection to remote monitoring agency
- Central alarm with voice
- Central alarm with voice, connection to remote monitoring agency
- Not applicable (vehicle, outside area, etc.)
- Cannot be determined

**Type of Detection Device(s) Present:**

- No detection devices
- Smoke detectors
- Smoke detectors, heat detectors and smoke detectors in return air ducts
- Heat detectors and smoke detectors in return air ducts
- Heat detectors
- Smoke detectors and specialty detectors
- Heat detectors and specialty detectors
- Not applicable (vehicle, outside area, etc.)
- Heat detectors, smoke detectors and specialty detectors
- Cannot be determined

Note: Specialty detectors include flame detectors, beam detectors and line detectors.

**Performance of detection or alarm equipment (ISO 17755-1, page 122)**

**How Fire Was Detected:**

- Smoke Alarm Device
- Smoke Detector Device
- Heat Alarm Device
- Heat Detector Device
- Automatic Sprinkler System
- Automatic System Other Than Sprinkler
- Visual Sighting or Other Means of Personal Detection
- No initial detection (burned out before detection)
- Initial Detection - unclassified
- Initial Detection – unknown

**Performance and Reasons for Failure**

- No Smoke Alarm
- Alarm in Room of Origin - Activated
- Alarm Not in Room of Origin - Activated
- Alarm in Room of Origin – Not Activated – Non-suitable Location
- Alarm in Room of Origin – Not Activated – Battery Dead
- Alarm in Room of Origin – Not Activated – No Battery
- Alarm in Room of Origin – Not Activated – AC Not Connected/Disabled
- Alarm in Room of Origin – Not Activated – Mechanical Failure
- Alarm Not in Room of Origin – Not Activated – Battery Dead
- Alarm Not in Room of Origin – Not Activated – No Battery
- Alarm Not in Room of Origin – Not Activated – AC Not Connected/Disabled
- Alarm Not in Room of Origin – Not Activated – Mechanical Failure
- Not Enough Smoke to Activate Smoke Alarm
- Smoke Alarm Activation - Unknown

**Impact**

- Not Applicable/No Occupants

- Occupants Evacuated Safely
- Occupants Did Not Evacuate – Alarm Inaudible
- Occupants Did Not Evacuate – Physically/Mentally Challenged
- Occupants Did Not Evacuate – Age Related (Infants/Aged)
- Occupants Did Not Evacuate – Unnecessary to Evacuate
- Occupants Did Not Evacuate – Suspected Influence of Drugs/Alcohol
- Occupant Response/Evacuation – Unknown

**Presence of extinguishers or other manual extinguishing equipment** (ISO 17755-1, page 125)

Included in reporting under “Manual Fire Protection Facilities”.

- Extinguishers & Standpipe System
- Extinguishers
- Standpipe System
- No Manual Fire Protection
- Not Applicable - outside area, etc.
- Manual Fire Protection Facilities - unclassified
- Cannot Be Determined

Under “Outside Fire Protection”, there is an opportunity to report the presence of municipal or private hydrants, but the emphasis is on hydrants for use by fire brigades not by occupants.

**Reporting on fire doors, fire walls and other compartmentation** (ISO 17755-1, page 128)

Included in reporting indirectly as factors in flame spread:

**Flame Spread – Vertical Openings**

- Through Unenclosed Stairwell or Elevator Shaft
- Through Inadequate Firestopping, including inside of walls, around pipes, poke-throughs
- Through Air-Handling Ducts
- Through Utility Shaft
- Through Failure of a Rated Assembly
- By Way of the Exterior of the Building
- Not a Factor
- Flame Spread Vertical Openings- unclassified

**Flame Spread – Horizontal Openings**

- Through Air-Handling Ducts
- Through Attic Spaces, Ceilings or Concealed Spaces
- Doors Burned Through in Rated Assembly
- Though Doors Open in Rated Assembly
- Through Corridor
- Through Utility Openings
- Through Windows
- Not a Factor
- Flame Spread Horizontal Openings - unclassified

**Smoke Spread Avenues**

- Through Air-Handling Ducts
- Through the Corridor
- Through the Elevator Shaft
- Through the Stairwell
- Through Openings in Construction, including gaps between slabs and walls, over doors
- Through Utility Openings - horizontal walls
- Through Utility Openings - in floors
- Not a Factor
- Smoke Spread Avenues – unclassified

References of existing database/studies

Canadian Centre for Justice Statistics. Selected observations from the National Fire Information Database 2005-2014. <http://nfidcanada.ca/wp-content/uploads/2017/09/Fire-statistics-in-Canada-2005-to-2014.pdf>

Maxim, P, Plecas, D, and Garis, L. Report on the feasibility of a Canadian National Fire Information Database. <http://nfidcanada.ca/wp-content/uploads/2016/10/Report-on-the-Feasibility-of-a-Canadian-National-Fire-Information-Database.pdf>

Clare, J and Kelly, H. Fire and at risk population in Canada: Analysis of the Canadian National Fire Information Database. <http://nfidcanada.ca/wp-content/uploads/2018/01/Murdock-U-NFID-Report-At-Risk-People.pdf>

Yang, Z and Liu, Y. Using statistical and machine learning approaches to investigate the factors affecting fire incidents. <http://nfidcanada.ca/wp-content/uploads/2018/01/York-Using-Statistical-and-Machine-Learning-Approaches-to-Investigate-the-Factors-Affecting-Fire-Incidents.pdf>

Smith, J, Dhinsa, A, Rajabali F, Zheng A, Bruin S, and Pike I. The epidemiology of residential fires among children and youth in Canada. [http://nfidcanada.ca/wp-content/uploads/2018/02/UBC-IAN-PIKE-NFID\\_Report\\_0220181.pdf](http://nfidcanada.ca/wp-content/uploads/2018/02/UBC-IAN-PIKE-NFID_Report_0220181.pdf)

#### Summaries of existing database

Data is collected at the provincial and territorial levels. Currently there is no national database, although data was previously consolidated from across the country. Data describes structure fires, vehicle fires, and outdoor fires. Data includes core variables regarding date and location, type of property and characteristics, fire protection features, circumstances contributing to ignition, causal information, discovery of fire and actions taken, and casualties.

#### Existing definitions

**Structure fire:** includes a wide range of properties/assemblies of materials forming a construction for occupancy or use to serve a specific purpose.

**Vehicle fire:** includes a wide range of motorized vehicles including, but not limited to passenger vehicles (other than a motor home), trucks, sport utility vehicles, buses, freight or transport vehicles, rail vehicles, farm equipment, water vehicles (this does not include accidents).

**Outdoor fire:** refers to fires involving vegetation, grass, brush, crops, leaves and other outdoor properties not involving a structure or vehicle.

#### Are there differences within the same country?

Yes, differences exist both within and between provinces and territories with respect to in how data is collected and maintained, which data elements are collected, and how variables are coded.

#### Identification of missing information

According to the Canadian Association of Fire Chiefs, “a number of tables contain a relatively high proportion of unknown values. Although these counts have been removed from the calculation of proportions for other categories in the table, the proportion of known values is artificially inflated.”

## **D2. STATISTICS COLLECTION ISSUES**

#### Fire department responsibilities

Local fire departments provide requested data on fire incidents, but it appears that this is generally a voluntary activity and that reporting and extent of compliance vary, based upon local and provincial directives.

#### Fire response organisation

The majority of firefighters are volunteers, but there are also professional career firefighters who serve in local fire departments.

#### Who issues the data?

Data is not currently issued at the national level. The Canadian Centre for Justice Statistics (CCJS) is responsible for collecting and standardizing data. The National Fire Incidents Statistics Committee (NFISC) is a subcommittee of the Canadian Association of Fire Chiefs (CAFC) and the Council of Canadian Fire Marshals and Fire Commissioners (CCFMC) charged with providing guidance and direction of data content.

#### Are there different levels of collection?

Varies by province or territory. Currently no national data is reported.

#### Identify disparities in data feedback

Although data is not currently collected at the national level, there was substantial variation in data submission from provinces and territories in the National Fire Information Database from 2005 to 2014. Seven provinces and territories did not participate. In addition, the completeness of data also varied among seven jurisdictions which did participate (six provinces and the Canadian Armed Forces). Some provinces did not provide a unique key that would provide linkage between incident files and victim files.

#### Where is the data stored?

Provincial level and Canadian Centre for Justice Statistics (division of Statistics Canada).

### **D3. STATISTICS INTERPRETATION ISSUES**

#### Purpose for which data is collected

According to the Council of Canadian Fire Marshals and Fire Commissioners, data on fires is intended to identify trends relative to the cause and severity of fires.

#### What are the methods used to fill the gaps where information is missing?

None currently.

#### Is there follow up to data collected?

Possibly, but likely to vary by province or locality.

#### Analyse potential cause and consequences in trends

According to [Fire Statistics in Canada, Selected Observations from the National Fire Information Database 2005 to 2014](#), the total number of fires reported to the National Fire Incident Database (NFID) showed a downward trend, declining 25% between 2005 and 2014. The report indicates that heating equipment as the source of ignition in residential fires declined consistently over the ten-year period, dropping 43%. Cooking equipment, such as ovens and fryers, was the most frequently reported source of ignition, accounting for one-third (33%) of all residential fires in 2014. This was followed closely by smoker's equipment and open flames, which accounted for a quarter (24%) of these fire incidents. There was some variation among the provinces in regards to the leading source of ignition in residential fires



#### **D4. ANALYSE EXISTING DATA**

##### Determining the level of confidence

Participation in the 2014 National Fire Information Database included coverage of 72% of the Canadian population. Seven provinces or territories did not participate, six of which had comparatively small populations and may have had unique issues not represented by the data from the more populous participating provinces.

##### Pinpointing issues and limitations

Data is incomplete. Not all jurisdictions provide data for national consolidation. Not all local fire departments provide data to the office of the fire commissioner or fire marshal. Reporting by First Nations fire services may not be included. There are a high number of unknown values in some categories.

##### Examples

###### Canada: Key Findings

- In the 10-year period between 2005 and 2014, a total of 439,256 fire incidents were reported to the National Fire Incident Database.
- These fires resulted in 1,733 deaths and 12,503 persons injured.
- Civilians represented 98 percent to 100 percent of the annual deaths over the ten-year period.
- A total of nine firefighter deaths were reported as a result of firefighting activities and 3,102 firefighter line-of-duty injuries were reported over the period.
- Residential fires accounted for the majority of structural fires, ranging from 69 percent in 2005 and 2006 to 75 percent in 2013.
- Cooking equipment and smoking equipment or open flame were the leading sources of ignition.
- Heating equipment as a source of ignition in residential fires declined by 43 percent from 2005 to 2014.
- The number of fires declined by 25 percent between 2005 and 2014.
- A total of 38,844 fires were reported in 2014, of which 19,062 incidents were structural fires.
- Three-quarters of the structural fires in 2014 were residential fires.
- Almost nine in ten fire-related deaths in 2014 occurred in structure fires. Vehicle fires accounted for 11 percent of reported deaths and outdoor fires for four percent of deaths in 2014.

Source: Statistics Canada. Fire statistics in Canada, Selected Observations from the National Fire Information Database 2005 to 2014. September 2017. Available at: <http://nfidcanada.ca/wp-content/uploads/2017/09/Fire-statistics-in-Canada-2005-to-2014.pdf> . Accessed 3 October, 2020.

## E. DIAGNOSTIC SHEET FOR CROATIA

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### E1. TERMINOLOGY ISSUES

List references of existing database/studies

The Croatian Firefighting Association has developed several web-based data-collection and management systems of activities and incidents of all Croatian fire-fighting organizations:

1. Vatronet: Fire-fighting net
2. GIS i sustav za praćenje vozila- GIS and tracking system
3. Sustav za uzbunjivanje-Alarm system
4. Interaktivna baza opasnih tvari: Dangerous materials
5. SPIS: Central portal of internet pages of fire-fighting organizations
6. UVI: Incident management system (integrated data with 1. to 4.)

Instructions for use are published only for Geo information and tracking system

<http://www.hvz.hr/informatizacija/sustav-za-pra%C4%87enje-vozila>

The other web-applications have no written manuals (is planned to be made in near future), but our office gives assistance if problems with use and organize in each county educations each year for each application.

<http://www.hvz.hr/informatizacija/korisni%C4%8Dka-podr%C5%A1ka>

Law: Firefighting organisations have the responsibility to enter data (article 24) Strategic documents (<http://www.hvz.hr/informatizacija/pravilnici-i-strategije>):

1. Strategy of informatisation of the Croatian Firefighting Association
2. Regulation of education of ICT operators of the Croatian Firefighting Association
3. Regulation about the informatics system of the Croatian Firefighting Association

Orders and Regulations:

1. Regulation about the maintenance and use of informatics systems of the Croatian Firefighting Association (<https://www.hvz.hr/informatizacija>, at the bottom)
2. Standardization of fire-fighting incidents
3. Matrix of fire-fighting incidents
4. Standardization of fire-fighting equipment
5. Matrix of standardization of fire-fighting equipment
6. Standardization of aircrafts in fire-fighting
7. Standardization of fire-fighting boats
8. Engagement and alert plan of fire-fighting forces (has to be made by county-fire-fighting associations)
9. System of management of fire-fighting incidents
10. Order about unique report of fire-fighting incident
11. Order about unique price list about fire-fighting incidents
12. Order about education program of fire-fighting operators
13. Order about the exit number of the alert system of the Croatian Firefighting Association
14. Decision about alerting of operative members of the firefighting brigades through the Alert System of the Croatian Firefighting Association
15. Decision about the daily order
16. Order about the organizational and technical measures of use of ICT applications of the Croatian Firefighting Association
17. Working processes during management of fire-fighting incidents in a county fire-fighting call center
18. Registration and deny sheet for fire-fighting operators
19. Order about operational data bases (villages, house numbers, sirens, fire-alas, fire monitoring), fire-protection plans, contacts with other organizations)
20. Order about radiophonic data (on county level)
21. Parish register of member of firefighting unit
22. Use agreement of Fire-management system between the Croatian Firefighting Association and County Fire-fighting Association

#### Summaries of existing database

1. Vatronet: Fire-fighting net: 11 modules (members, organizations-equipment, reports, search, education, competitions, decorations, ID cards, forum, other activities, administration)
2. GIS i sustav za praćenje vozila- GIS and tracking system: GIS fire-fighting layers and vehicle tracking
3. Sustav za uzbunjivanje-Alarm system alarming by phone and SMS
4. Interaktivna baza opasnih tvari: Dangerous materials-basic data about all dangerous goods by UN number, lessons learned, producers/suppliers, experts, equipment, general information
5. Središnji portal internet stranica SPIS: Central portal of internet pages of fire-fighting organizations- each fire-fighting organization can open a web-site
6. UVI: Incident management system (integrated data with 1. to 4.)- real time data collection for incidents (preparation for incident, incident management, statistical-and analytical management)

#### Existing definitions

The Croatian Firefighting Association has a list of all definitions.

Are there differences within the same country?

Unique database within the whole country.

## **E2. STATISTICS COLLECTION ISSUES**

#### Fire response organisation

- Professional fire-brigades
- Volunteer fire brigades
- Intervention units of Croatian Firefighting Association
- Army (air forces and namjenski organizirane snage-purpose organized forces)

#### Who collects data?

- Number of fires is collected by the Croatian Firefighting Association
- Fires by fire objects (buildings types, sectors of industry, etc.) is collected by the Croatian Firefighting Association
- Number of victims (deaths, injured, rescued persons, missing persons) is collected by the Ministry of interior
- Fire causes is collected by the Ministry of interior
- Fire damage is collected by the Ministry of interior

#### Who issues the data?

Croatian Firefighting Association on behalf of all firefighting departments

Are there different levels of collection?

No difference.

#### Identify disparities in data feedback

The new Firefighting Law from 2019: all firefighting units are obliged to enter and renew data that are prescribed by law

#### Where is the data stored?

At national level (ministry, institution, private company), in the Shared Services Centre within the Ministry of Justice and Administration

### **E3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

Ministry and Fire Service

Purpose for which data is collected

Incident preparation, incident management, post analysing, financing of fire-fighting units ("Vatrogasna mreža"- Firefighting Net), public relations and visibility

What are the methods used to fill the gaps where information is missing?

All fire departments are required by law to report their data; meaning that funding can be withdrawn if data is not provided.

Is there follow up to data collected ?

Update versions are made regularly

### **E4. ANALYSE EXISTING DATA**

Determining the level of confidence

Confidence is growing as it used to be collected from several sources but now it is all governed by the Croatian Firefighting Association

Pinpointing issues and limitations

Issues: constant updates, integration of data with other data of ministries, use for free for all fire-fighting units.  
Limitations: Informatics personnel

Examples

- The examples shown above show that the main focus in Croatia is on fighting forest fires.
- The number of fires in buildings has been increasing for years.
- Since there are many key players in Croatia, the procedure for uniform national fire statistics is a bit confusing.

## F. DIAGNOSTIC SHEET FOR CZECH REPUBLIC

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### F1. TERMINOLOGY ISSUES

#### References of existing database/studies

The name of the national Fire Statistics Database is “Statistical monitoring of emergencies” (Statistické sledování událostí). In this programme not only fire statistics are recorded but also all details of all emergencies in which the fire units intervened.

The database is accessible only by the Fire Rescue Service, but the basic data are published every 3 months on the website and in the Statistical Yearbooks.

<https://www.hzscr.cz/clanek/statistical-yearbooks.aspx>

The typical content of the Yearbook is as follows:

#### FIRE SERVICE ACTIVITY (FSA)

- Individual types of events with FSA interventions
- Evacuated and rescued persons
- Number of interventions in natural disasters
- Summary information on events in the regions
- Interventions (including multiple)
- for individual types of events according to the type of FSA
- Basic information about FSA
- Interventions of FSA HZS ČR at events abroad
- Death and injury of firefighters during interventions
- Events with the intervention of the chemical laboratory of the Fire and Rescue Service of the Czech Republic and aeronautics of other services
- Events involving military fire brigades
- Events in the territory under the administration of municipalities with extended powers
- Road traffic accidents with the participation of FSA
- FSA cooperation in intervention
- Negative effects of interventions
- Overview of FSA interventions in districts and regions
- The share of individual types of FSA in the total number of interventions
- Events with FSA interventions by time of day
- Fires with damage of CZK 10 million and more, events in the 3rd and special alarm level
- Number of persons killed in fires
- Number of persons injured in fires
- Number of rescued persons
- Number of persons killed in traffic accidents
- Number of persons injured in traffic accidents
- Number of evacuees
- Extraordinary events in the 3rd and special alarm level
- Selected tactical and verification exercises of IRS units
- Individual activities of the FSA

#### FIRE 27

- Basic indicators
- Fires - an overview
- Share of fires with damage of CZK 1 million and higher in total damages
- Persons killed and injured in fires
- Fires: by district and region
- Fires - an overview of industries
- Fires in restaurant facilities
- Fires in connection with heat preparation of food and chimney fires
- Direct damage and protected values in case of fires
- Fires and damage by place of origin
- Persons killed in a fire
- Fires in buildings, vehicles and open spaces

- Forest fires
- Fires by cause and activity

#### PREVENTION

- Overview of fire prevention services of the Fire and Rescue Service of the Czech Republic
- Inspections of restaurant facilities
- Inspections of monuments
- An overview of other selected data from the activities of the Fire and Rescue Service of the Czech Republic
- Preventive educational activity

#### INTERNATIONAL COOPERATION

- Humanitarian aid
- International exercises of IRS units
- Foreign activities

#### ECONOMIC AND PERSONNEL TELE SHOW

#### TYPES OF EXTRAORDINARY EVENTS WITH FSA INTERVENTIONS

##### Summaries of existing database

- Type of emergency,
- Address,
- times,
- number of fire units,
- casualties,
- Fires: saved values, damages, causes and activities by the origin, building, objects

##### Are there differences within the same country?

There is a unique database. Each region is responsible for collecting the fire statistics and the republic data are concentrated in Ministry of the Interior-General Directorate of the Fire Rescue Service of the Czech Republic

##### Are there differences and contradictions with other domains?

No

##### Identification of missing information

There are no missing information in our database. All relevant data collected is necessary and sufficient for analysing the emergencies.

## **F2. STATISTICS COLLECTION ISSUES**

### Fire department responsibilities

Primary mission of the Fire Rescue Service of CR is to protect life, health and property of citizens against fire, and to provide effective help in emergencies. Fire Rescue Service of CR is one of the basic bodies of the Integrated Rescue System, which has been operating with new structure since 1st January 2001. Under the Act No. 320/2015 Coll. on Fire Rescue Service of CR and on certain regulations, new organisational structure had been established and the basic tasks had been determined.

<https://www.hzscr.cz/hasicien/article/fire-rescue-service-of-the-czech-republic-mission-and-tasks.aspx?q=Y2hudW09MQ%3d%3d>

### Fire response organisation

The fire system in the Czech Republic is based on professional fire units (Act No. 320/2015 Coll.) and voluntary fire units.

Who collects data?

The Fire Rescue Service is responsible for collecting fire data, some information is collected also by insurance companies and Police of the Czech Republic.

Who issues the data?

Fire Rescue Services (FRS) of the regions issue their statistics and the republic data are issued by the Ministry of the Interior- Directorate General of the Fire Rescue Service.

Are there different levels of collection?

The detailed information about fires (expert reports) are collected by the regional FRS. The national database includes only basic indicators about fires.

Identify disparities in data feedback

Not applicable.

Where is the data stored?

The data are stored in the FRS of the regions and in the Ministry of the Interior- Directorate General of the Fire Rescue Service.

### **F3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

The data are interpreted by the FRS of the regions and the Ministry of the Interior- Directorate General of the Fire Rescue Service.

Purpose for which data is collected

All relevant data which are necessary for analysing the emergencies.

Is there follow up to data collected ?

The Ministry of the Interior- Directorate General of the Fire Rescue Service analyse every 3 months the data from the regions – in case anything is missing – the regions repair the data in the database.

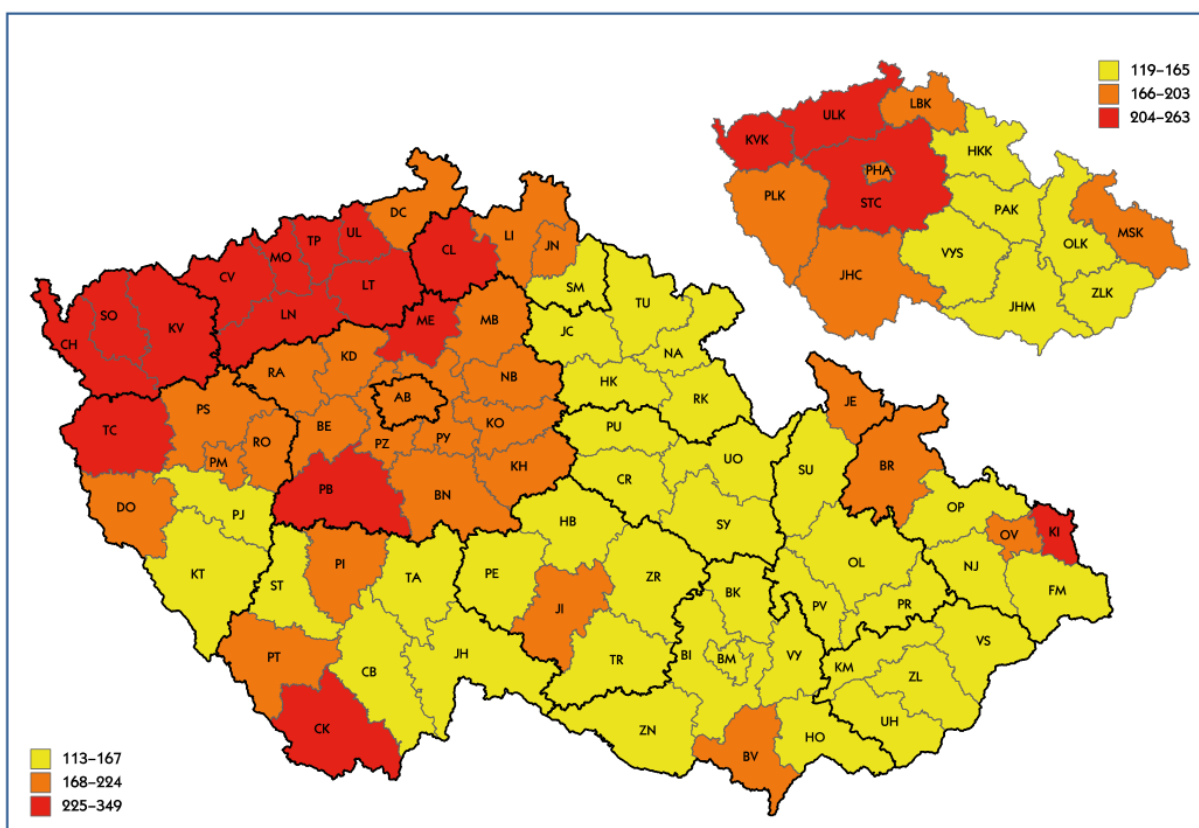
The database is updated every year depending on the special needs of the Fire Rescue Service.

### **F4. ANALYSE EXISTING DATA**

Examples

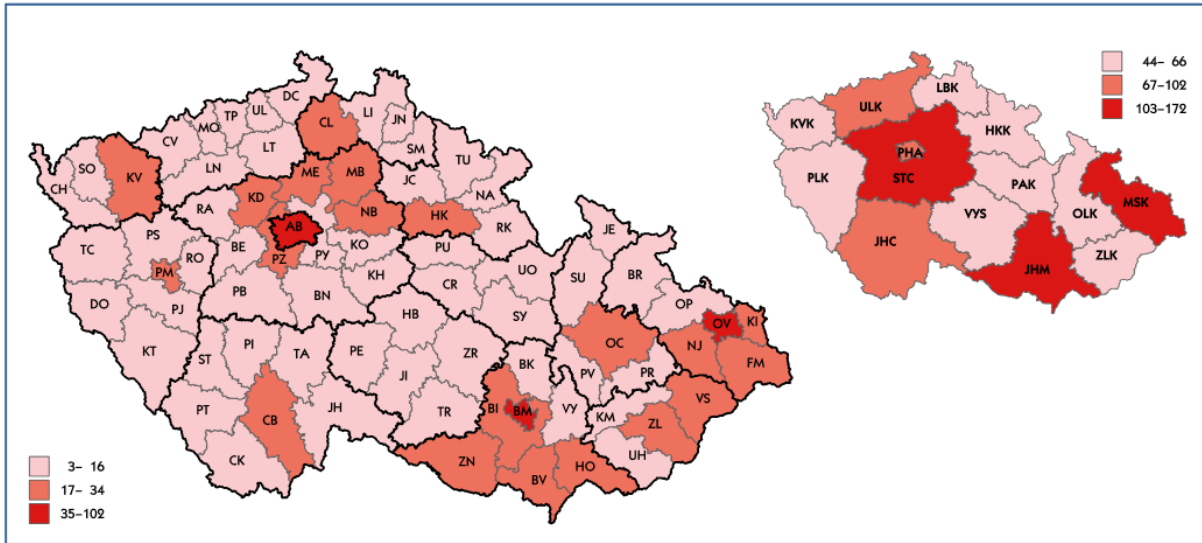
The following figures taken from Statistical Yearbook 2017.

	Fires	Damage (Kč)	Protected values (Kč)	Fire Deaths	Fire injuries
1996	21 539	1 345 497 700	8 418 267 000	118	1 037
1997	21 540	1 229 951 200	6 393 776 000	135	1 026
1998	24 041	1 902 566 000	6 925 493 000	96	1 123
1999	20 857	2 088 610 700	8 907 455 000	105	934
2000	20 919	1 426 340 200	6 584 192 000	100	975
<b>1996–2000</b>	<b>108 896</b>	<b>7 992 965 800</b>	<b>37 229 183 000</b>	<b>554</b>	<b>5 095</b>
2001	17 285	2 054 670 000	6 230 121 000	99	881
2002	19 132	3 731 915 000	6 251 751 000	109	942
2003	28 937	1 836 614 900	7 646 975 000	141	1 112
2004	21 191	1 669 305 100	6 977 363 000	126	918
2005	20 183	1 634 371 000	7 110 116 000	139	914
<b>2001–2005</b>	<b>106 728</b>	<b>10 926 876 000</b>	<b>34 216 326 000</b>	<b>614</b>	<b>4 767</b>
2006	20 262	1 933 991 700	9 182 541 000	144	919
2007	22 394	2 158 494 200	8 974 428 000	130	1 023
2008	20 946	3 277 297 400	14 545 693 000	142	1 109
2009	20 177	2 169 150 200	9 074 906 000	117	980
2010	17 937	1 956 159 200	11 115 762 000	131	1 060
<b>2006–2010</b>	<b>101 716</b>	<b>11 495 092 700</b>	<b>52 893 330 000</b>	<b>664</b>	<b>5 091</b>
2011	21 125	2 241 800 100	8 078 932 000	129	1 152
2012	20 492	2 861 527 700	10 637 936 000	125	1 286
2013	17 105	2 402 562 900	13 342 294 000	111	1 189
2014	17 388	2 198 327 400	11 533 643 000	114	1 179
2015	20 232	2 495 902 900	11 093 236 000	115	1 449
<b>2011–2015</b>	<b>96 342</b>	<b>12 200 121 000</b>	<b>54 686 041 000</b>	<b>594</b>	<b>6 255</b>
2016	16 253	3 378 246 000	11 654 305 900	124	1 291
2017	16 757	3 653 115 100	9 674 378 000	92	1 392

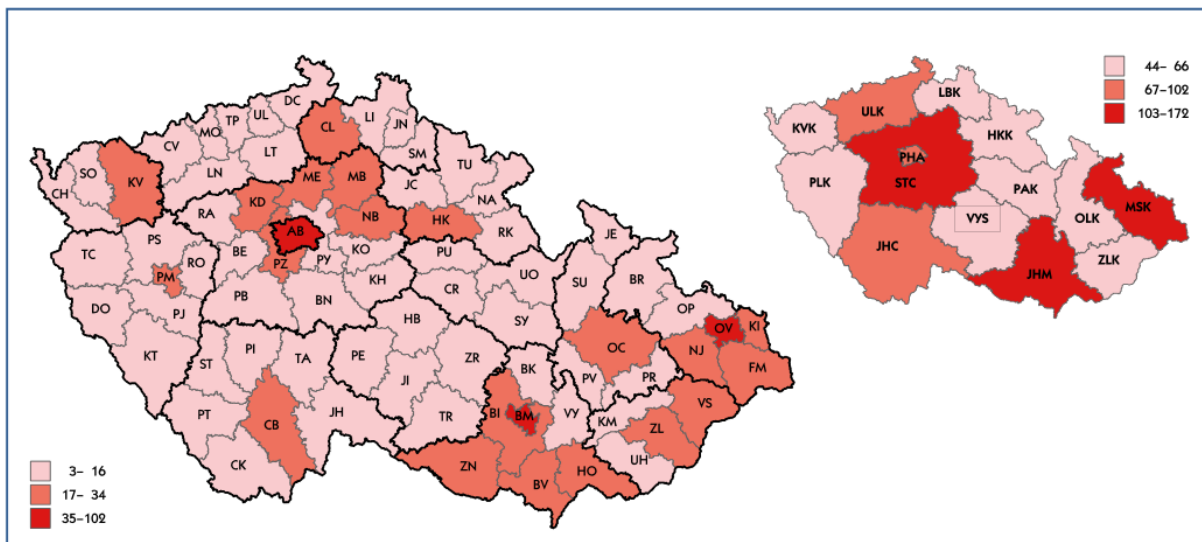


Fires in 2008–2017 (number per 10,000 inhabitants)

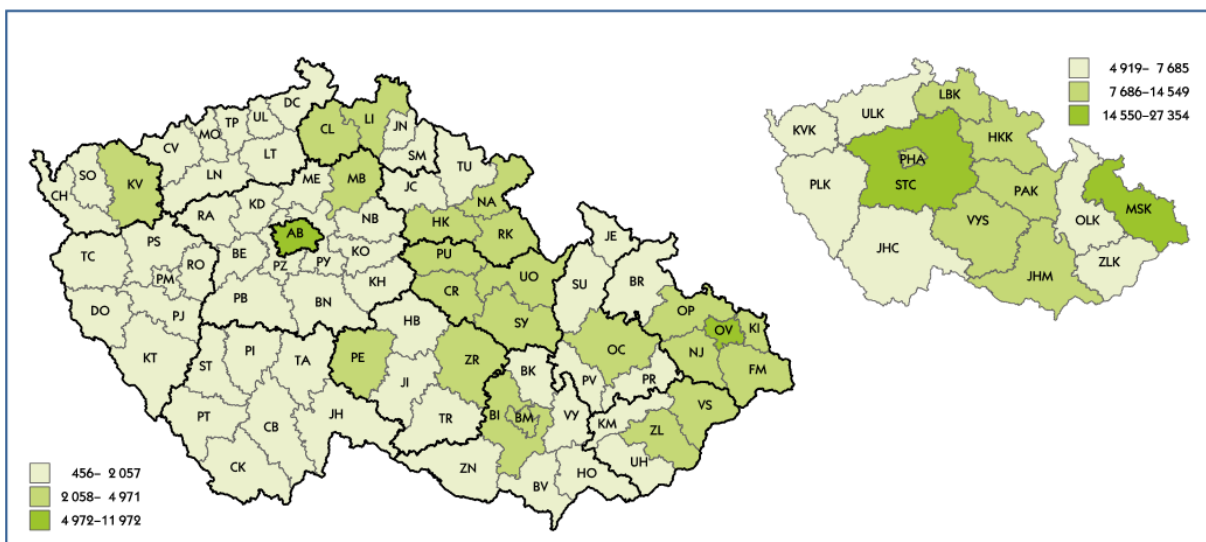




Number of people killed in fires in 2008-2017



Number of persons injured in fires in 2008-2017



Number of rescued persons in 2008-2017

## G. DIAGNOSTIC SHEET FOR DENMARK

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### G1. TERMINOLOGY ISSUES

References of existing database/studies

<https://www.beredskabsstyrelsen.dk/viden/odin/vejledninger/definitioner/Pages/default.aspx>

Summaries of existing database

At national level:

Danish national fire statistics is published every year.

It published by Danish Emergency Management Agency – (DEMA) [www.brs.dk](http://www.brs.dk)

Existing definitions

In the database there exists the following definitions:

- Real alarm/false alarm
- CRBN Tasks
- Type for vehicles
- Type of emergency for vehicles
- Type of task for personnel
- Definition of personal
- Definition of competences
- First response type
- Category of report

Capacities (information regarding the municipal fire department)

Fire stations: (Name, address, category, type (full time/part time/volunteer)

Personal: (Name, full time/part time/volunteer, education)

Vehicles (ID, type, station)

Response activities

Alarm:

- Date and time
- Who alarmed (alarmcenter, firealarm system, other)
- Cause of alarm (building fire, rescue, train accident etc.)
- Adress
- Response time and response demand
- Assistance
- Meeting plan

Information about the incident address:

- Type of alarm (real or false alarm)
- Place of incident (type of building)
- Type of incident (fire, traffic incident, pollution, nature disaster)
- Is it building covered by the fire regulation.
- extinguished before arrival

Information about used vehicles:

- Type of emergency response
- Type of task
- Time of alarm
- Time of departure
- Time of arrival
- Time of release
- Ready
- Use of special material

Information of personal:

- Task
- Function
- Time of alarm
- Time of arrival
- Ready

Task:

- Job done at the incident scene (extinguishing fire, rescue persons ie)
- Object for the effort
- Any dead or injured

Fire incidents:

- Information about the extinguishing
- Classification
- Water consumption
- Source of water
- Information about ignition
- Information about factors resulting in fire
- Building fire
- Size of fire at arrival
- Starting place of fire
- Spread of fire
- Any functional fire safety equipment
- Information about rescue task
- Use of ladders
- Number of persons rescued
- Number of animals rescued
- Number of persons evacuated
- Information about CRBN task

Fire alarm system:

- System number
- Number of detectors
- Types of detectors
- Cause of alarm

Are there differences within the same country?

No both the local (municipal) fire department and the state fire department use the same program/database

Are there differences and contradictions with other domains?

No, not known. Health authorities make their own statistics about people insured or dead in fires / smoke intoxication etc.

Identification of missing information

Fire's the fire brigade don't know about (no official fire alarm) is not stored in the database-system. The insurance companies have more data / databases but they are not public available.

## **G2. STATISTICS COLLECTION ISSUES**

Fire department responsibilities

The local fire departments are responsible to deliver the data to the database.

Fire response organisation

The local fire department is owned by the municipal, and is always involved in an incident. If it is a large scale incident then the state can assist with material and men.

Who collects data?

The database is driven by the State (DEMA) but it is the local fire department, that delivers the data. The police department and Health authorities (ambulance) do not deliver any data. The insurance company don't deliver any data

Who issues the data?

DEMA

Are there different levels of collection?

The local fire department delivers the data from their alarms. The national firebrigade delivers the data from their alarms

Identify disparities in data feedback

The education in filling out the report (database) is rather weak, which increase the risk of different interpretations of an incident.

Where is the data stored?

DEMA (in the database ODIN)

## **G3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

DEMA

Purpose for which data is collected

The main purposes are:

1. To elaborate and develop the fire departments
2. To optimize fire response time
3. To define the volume of personnel and equipment
4. To detect any trends in incidents

What are the methods used to fill the gaps where information is missing?

Unknown

Is there follow up to data collected ?

DEMA is controlling that all reports are made and contact the municipal if any is missing

#### **G4. ANALYSE EXISTING DATA**

Determining the level of confidence

Medium, mostly due to the lack of education.

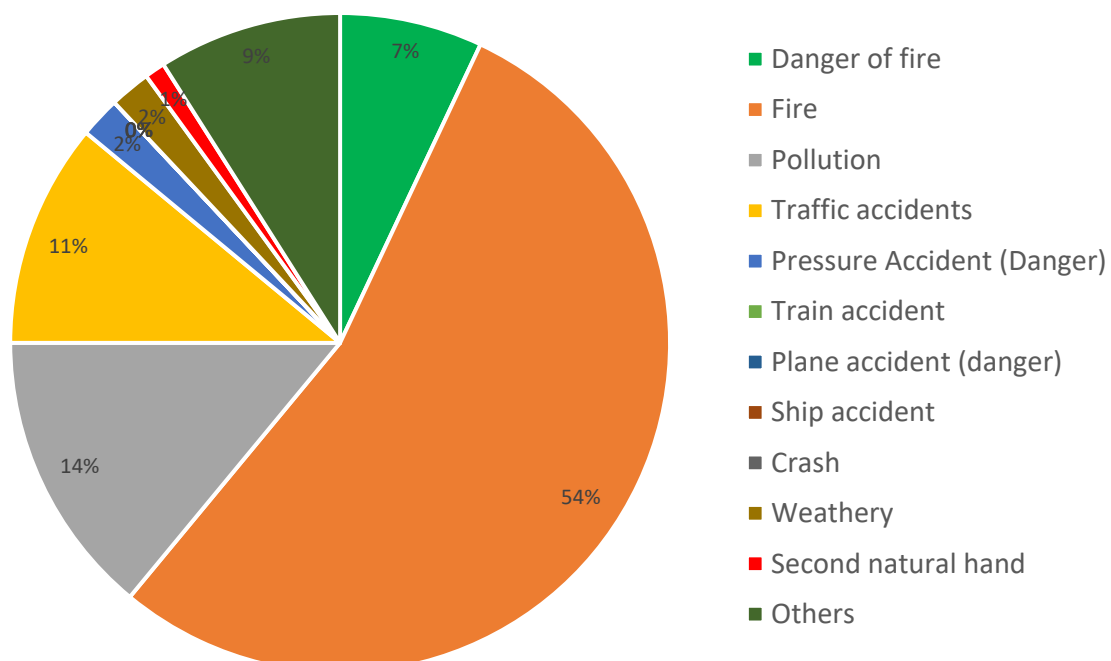
Pinpointing issues and limitations

- The lack of training for the firefighters in charge of the fire response report.
- The police is responsible for the fire investigation. There is no feedback-loop into the database from their investigation.
- The database from the fire departments is not taking into account the fire casualties, which are not reported or reported in a separate database.

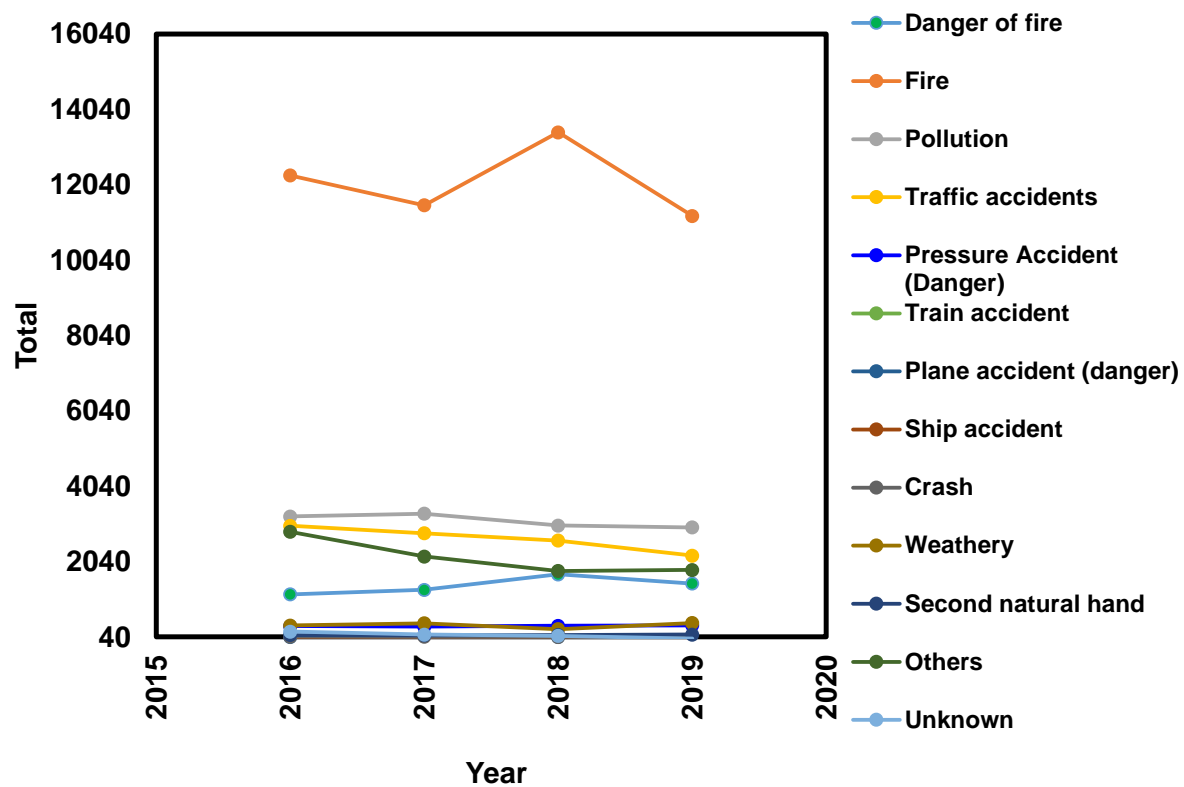
Examples

In 2019, the fire activity has accounted for 54% of the total activity and it represented the main activity.

**Breakdown of interventions by type in 2019**

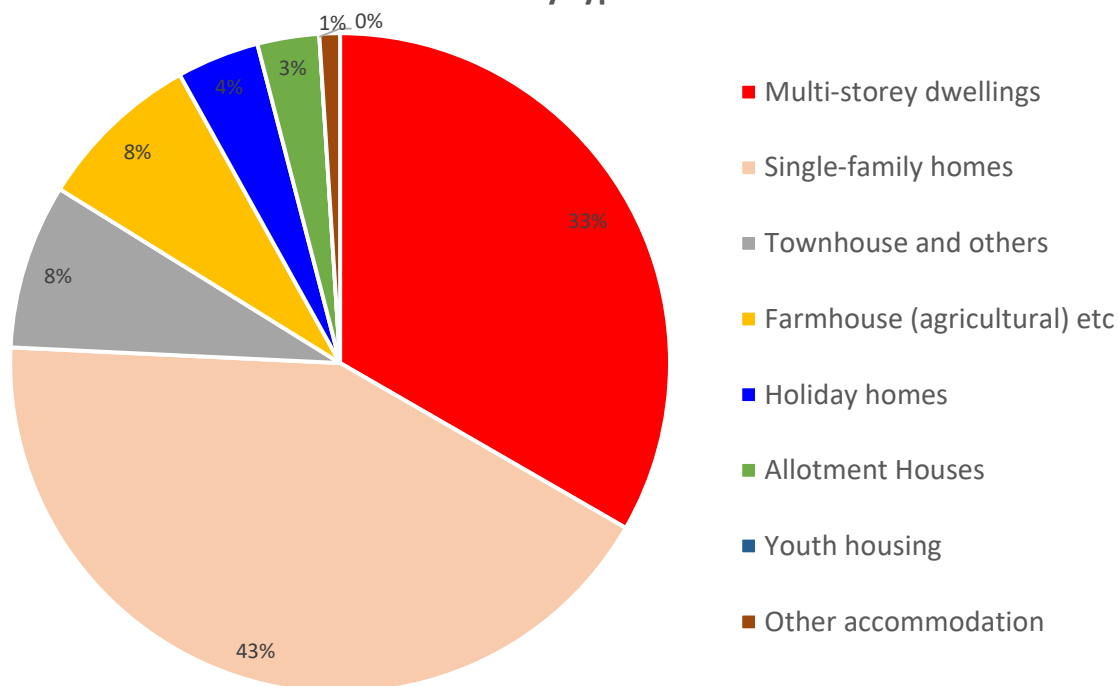


Evolution of the number of fire interventions by type

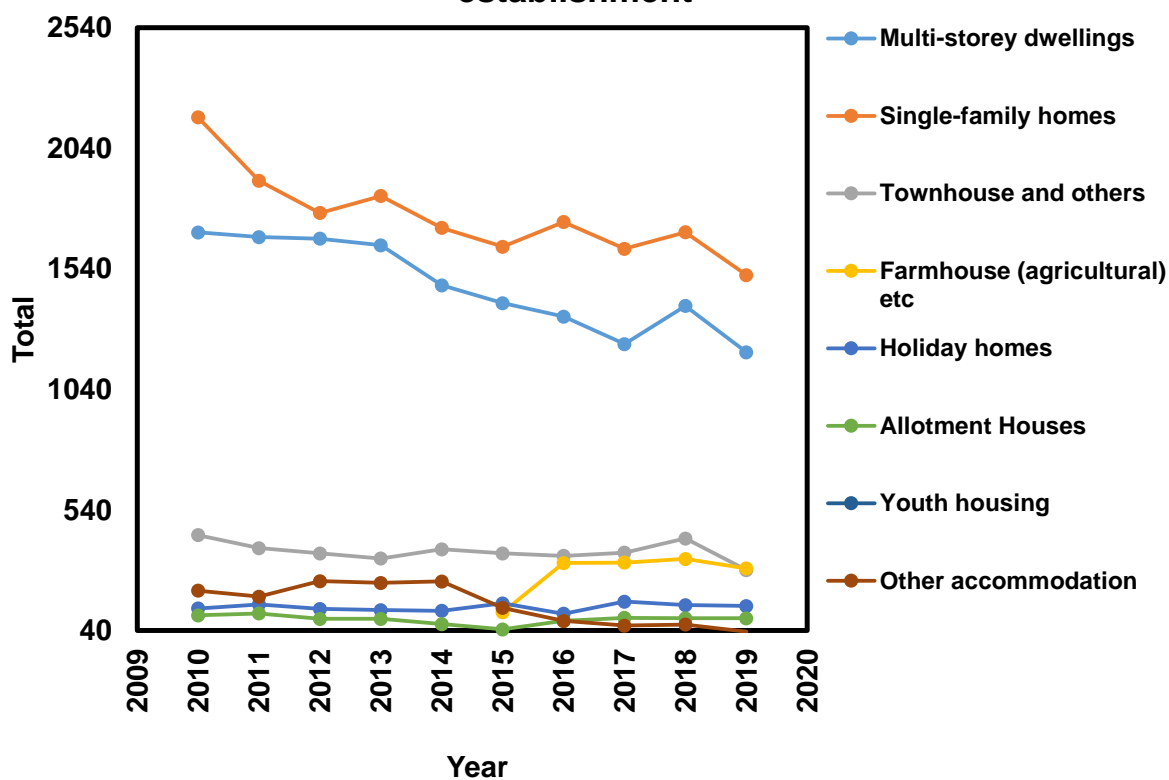


In 2019, the majority of fire interventions was for single-family homes (43%), followed by fire interventions in multi-storey dwellings (33%), townhouse and others (8%), farmhouse (agricultural) (8%) and others (8%).

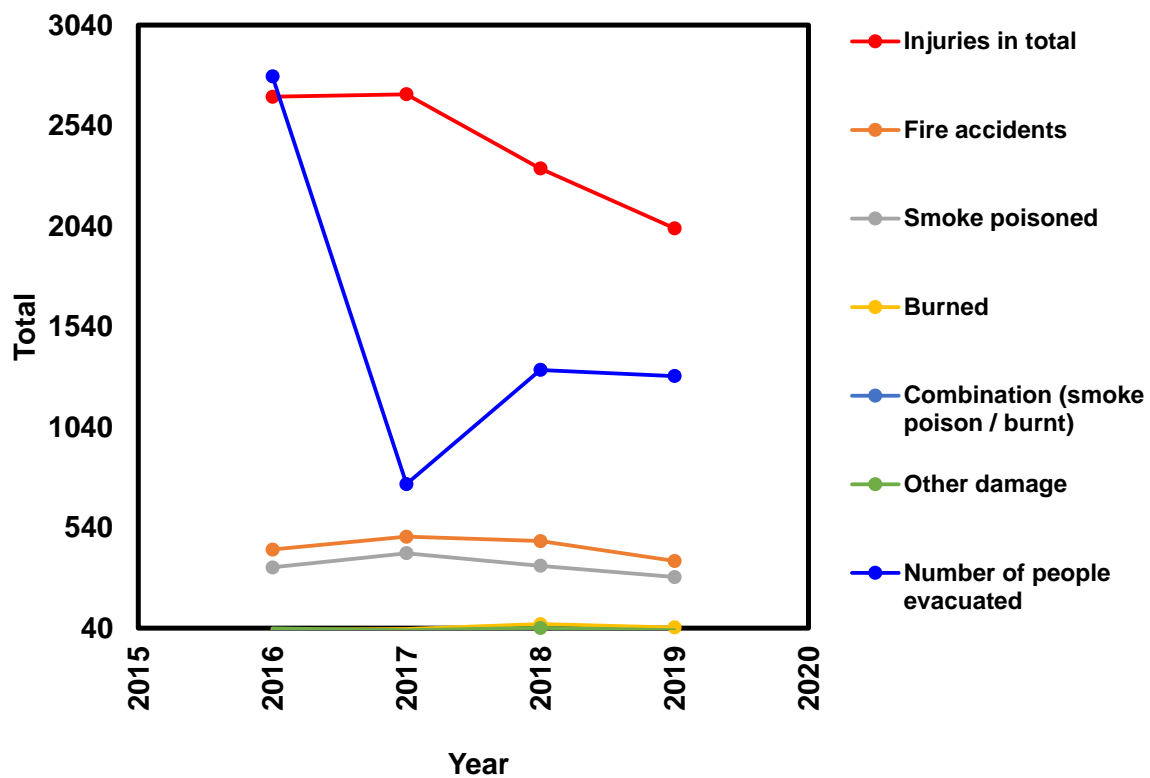
**Breakdown of interventions by type of establishment in 2019**



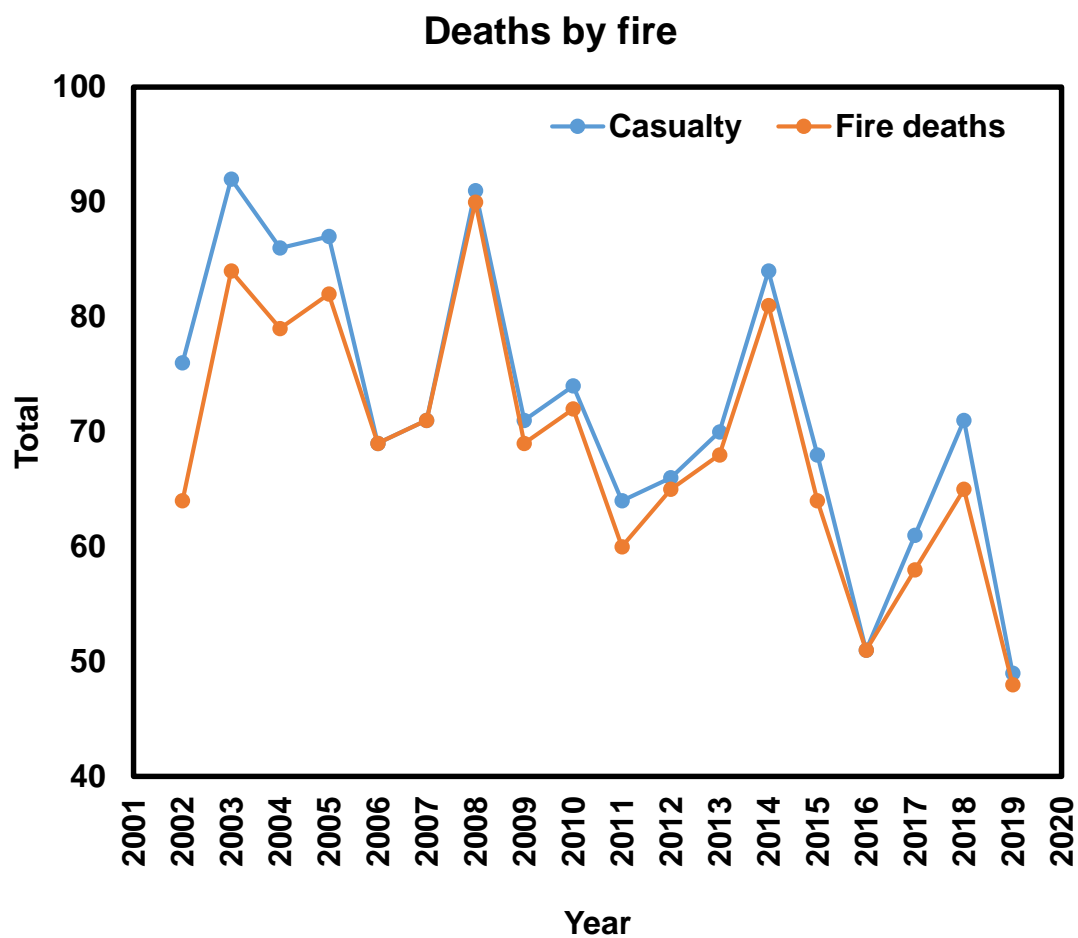
**Evolution of the number of fire interventions by type of establishment**



### Total injuries and fire accidents







The source of the data is <https://brs.dk/globalassets/brs---beredskabsstyrelsen/dokumenter/forskning-statistik-og-analyse/2020/-redningsberedskabet-i-tal-2019-2.pdf>.

## H. DIAGNOSTIC SHEET FOR FRANCE

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### H1. TERMINOLOGY ISSUES

Information from ISO 17755-1 & -2

#### **ISO TR 17755-1**

##### **Fires subject to reporting** (ISO TR 17755-1 page 4)

“Undetermined.”

##### **Fire deaths subject to reporting** (ISO TR 17755-1 page 7)

“Officially undetermined (No survey returned).”

But actually there are two different fire fatality databases in France: one is realized by the Home Ministry-DGSCGC and the other by the INSERM- CapiDc.

The database realized by the Home Ministry - DGSCGC is implemented by the fire services. All the deaths which occurred on the scene of a fire are taken into account. Deaths (due to acute fire effects) of firefighters, fire officers, fire brigade personnel and other emergency responders are also reported. This database does not take into account the fire casualties which will die at the hospital or during their transportation to the hospital by EMS.

Some elements of this database are published every year by DGSCGC through a special document.

The 2012 edition (for 2011) detailed the number of French fire services which have contributed to the national database and the number of fire fatalities which occurred on the scene of fires. This publication does not detail the age, gender, ethnicity (strictly forbidden by the law), activity when injured, type and severity of injury, behaviors that contributed to injury, part of body injured. It just specifies the type of fire during which the death occurred, such as home building, public building, forest fire.

The database realized by the INSERM- CapiDc is compiled from the medical death certificates completed by physicians. Since 2000, the causes of death are coded according to the tenth revision of the International Classification of Diseases of WHO. The data are based on the underlying causes of death selected by the WHO rules. This database includes all the fire deaths which occurred in France (Metropolitan and ultramarine): on the scene of the fire, during the transportation and at the hospital. Suicides by fire are also included in this database. INSERM-CapiDc uses CIM 10 codes: X00-X009, X01-X019, X02-X029, X03-X039, X04-X049, X05-X059, X06-X069, X08-X089, X09-X099, W35-W409, X97-X979.”

##### **Fire injuries subject to reporting** (ISO TR 17755-1 page 9)

“Officially undetermined (No survey returned).”

But actually the database realized by the Home Ministry - DGSCGC is implemented by the fire services.

The database realized by the Home Ministry - DGSCGC is implemented by the fire services. All the injuries which occurred on the scene of a fire are taken into account. Injuries (due to acute fire effects) of firefighters, fire officers, fire brigade personnel and other emergency responders are also reported.

Some elements of this database are published every year by DGSCGC through a special document.

The 2012 edition (for 2011) detailed the number of French fire services which have contributed to the national database and the number of fire injuries which occurred on the scene of fires. This publication does not detail the age, gender, ethnicity (strictly forbidden by the law), activity when injured, type and severity of injury, behaviors that contributed to injury, part of body injured. It just specifies the type of fire during which the injury occurred, such as home building, public building, forest fire.”

##### **Victim characteristics** (ISO TR 17755-1 page 13)

“The only information available in the two different fire French databases (Home Ministry-DGSCGC and INSERM- CapiDc) is the number in each type of building (home, public building).”

##### **Property damage subject to reporting** (ISO TR 17755-1 page 26)

“Undetermined.”

##### **Other losses subject to reporting** (ISO TR 17755-1 page 30)

“Deaths and injuries of firefighters, fire officers, fire brigade personnel, and other emergency responders due to acute fire effects.”

##### **Location of fire** (ISO TR 17755-1 page 32)

“Undetermined.”

##### **Reporting of type of construction** (ISO TR 17755-1 page 52)

“Undetermined.”

**Reporting on building height and other building characteristics** (ISO TR 17755-1 page 54)

“Undetermined.”

**Reporting and estimation of deliberately set fires** (ISO TR 17755-1 page 56)

“No.”

**Reporting and estimation of natural cause fires** (ISO TR 17755-1 page 60)

“Undetermined.”

**Reporting and estimation of exposure fires** (ISO TR 17755-1 page 62)

“Undetermined.”

**Reporting and estimation of smoking materials and open flame fires** (ISO TR 17755-1 page 65)

“Undetermined.”

**Reporting and estimation of heating and cooling equipment fires** (ISO TR 17755-1 page 67)

“Undetermined.”

**Reporting and estimation of cooking and kitchen equipment fires** (ISO TR 17755-1 page 71)

“Undetermined.”

**Reporting and estimation of clothes dryer fires** (ISO TR 17755-1 page 74)

“Undetermined.”

**Reporting and estimation of entertainment equipment fires** (ISO TR 17755-1 page 76)

“Undetermined.”

**Reporting and estimation of office equipment fires** (ISO TR 17755-1 page 78)

“Undetermined.”

**Reporting of electrical and electrical distribution or lightning equipment fires** (ISO TR 17755-1 page 62)

“Undetermined.”

**Presence and type of sprinkler or other extinguishing equipment** (ISO TR 17755-1 page113)

“Undetermined.”

**Performance of sprinkler or other extinguishing equipment** (ISO TR 17755-1 page115)

“Undetermined.”

**Presence and type of detection or alarm equipment** (ISO TR 17755-1 page118)

“Undetermined.”

**Performance of detection or alarm equipment** (ISO TR 17755-1 page122)

“Undetermined.”

**Presence of extinguishers or other manual extinguishing equipment** (ISO TR 17755-1 page125)

“Undetermined.”

**Presence of smoke management or control equipment** (ISO TR 17755-1 page127)

“Undetermined.”

**Reporting on fire doors, fire walls and other compartmentation** (ISO TR 17755-1 page128)

“Undetermined.”

#### **ISO 17755-2**

Nothing relevant

## References of existing database/studies

### Databases

#### At national level:

- French national fire statistics published every year (only in French) by the “General Direction of Civil Security and Crises Management” (DGSCGC) of the French Home Ministry. Official web site: [www.interieur.gouv.fr](http://www.interieur.gouv.fr).
- French national medical causes of deaths statistics published every year (only in French) by the Epidemiology Centre of medical causes of death (CEPIDC) of the National Health and Medical Research Institute (INSERM) itself placed under both the authority of the Ministry of Health and the Ministry of Research. Official web site: [www.cepidc.inserm.fr](http://www.cepidc.inserm.fr).
- Within the Ministry of Ecology, the Bureau d'Analyse des Risques et Pollutions Industriels (BARPI) is responsible for gathering, analysing and disseminating feedback regarding industrial and technological accidents including fire. The BARPI manages the ARIA (Analysis, Research and Information on Accidents) database, specifically designed for industrial and technological accidents. Every year the BARPI publishes an inventory of technological incidents and accidents. Official web site: <https://www.aria.developpement-durable.gouv.fr/>

#### At local level:

- French Fire Departments fire statistics published every year (only in French) by each French Fire Department (SDIS or BSPP or BMPM).
- Thematic fire statistics published when it is necessary by some French Fire Department (SDIS or BSPP or BMPM).

### Studies

#### Fire statistics

A few number of studies and scientific publications about fire statistics are on the Web. E.g.

- “Fire deaths in home fires in 2008” - BSPP – BPREV- 9 January 2009 – (in French)
- “Elements to assess cars arsons in 2015” – ONDRP – n° 13 – April 2017 – (in French)
- “Statistical analysis of intervention reports for fires resulting in casualties deceased on the spot in Paris area” – Pierre CARLOTTI, Dominique PARISSE, Nicolas RISLER - Fire Safety Journal n° 92 (2017) – Pages 77 to 79 – (in English)

#### Medical causes of deaths statistics

113 international scientific publications and 30 national scientific publications (from 1987 to 2020) about medical causes of deaths (among which fire deaths) are available on CEPIDC/INSERM web site. Most of them are in English.

Lasbeur L, Rigou A, Thélot B. Application de la méthode capture-recapture aux victimes décédées par incendie après transfert en milieu hospitalier, France métropolitaine, 2007. Saint-Maurice : Institut de veille sanitaire ; 2012. 26 p. <http://www.invs.sante.fr>

#### Abstract :

In France, the epidemiological surveillance of fire-related mortality is provided primarily from three sources: mortality data from French Epidemiological Centre for Medical Causes of Death - CépiDc (476 accidental deaths in 2008), the French Hospital Information System - PMSI (194 hospital deaths in 2008) and firefighters reporting (378 deaths in 2008). The objective of the study was to estimate the number of fire-related deaths in hospitals based on the capture-recapture method. The capture-recapture method is used to make population estimates from sources that have partially shared information. The principles and conditions of the capture-recapture method were considered. The method was applied to two data sources: CépiDc and PMSI, as the firefighters data was not homogeneous enough to be crossed with other data. The study was restricted to hospital deaths. In order to identify common cases, the matching variables used were the month of death, age, sex, and the death district.

The method enabled to estimate that there had been 252 fire-related deaths (95% CI = [134-370]) in hospitals in France in 2007. The exhaustivity of the two combined sources was 97% (85% for CépiDc and 79% for PMSI). The conditions of application of capture-recapture method were discussed: real cases, independence of sources, capture homogeneity, closed population, same period and geographical area.

The application of the capture-recapture method can be repeated annually. The whole approach aims to produce validated and generally acknowledged estimates, by date, gender, age, region, year after year, of the number of fire-related deaths in France.

### Summaries of existing database

#### **National level/French national fire statistics (DGSCGC-French Home Ministry)**

The last published edition (fire statistics of 2018) is a document of 80 pages organized as followed:

1. Foreword
2. The actions
3. The personnel
4. The organisation
5. The equipment
6. The national fire departments indicators

This report contains information such as:

- The number of interventions for all type of activities: fire related, traffic accidents, personal assistance...
- Number of interventions by day,
- Number of interventions for 100 000 inhabitants,
- Number of interventions for types of buildings and the type of intervention missions (fire related, traffic accidents, personal assistance...),
- Duration of an intervention,
- Average number of intervention by day, by activity and type of building,
- Number of aggression by 100 000 hours of interventions,
- Number of victims by type of intervention (deaths, severe injuries, relative injuries)
- Number of victims by type of buildings (deaths, severe injuries, relative injuries)
- Number of enrolled fire fighters (civil, professional, military...)

#### **BARPI yearly reports for industrial buildings**

The report covers all type of accidents in the industrial sector for all types of buildings including plants, workshops, warehouses, construction sites, quarries, breeding farms, etc.

In 2019, most accidents occurred due to fires (59%), followed by material releases (41%) and finally explosions (4%). These percentages, however, remain variable depending on the activity sector: waste treatment, agriculture, woodworking, the rubber and plastics industry are more prone to fire phenomena, whereas the chemical and metallurgical industries as well as coking and refining are more prone to the discharge of dangerous or polluting materials.

This report contains information such as:

- Breakdown of accidents and dangerous phenomena by sector of activity
- Evolution of the annual number of deaths and injuries (all type of accidents)
- Breakdown of organisational causes (lack of feedback, training, control, procedures, risk assessment, etc.)
- Breakdown of consequences of accidents during transport of hazardous materials (explosion, fire, loss of hazardous materials, etc.)

#### **Statistical analysis of intervention reports for fires resulting in casualties deceased on the spot in Paris area**

##### Report/source:

Statistical analysis of intervention reports for fires resulting in casualties deceased on the spot in Paris area.

Pierre Carlotti, Dominique Parisse, Nicolas Risler in Fire Safety Journal, 2017.

<http://dx.doi.org/10.1016/j.firesaf.2017.05.017>

##### Purpose:

This study analyses the data collected by the Laboratoire central de la Police Prefecture concerning fires which caused casualties deceased on the spot for the years 2012, 2013 & 2014 in the Paris region.

##### Data:

The geographic sector includes Paris and its surrounding counties (Hauts de Seine, Seine Saint-Denis, Val de Marne), namely more than 10% of the French population. The database covers interventions by the Paris Fire Department for fires (about 15,000) when a fire causes one or several casualties.

Key finding (s):

The origin of the fire was intentional for 19 deaths out of 124 (i.e. 15% of cases). In this case, they might be suicides (4 cases) or unintentional fire victims of an intentional fire. Out of the 108 fires that were analysed, the origin of the fire could be determined in 90 cases out of 108 (i.e. 83%).

In residential buildings, for 88 fires having caused 100 deaths, 26 fires caused 37 deaths, i.e. 35% of the recorded deaths. In four of the fires having caused 7 deaths, the flashover also reached the building staircase. In 43 fires having caused 44 deaths, i.e. 41% of the total number of deaths registered, the fire was limited to the room where the fire started: most often in a bedroom (20 fires having caused 20 deaths), then the living room and the lounge (10 fires having caused 10 deaths), last in the kitchen (9 fires having caused 9 deaths). The origin of the alarm was registered for 92% of the fires analysed: the alert was given by someone who neither was a victim nor lived on the premises in 90% of the cases registered; it was given by a victim or a resident in 7% of cases; smoke detectors gave the alarm in only 3% of the cases.

A significant number of death occurs during the day, when people are not usually asleep, with 44% of death from 9am to 9pm. Knowing that 94% of the victims were found in their homes and that the home occupation rate is much lower in the daytime, this goes against general opinion that fires kill in majority when people are asleep.

The gender of the deceased is unknown for 8 victims. Males represent 58% of the deceased of known gender, females 42%.

### **A Multi-national Survey of Low-Energy and Smoking Materials Ignition Fires**

Report/source:

Les victimes de brûlures : patients hospitalisés en France métropolitaine en 2011 et évolution depuis 2008 // burn victims: patients hospitalised in metropolitan France in 2011 and evolution since 2008 - Axelle Dupont, Anne Pasquereau, Annabel Rigou, Bertrand Thélot  
Institut de veille sanitaire 2015

Purpose:

The goal of the study is to assess the number of hospitalizations for burns, and the severity of them and to confirm the importance of developing preventive actions and which type.

Data:

Data from the French National Hospital Discharge Programme were analysed over the period 2008- 2011 for metropolitan France. All hospitalisations in acute care hospitals with a principal diagnosis of burns, coded T20 to T32 in the International Classification of Diseases, 10th revision (ICD10), were analysed.

Key finding (s):

In 2011 in metropolitan France, 8,670 patients (living in metropolitan France) were hospitalised for burn, representing 11,651 hospitalisations. Children aged 0-4 year-old accounted for more than a quarter of all burn victims, and men for 63%. Among patients hospitalised in burn centers, 11.5% of them had a severe burn. The crude incidence hospital rate was 13.7 per 100,000 inhabitants. It was particularly high among children under 5 years old (60.7) and in men (17.9 vs 9.9 in women). The number of hospital deaths was 215, representing a fatality rate of 2.5 %.

These epidemiological results, consistent with the international literature, characterize patients with burns and their hospital care. They highlight the importance of developing prevention interventions, particularly among children, from the moment they start walking, and among the elderly, in whom burns are less frequent but more severe. They could be very useful for planning and organising hospital resources.

### **Application of the capture-recapture method to victims of fire-related deaths after being transferred to hospital**

Report/source:

Lasbeur L, Rigou A, Thélot B. Application de la méthode capture-recapture aux victimes décédées par incendie après transfert en milieu hospitalier, France métropolitaine, 2007. Saint-Maurice : Institut de veille sanitaire ; 2012. 26 p. <http://www.invs.sante.fr>

**Purpose:**

The objective of the study was to estimate the number of fire-related deaths in hospitals based on the capture-recapture method.

**Data:**

In France, the epidemiological surveillance of fire-related mortality is provided primarily from three sources: mortality data from French Epidemiological Centre for Medical Causes of Death - CépiDc (476 accidental deaths in 2008), the French Hospital Information System - PMSI (194 hospital deaths in 2008) and firefighters reporting (378 deaths in 2008).

The capture-recapture method is used to make population estimates from sources that have partially shared information. The method was applied to two data sources: CépiDc and PMSI, as the firefighters data was not homogeneous enough to be crossed with other data. The study was restricted to hospital deaths. In order to identify common cases, the matching variables used were the month of death, age, sex, and the death district.

**Key finding (s):**

The method enabled to estimate that there had been 252 fire-related deaths (95% CI = [134-370]) in hospitals in France in 2007.

The exhaustivity of the two combined sources was 97% (85% for CépiDc and 79% for PMSI). The conditions of application of capture-recapture method were discussed: real cases, independence of sources, capture homogeneity, closed population, same period and geographical area.

The whole approach aims to produce validated and generally acknowledged estimates, by date, gender, age, region, year after year, of the number of fire-related deaths in France. It will help measure the effectiveness of regulatory measures such as those that require the installation of automatic autonomous smoke detectors by 2015 or the obligation for the tobacco industry to produce cigarettes that meet low ignition propensity standards.

**Mortalité par accident de la vie courante en France métropolitaine, 2000-2010**

Mortality from everyday accidents in mainland France, 2000-2010

**Report/source:**

Lasbeur L, Thélot B. Mortalité par accident de la vie courante en France métropolitaine, 2000-2010. Institut de veille sanitaire, 2014. <http://www.invs.sante.fr/%20fr/Dossiers-thematiques/Maladies-chroniques-et-traumatismes/Traumatismes/Bases-de-donneesoutils/Mortalite>

**Purpose:**

The objective of this work is to report the statistics of deaths from everyday accidents, with a focus on deaths by fire flames, between 2000 and 2010 in metropolitan France.

**Data:**

Deaths were selected when the underlying cause of death belonged to a reference list of codes of the ICD-10 corresponding to deaths from everyday accidents. The analyzes were mainly carried out according to the cause initial death, which is at the origin of the chain of causes leading to death and on which it is possible to act to avoid the latter. However, deaths from accidental falls are underestimated by this type of analysis. An additional analysis was therefore carried out, known as a "multiple cause", adding to the deaths from an initial cause "Falls" (codes W00-W19) deaths coded both as the underlying cause "exposure to unspecified factors" (code X59) and associated cause "fracture of the femur" (code S72).

**Key finding (s):**

The number of fire/flame deaths in 2010 was 513; the sex ratio was 1.5 (standardized male / female rate = 0.9 / 0.6). Overall, between 2000 and 2010 the standardized death rates decreased by 0.6% per year, this decrease was not significant. In 2010, the majority of deaths from fire-flames occurred at home: 60% of cases compared to 31% in hospitals or private clinics.

**Main limitations of the HLCA mortality data:**

- Underestimation of the number of deaths caused by a fire: example of deaths by accidental fall from a great height (code W13) or collision caused by the throwing or falling of an object (W20) which may occur during a fire.
- 20% of deaths for which the accidental cause is not known.

- Inclusion of accidents at work: it is not possible to differentiate them from everyday accidents, which probably corresponds to a few hundred deaths per year.
- The circumstances of the accident (place of occurrence, activity carried out, product in question) are not provided although they would constitute useful information for the implementation of appropriate prevention

### **Épidémiologie des hospitalisations pour brûlures en France : résultats 2011 et évolution depuis 2008** Epidemiology of hospitalizations for burns in France: 2011 results and changes since 2008

#### Report/source:

Pasquereau A, Thélot B. Hospitalisations pour brûlures à partir des données du Programme de médicalisation des systèmes d'information, France métropolitaine 2011 et évolution depuis 2008. Institut de veille sanitaire ; 2014. 8 p. <http://www.invs.sante.fr>

#### Purpose:

The objective of this study was to describe, the socio-demographic profile and the care of people hospitalized for burns and to establish incidence rates and present developments since 2008, based on 2011 data from the Program for the medicalization of information systems in Medicine, Surgery, Obstetrics.

#### Data:

Hospital stays in 2011 in mainland France with a main burn diagnosis coded from T20 to T32 were analyzed . The severity of the burns was measured according to the extent of the body surface affected (codes T31 and T32), the presence of burns in the respiratory tract (code T27) and age. The severe burns were defined as meeting one of the following three conditions:

- burns covering at least 20% of the body surface in children under 5 years old;
- burns covering at least 30% of the body surface in people over 5 years old;
- presence of burns in the respiratory tract.

However, the extent of the affected body surface was not systematically documented. The study of the severity of burns thus focused only on stays in hospitals with a burn treatment center, in which the information rate was 85% (compared to 24% in other hospitals).

#### Key finding (s):

In 2011 in mainland France, 8,670 people were hospitalized for burns, corresponding to 11,824 hospital stays. More than 80% of patients were hospitalized only once during the year. Children under 15 were more often readmitted for burns than other patients: they represented 2/3 of people hospitalized 4 or more times during the year.

#### Distribution by age and sex:

- 5,465 men (63%) and 3,205 women (37%): sex ratio of 1.7.
- Average age: 30.4 years.
- More than a quarter of the patients were between 0 and 4 years old. Of these, half were 1 year old.

Crude incidence rate: 13.7; age-standardized incidence rate: 13.4.

- Very high among children under 5 (61), higher among those aged 85 and over (14) than among adults (10).
- At all ages the incidence was higher in men than in women.
- The incidence was not homogeneous across the country: from 9.6 to 17.7.

#### Evolution 2008 to 2011:

- The number of people hospitalized for burns per year remains at the same level, nearly 9,000.
- The breakdown by age and sex of burn victims, the proportion of burns covered by hospitals with a burn treatment center, characteristics of people with severe burns and the incidence rates remain stable.
- Some changes for people who died in hospital from burns can be noted: the number and the case fatality rate increases slightly, as does the average age at death.

#### Existing definitions

There is no official definitions of terms and expressions for fire statistics in France.



Are there differences within the same country?

Due to the current lack of official definitions of terms and expressions for fire statistics, it is possible, and even probable, that differences exist in the definitions used by fire departments and Ministries.

Are there differences and contradictions with other domains?

Due to the current lack of official definitions of terms and expressions for fire statistics, it is possible that differences and contradictions with other domains also exist.

Identification of missing information

All terms and expressions dealing with fire statistics.

## H2. STATISTICS COLLECTION ISSUES

Fire department responsibilities

In France, in accordance to the **Law n° 96-369 of 3 May 1996 (article 55)**, firefighters are in charge of the prevention, protection and fight of fires. They participate, with the other concerned services and professionals, to the protection and the response to all other accidents and disasters, to the assessment and the prevention of natural or technological risks and to emergencies.

Fire response organization

France is divided in 101 “departments”, an administrative level between a county and a region. Five of them are overseas territories (Guadeloupe, Martinique, Guyane, La Réunion, Mayotte).

Each of these 101 “departments” are defended against fire by a Fire Department (SDIS) which has the number of the “department: e.g. the Fire Department of the department “Calvados” (14) is SDIS 14. These SDIS are composed of civilian professional firefighters (in the main cities) and civilian volunteer firefighters (in the country).

There are two main exceptions:

1. the BMPM (Marseille Fire Battalion), a military professional firefighter’s unit from the Navy in charge of Marseille and its airport,
2. the BSPP (Paris Fire Brigade), a military professional firefighter’s unit from the Army in charge of Paris, the three departments around Paris and three main airports (Orly, Le Bourget and Roissy-CDG).

In 2018, France had 249 700 firefighters dispatched in:

1. 40 400 civilian professional firefighters (16 %)
2. 196 600 civilian volunteer firefighters (19 %)
3. 12 700 military professional firefighters (5 %)

Who collects data?

- The fire response report is filled and signed by the firefighter in charge of the operation. The information is then collected by the fire department (SDIS) then is sent to the Ministry of interior.
- The death certificate can be filled and signed only by a doctor. All death certificates are in theory collected by the Epidemiology Centre of medical causes of death (CEPIDC) of the National Health and Medical Research Institute (INSERM) placed under both the authority of the Ministry of Health and the Ministry of Research.
- The Laboratory of Paris Police (LCPP) investigates fires occurring in Paris when there are casualties. The LCPP collects and analyses the information at this level. This is only Police department that does this type of analysis and it is only for the city of Paris.

Who issues the data?

At the national level, a DGSCGC/Home Ministry civilian official.  
At the local level, Fire Department officers in charge of fire statistics.

Are there different levels of collection?

For the fire statistics, there are two different levels of collections: national and local ("French department" which is equivalent of county), except for the Paris fire Brigade (BSPP) which is in charge of four French departments.

Identify disparities in data feedback

As mentioned previously, most of the disparities should come from the lack of definitions of fire terms and expressions.

Other important point: if fire statistics from the five overseas Fire Departments (SDIS 971, SDIS 972, SDIS 973, SDIS 974 and SDIS 976) are included in the national fire statistics, there is an important doubt regarding the other French overseas territories which are also part of EU or have special relations with EU, e.g. Saint-Martin, French Polynesia, New Caledonia, Wallis-et-Futuna, Saint-Pierre-et-Miquelon.

Where is the data stored?

French national fire statistics are stored by the "General Direction of Civil Security and Crises Management" (DGSCGC) of the French Home Ministry.

French local fire statistics are stored by each French Fire Department (SDIS or BMDM or BSPP).

French national medical causes of deaths statistics are stored by the Epidemiology Centre of medical causes of death (CEPIDC) of the National Health and Medical Research Institute (INSERM).

### **H3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

A civilian official from the Home Ministry (DGSCGC).

Purpose for which data is collected

The main purposes are:

5. To elaborate the budgets for fire departments
6. To optimize fire response time
7. To define and locate the fire and rescue stations
8. To define the volume of personnel and equipment

What are the methods used to fill the gaps where information is missing?

Unknown.

Is there follow up to data collected ?

Unknown but corrections from previous years are presented in the report issued the year after. Those are due to fire department that did not submit their data to the enquiry on time. This means that there is some sort of follow up.

Analyse potential cause and consequences in trends

1. French Fire Departments have reported 285 661 fires and 289 fire fatalities in 2016.
2. The number of fire fatalities has decrease of more than 58 % from 1982 to 2016.
3. The number of fire fatalities in home buildings has decrease of more than 28 % from 2008 to 2016 while the number of housing was in increase of more than 12 % during the same period.
4. More than 10 % of all fire fatalities in France from 2004 to 2010 are suicides.

5. In 2008, 32 % of all fire fatalities are dead at the hospital after their transportation from the fire location.

#### H4. ANALYSE EXISTING DATA

Determining the level of confidence

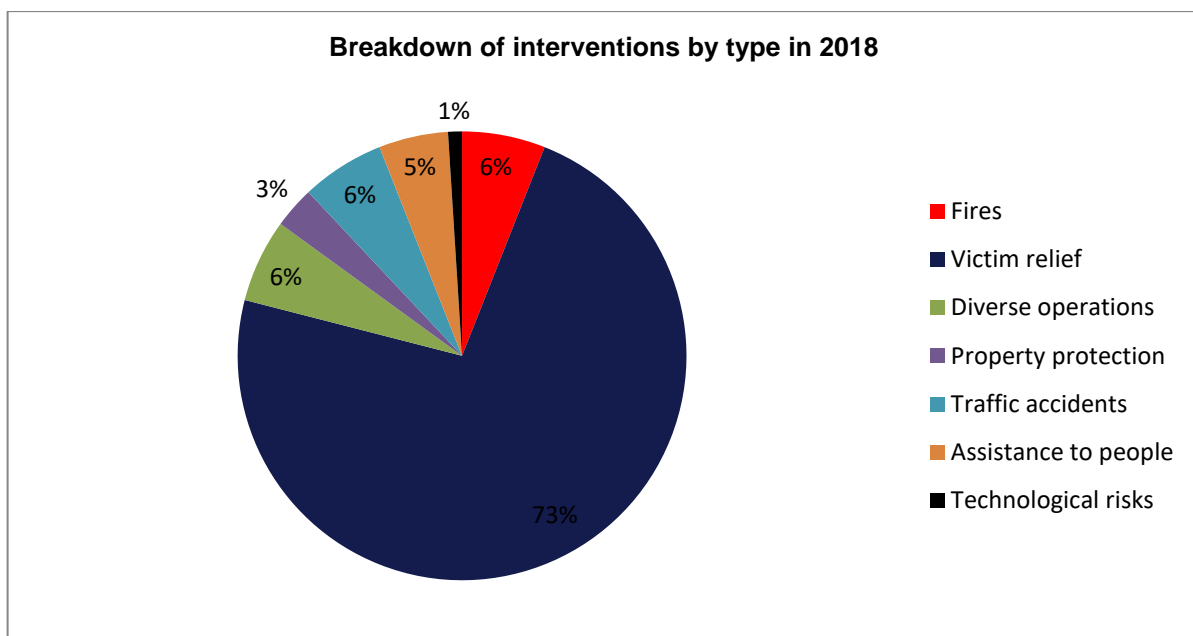
Medium, mostly due to the lack of definitions in the scope of fire statistics.

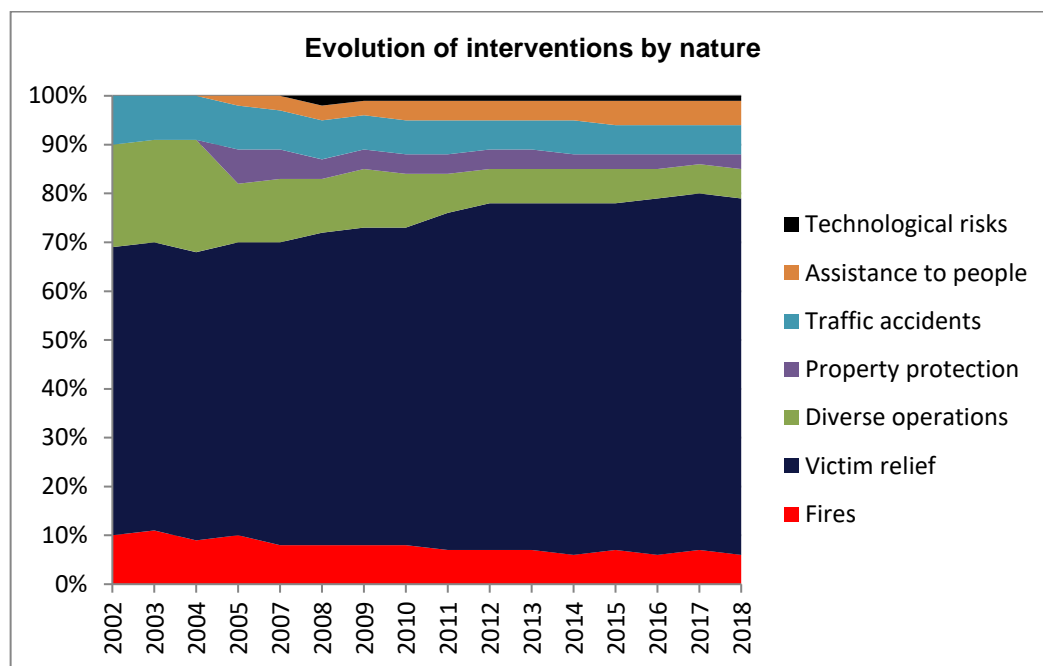
Pinpointing issues and limitations

- The lack of definitions for fire statistics words and expressions.
- The lack of methodology to fill the gaps where information is missing.
- The lack of training for the firefighters in charge of the fire response report.
- The database from the fire departments does not take into account the fire casualties occurring at the hospital or during their transportation to the hospital by EMS

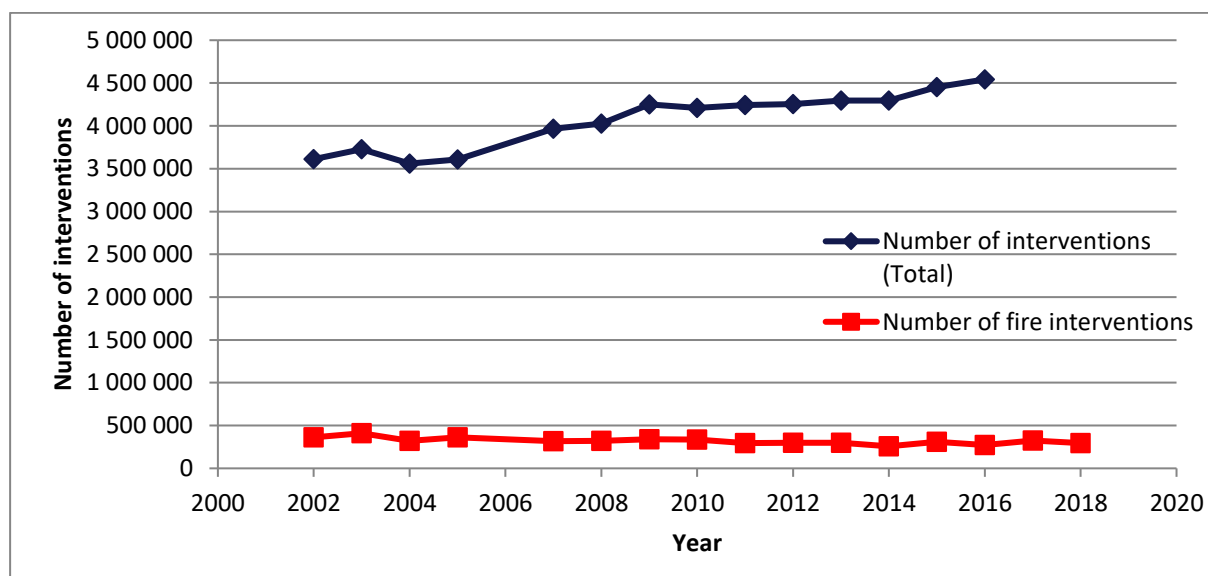
Examples

Fire activity accounted for 6 to 10 % of fire department activities since 2002. In 2018, it has accounted for only 6% of the total activity. The main activity being “victim relief” (73%) in 2018.



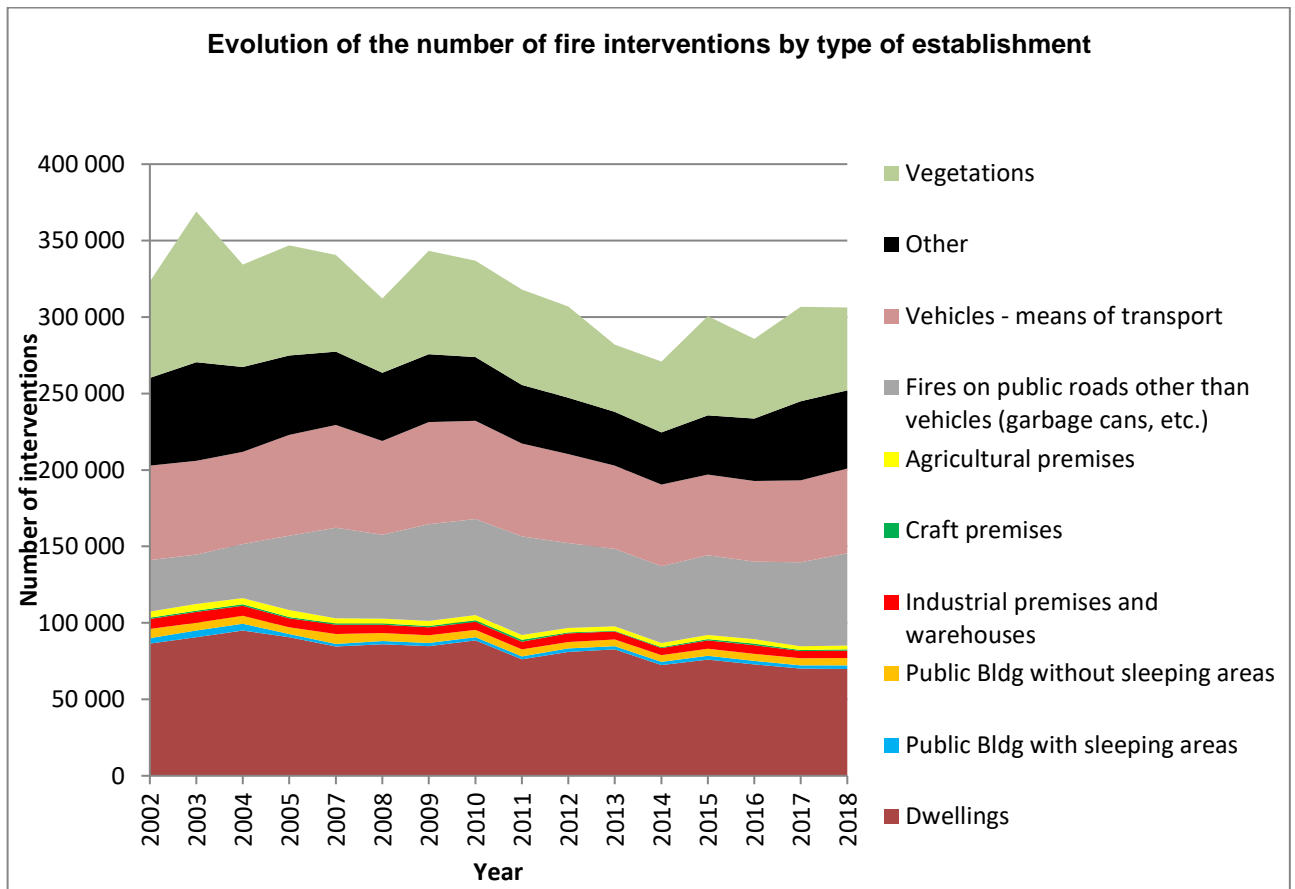


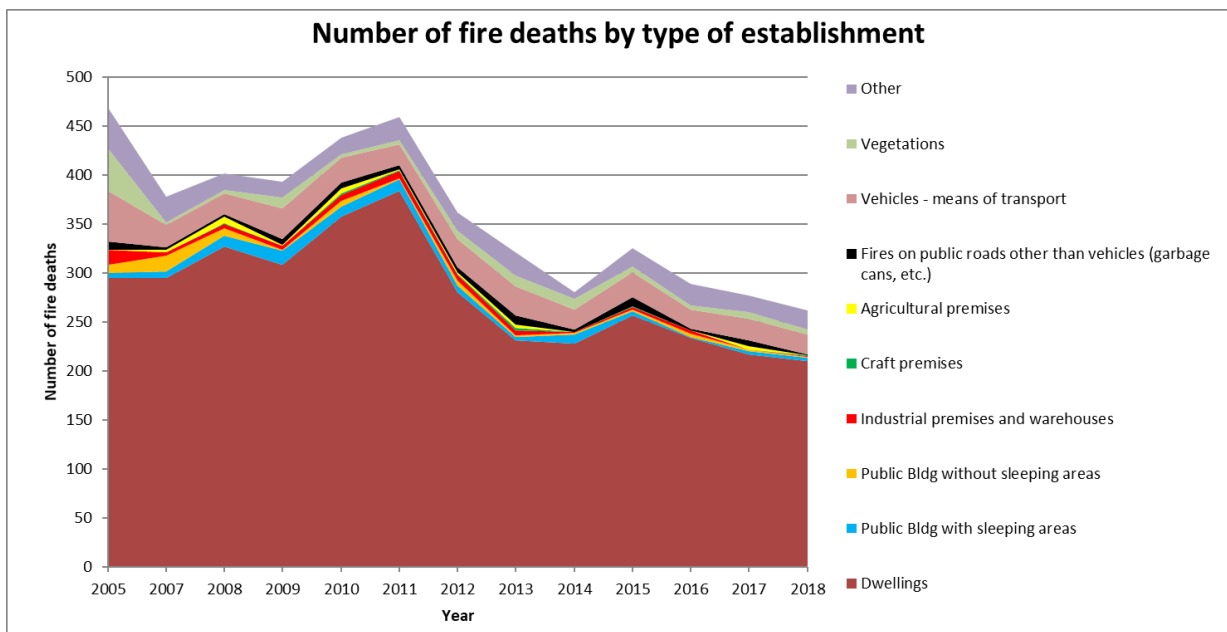
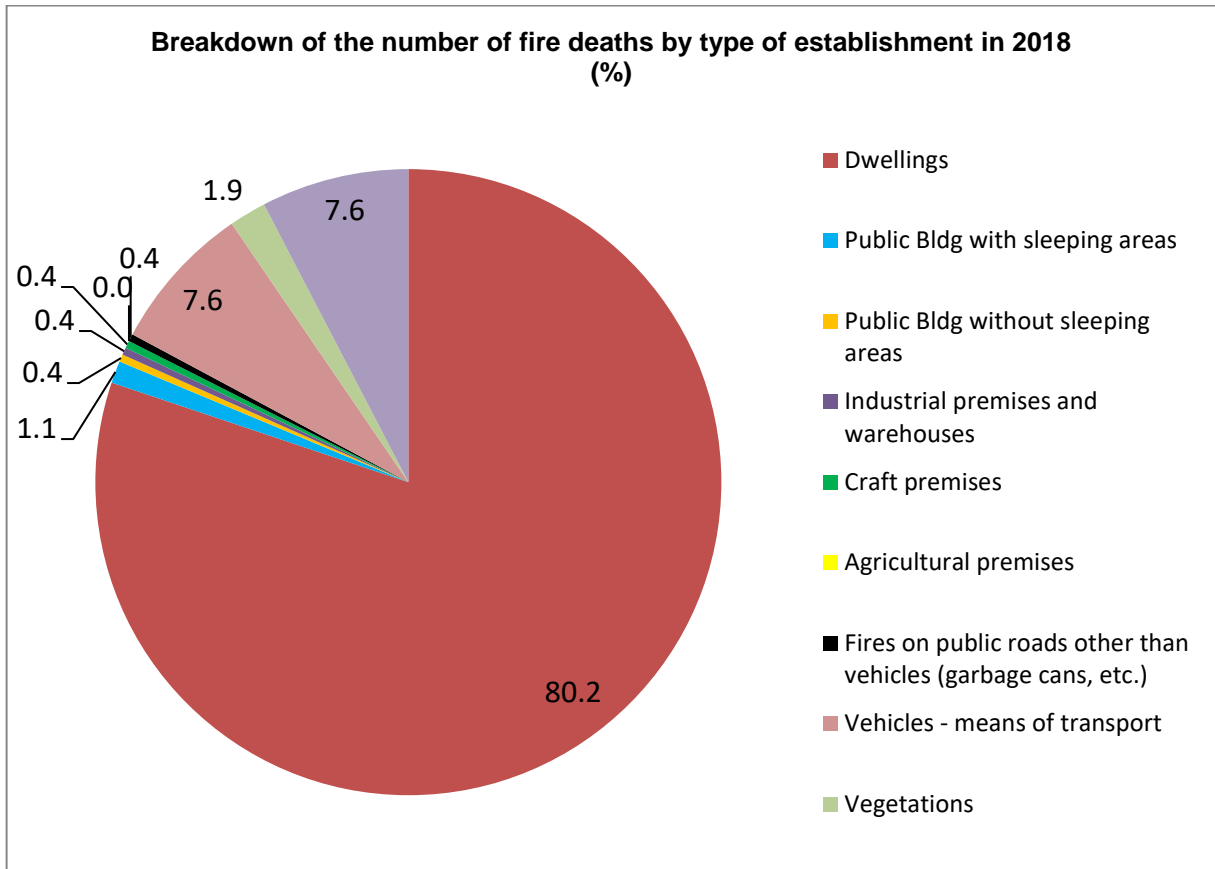
Although the number of fire department intervention has increased significantly in the last two decades, the number of fire interventions is relatively stable.



In 2018, the majority of fire interventions (by fire departments) was for dwelling fires (22.8%), followed by fire interventions on public roads (19.7%), vehicle fires (18.1%), vegetation fires (17.7%) and others (16.7%).

**Erreur ! Liaison incorrecte.**





## I. DIAGNOSTIC SHEET FOR GERMANY

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### 11. TERMINOLOGY ISSUES

References of existing database/studies

#### Databases

At national level:

Fire statistics in Germany are no direct fire statistics. Statistics are dealing with fire operation. Operations are distinguished between.

- Small fire A: Can be extinguished using a small fire extinguishment equipment
- Small fire B: Can be extinguished using a C-pipe
- Medium fire: Can be extinguished by one first attendance using not more than three C-pipes
- Large fire: More than three C-pipes are used.

Furthermore false alarms and technical and medical help operations are listed.

- National cause of death statistics, ICD-10 and gender, e.g. exposition to flames, fire and smoke, official website (public available): <https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Todesursachen/inhalt.html>
- Operations of fire brigades, fire deaths and injuries, Deutscher Feuerwehrverband (DFV), only as paper book "Feuerwehrjahrbuch" (only in German, website including some data. <https://www.feuerwehrverband.de/presse/statistik/> )
- Injuries and fatalities from accidents (DGUV), <https://www.dguv.de/de/zahlen-fakten/au-wu-geschehen/index.jsp>
- Property loss: data collected by insurer Gesamtverband der Versicherer (GDV), website (with data: <https://www.gdv.de/de/zahlen-und-fakten/versicherungsbereiche/hausrat-24100#Schaeden> )
- Fire causes (insured fire incidents), collected by institute for fire cause investigation (for insurers), Institut für Schadenverhütung (IFV) website with data: <https://www.ifs-ev.org/schadenverhuetung/ursachstatistiken/brandursachenstatistik/>

At local level:

- Data collected by fire services, different data and formats, several fire services collect via an electronical system but not all. Often there is a fire service operation statistics (electronic) and a fire incident report (form to fill in). Example for such a form for fire incident report is given in uploaded documents, one form is to be submitted to DFV, it is called FEU 905 and it summarizes data for one year and is collected on national level by DFV (see above)
- Some "Länder" (countries) and some larger fire brigades collect data about fire incidents with a survey about prevention measures and effect of these measures on the fire development (form to fill in uploaded documents) For example: <https://www.lfv-bayern.de/informationen/statistiken/>
- Munich fire service collects data about fire incidents with a survey about prevention measures and effect of these measures on the fire development (form to fill in uploaded documents)
- Data, collected by German police: criminal statistics - fire causes, not public available

## **Studies**

### Fire statistics

vfdb collects data with several fire services in German which volunteered for the project. The report (Technischer Bericht) is in uploaded documents (abstract is in English, report is in German), vfdb website gives an overview of activities. Results are based on a about 5.000 fire service interventions on building fires.

<http://www.ref14.vfdb.de/brandstatistik/brandschadenstatistik/>

#### 12.1.1. Summaries of existing database

The national German database is the cause of deaths statistic. It is organised according to ICD-10. Certain fire data can be derived by summarising different sub categories, e.g. exposed to fire, smoke and flames. However, smoke inhalation might be partly found under the category CO intoxication. It depends on the death certificate in which category it is collected.

fire incident report (fire service, example uploaded – brand\_ab2009\_online\_V1.pdf) includes: call, personnel, vehicles, equipment, other services on scene, fire size, fire area, fire load, fire object, water supply, injured, rescued and death people

#### Existing definitions

In DIN 14010 definitions are made but they are not widely used in German provinces and data collections.

In the fire incident report (example uploaded: brand\_ab2009\_online\_V1.pdf) definitions are used.

Fire data collected by Munich fire service gives definitions and an example report (uploaded form: 2017-05\_Evaluierungsbogen\_zu\_Massnahmen\_VBG\_201904.pdf )

Insurers have definitions with regard to their collection aims.

#### Are there differences within the same country?

Yes, fire services are collecting data on local level and the systems and data differ.

#### Are there differences and contradictions with other domains?

Fire service, police and insurer are organising their data very differently- so an overall picture can't be built.

#### Identification of missing information

So far, no uniform fire statistic has been enforced in Germany. All fire service interventions and statistics are obtained with different criteria in Germany. Due to this situation, there is a lack of statistical information on extensive fire service interventions and reasonable statistical findings on fire service intervention, on the fire phenomenon and on the effectiveness of fire protection measures.

Many detail information (building / first burning item / smoke detector us etc.) is missing. A start is made with the vfdb project with a form that has to be filled in by the fire service. Up to date it is a project which is voluntary. The link between fire causes and fire statistics is missing.



## **12. STATISTICS COLLECTION ISSUES**

### Fire department responsibilities

Fire departments are responsible for the prevention, protection and fight of fires (Including industry). Furthermore to the protection and the response to all other accidents and disasters all technical help. Several fire services are responsible for ambulance as well.

### Fire response organisation

Professionals and volunteers on local level. Furthermore industrial fire brigades. Military sector is organised similar to professional fire brigade.

### Who collects data?

The fire response report is filled and signed by the firefighter in charge of the operation.

### Who issues the data?

The Länder issue summary reports.

### Identify disparities in data feedback

A fire death might not be counted as fire death if the person is dying later in hospital and if the cause of death doesn't state a relation to fire / smoke / flames.

### Where is the data stored?

Only the cause of death statistics are collected and stored centrally, all other statistics are collected and stored locally.

## **13. STATISTICS INTERPRETATION ISSUES**

### Who is interpreting the statistics

Nobody / everybody, no national or local entity for this issue. Used mainly for budget discussions.

### Purpose for which data is collected

Death cause: determine cause of most deaths

Fire statistics (fire service): personnel / equipment / response times

Fire statistics (vfdb): research of how fires develop / effectiveness of measures etc.

Property losses: identification of most costly fires

Fire causes: police – determination of arson; IFV: insurance issues

### What are the methods used to fill the gaps where information is missing?

No methods

### Is there follow up to data collected ?

No

### Analyse potential cause and consequences in trends

#### **14. ANALYSE EXISTING DATA**

Determining the level of confidence

Medium. Partly different voluntary fire brigades are writing an operation report for a large fire. Finally it was one fire but in the statistic a larger number of reports are counted.

Pinpointing issues and limitations

The link between the different sources of data is missing. It is not possible to link data from insurer, police, fire service to gain information.

##### **Trends in German fire statistic data**

- Most fires and fatalities occur in residential building fires
- Fires and fatalities occur also often in nursing homes and hospitals
- Observation after bigger fires: the measures against fire spread work in general, the smoke spreads further than the fire and leads to damage / injuries (Munich fire service statistics), escape routes are blocked by smoke in significant number of fires (40 %) (TB – vfdb)
- High number of false alarms with automatic fire alarm systems
- Highest property loss in a few number of very big fire incidents

Summary of studies of fire data for the country

#### **Technischer Bericht vfdb TB 14-01 vfdb-Brandschadenstatistik (Technical report vfdb TB 14-01 vfdb Fire Statistic)**

##### Report/source:

vfdb-Brandschadenstatistik, Untersuchung der Wirksamkeit von (anlagentechnischen) Brandschutzmaßnahmenherausgegeben von Sebastian Festag & Ernst-Peter Döbbeling, 1. Auflage Februar 2020

Technisch-Wissenschaftlicher Beirat (TWB) der Vereinigung zur Förderung des Deutschen Brandschutzes e.V. (vfdb) Postfach 4967, 48028 Münster

##### Purpose:

Fire protection measures target at the avoidance of fires in advance and at limiting the resulting damage as low as possible. Regarding the effectiveness of measures, there are only partial statistical findings available so far. Within the fire loss statistics project of the German Fire Protection Association e.V. (vfdb), the statistical effectiveness of fire protection measures is examined in detail. Hereby, 5,016 recorded fire service interventions on building fires with 1,216 real fires of 29 fire services are evaluated systematically. On this basis, extensive statistical information for the incidences of fires handled by German fire service are derived. Evaluations on the distribution of building fires (partly specified in real fires and false alarms) are examined in this report.

##### Data:

Vfdb survey with German fire services, data on automated fire measures, data from insurers, data from fire services, data from Ministry (ICD-10)

##### Key finding (s):

So far, no uniform fire statistic has been enforced in Germany. All fire service interventions and statistics are obtained with different criteria in Germany. Due to this situation, there is a lack of statistical information on

extensive fire service interventions and reasonable statistical findings on fire service intervention, on the fire phenomenon and on the effectiveness of fire protection measures. On the one hand, the results support the fundamental gain in knowledge and experience and on the other hand, they provide completely new insights.

### **Schnell wie die Feuerwehr (Quick as the fire service)**

Report/source:

H. Herweg, P. Wagner. Vfdb 4/2013, Vereinigung zur Förderung des Deutschen Brandschutzes e.V. (vfdb), Postfach 4967, 48028 Münster

Purpose:

Different definitions and uses of terms regarding the time until the fire service is on scene after the first call are discussed. If specific times are legislatively given the fire service have to provide enough fire stations and enough vehicles / personnel to fulfill this requirement. This is a cost factor.

Data:

Traffic data, mainly average speed in certain areas and day times. Speed of fire service vehicles.

Key finding (s):

Average speed of fire service vehicles in Berlin was 32 km/h in 2011. 70 % of these drives have been emergency rescue incidents. This is about 5 to 7 km/h quicker than average speed of individual motor traffic. Bigger fire service vehicles tend to have a lower average speed than smaller vehicles. However, the bigger vehicles tend to have shorter distances to travel as they are located in more stations in the city. The average speed is relatively stable regarding days of the week, months in the year and hours of the day.

### **Trautes Heim, (Un-)Glück allein! (My home is my (un-) safe castle!)**

Report/source:

H. Herweg, P. Wagner, Trautes Heim, (Un-)Glück allein! Auswertung einer Stichprobe von 258 Brandtoten, vfdb 3/2014, Vereinigung zur Förderung des Deutschen Brandschutzes e.V. (vfdb), Postfach 4967, 48028 Münster

Purpose:

A comparison of fire statistics data in Germany, Austria and Switzerland.

Data:

Fire data from Germany, Austria and Switzerland

Key finding (s):

Most fires in Austria have 1 or 2 fatalities. Most fatalities occur in residential buildings. Smoke inhalation is more often than cause of death than flames / heat.

In Switzerland fires occur more often in residential buildings than in other buildings. Residential buildings are only responsible for 32% of the property losses (insured). The number of fire fatalities is small in Switzerland. In Germany most fires have only 1 fatality. Most fatalities occur in residential buildings. Most fatalities are found in living and bed rooms.

## **Brandopfer in Berlin – Teil 1: Faktor Zeit (Fire fatalities in Berlin – part 1: factor time)**

### Report/source:

P. Wagner, H. Herweg, Brandopfer in Berlin – Teil 1: Faktor Zeit, vfdb 2/2018, Vereinigung zur Förderung des Deutschen Brandschutzes e.V. (vfdb), Postfach 4967, 48028 Münster

### Purpose:

Number of fires and fatalities in Berlin, years 1997 to 2015

### Data

Data of Berlin fire service about fatal fires between 1997 and 2015.

### Key finding (s):

Number of fires decreased in Berlin between 1997 and 2015. Although the number of fatalities decreased as well, that is not true for number of injuries.

Especially, the number of fatalities per fire did not decrease.

Fall and winter show more fire fatalities than the other seasons.

## **Brandopfer in Berlin – Teil 1: Faktor Raum (Fire fatalities in Berlin – part 2: factor area)**

### Report/source:

P. Wagner, H. Herweg, Brandopfer in Berlin – Teil 1: Faktor Raum, vfdb 4/2019, Vereinigung zur Förderung des Deutschen Brandschutzes e.V. (vfdb), Postfach 4967, 48028 Münster

### Purpose:

Number of fires and fatalities in Berlin, years 1997 to 2015

### Data

Data of Berlin fire service about fatal fires between 1997 and 2015.

### Key finding (s):

Numbers of fire that Berlin fire service attends is the highest number in Germany – as Berlin is by far the biggest city.

The area in the city cannot be directly connected to high number of fatalities, although a higher density in population leads generally to a higher number of fires and higher number of fatalities. .

## J. DIAGNOSTIC SHEET FOR GREECE

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### J1. TERMINOLOGY ISSUES

References of existing database/studies

The database of the Hellenic Fire Corps.

- [https://www.fireservice.gr/el\\_GR/synola-dedomenon](https://www.fireservice.gr/el_GR/synola-dedomenon) (this weblink contains data including Fire Service's incidents, such as fires, floods, assistances, etc).
- [https://www.fireservice.gr/el\\_GR/stoicheia-symbanton](https://www.fireservice.gr/el_GR/stoicheia-symbanton) (another link, which gives the opportunity to user for searching with specific parameters, such as kind of incident, month of the year and year).
- [https://www.fireservice.gr/el\\_GR/drasteriotetes-p.s](https://www.fireservice.gr/el_GR/drasteriotetes-p.s). (the data of the each year are collected and presented, approaching them by specific steps, which are described below).

Instruction of use:

Hellenic Fire Corps: description of the using method for collection and presentation of the data.

- Each Fire Service in Greece (per region) is responsible for its incidents of the year, storing them written and electronically- in a database(Oracle).
- Department of IT and Communications of Fire Corps checking and processing the data through specific tools by Oracle Database e.g. PL/SQL Developer (creating queries with particular principles – criteria).
- The above results are presented through tables, statistic graphs ([https://www.fireservice.gr/el\\_GR/drasteriotetes-p.s](https://www.fireservice.gr/el_GR/drasteriotetes-p.s)). Please underlining at this point that the final results are announced at the beginning of the following year (each February).

Summaries of existing database

- type of incident (fire, assistance, etc),
- start time – ending time, duration of the incident,
- kind of fire
- type of staff participating in (staff of Hellenic Fire Service, military, volunteers, staff of foreign Fire Services e.g. earthquakes - Athens since 1999, etc.),
- Means: vehicles, air...
- kind of forest area - land (e.g. forest, marsh, agricultural area, etc),
- deaths and injured persons (personnel, citizens)

Existing definitions

Unknown

Are there differences within the same country?

There is one unique database for the whole country.

Are there differences and contradictions with other domains?

Unknown

Identification of missing information

Age of the personnel and citizens.

## **J2. STATISTICS COLLECTION ISSUES**

### Fire department responsibilities

The mission of the Hellenic Fire Corps:

- Facing the consequences of natural, technological and other disasters, such as earthquakes, floods, chemical - biological - radiological - nuclear threats, as well as the rescue of people and material goods, which are endangered by them. For the above purpose, it utilizes the available scientific data and information, prepares, organizes and mobilizes the fire brigade, means and equipment and requests the assistance of other Authorities and Services.
- Rescue and provide all possible assistance to persons whose physical integrity are threatened or endangered by all kinds of accidents, such as air, rail, traffic, work, falling into lakes or rivers, being trapped in elevators or other places; and facilities, inaccessible mountainous areas, caves as well as the notification of the competent Services for their transfer to medical assistance or care institutions.
- The guarding and preservation of property that has been destroyed or threatened by fires or other disasters, until it is handed over to police or its owners. The maintenance and protection of social security from arson crimes.
- Establish and control the implementation of fire protection legislation. The certification of the volunteer firefighters, who are subject to the provisions of Law 1951/1991 and of the volunteers and volunteer groups, who are active within the mission of the Fire Brigade, but have not been organized according to the above provisions, as well as the fire safety staff of companies and other bodies, provided by fire protection legislation.

### Who collects data?

The Hellenic Fire Corps collects the data. Besides, General Secretariat for Civil Protection and Forest Offices per region collect specific information, which is required by their sections.

### Who issues the data?

The Hellenic Fire Corps.

### Are there different levels of collection?

Data should be the same for the whole country.

### Identify disparities in data feedback

The information which is necessary is collected and stored, all the rest information (e.g. license plates, names, age of the personnel, citizens, etc) is stored by the Fire Service per region in a file.

The Department of Analysis, Planning and Statistics of Fire Corps HQ is responsible for checking the data before publishing them.

### Where is the data stored?

At the Hellenic Fire Corps.

## **J3. STATISTICS INTERPRETATION ISSUES**

### Who is interpreting the statistics

The Hellenic Fire Corps. The statistics are published and available to civilians, ministry, institutes or others for use.

What are the methods used to fill the gaps where information is missing?

There is no a particular method due to the fact that all the required information is collected by each Fire Service per region and stored in the platform mentioned above.

Is there follow up to data collected ?

Department of IT and Communications of the Fire Corps HQ has a cooperation with each Fire Service per region in order to check and correct the data. During the year the information stored in the platform is checked by both sides. The most effective checking of the data is in September (forest fires) and also at the end of December of each year. After that, the above steps (describing in 1.2) are used in order to have the final result.

Analyse potential cause and consequences in trends

The Department of IT and Communications of Hellenic Fire Corps does not analyze the final result, but the produced one is available to be analyzed by others, who for example participate in dissertations, research programs, etc

#### **J4. ANALYSE EXISTING DATA**

Examples

- Information on the structure of the database is available for Greece.
- Then information on the number of fires is given and information about fire victims is displayed.
- For every fire there is specific information about the time and place.
- Forest fires wanted to play a particularly important role for Greece. For this reason, there is various information on this topic, both on the Internet and in specialist literature.
- Studying information about the fires in Greece is particularly difficult due to the language barrier.

[https://www.fireservice.gr/el\\_GR/synola-dedomenon](https://www.fireservice.gr/el_GR/synola-dedomenon) (this weblink contains data including Fire Service's incidents, such as fires, floods, assistances, etc).

Term	Description
Law	Name of the responsible administrative unit, e.g. Attica
Event Type	Event type is divided into 3 forms: lift intervention sheet, help sheet and fire report
Date Event Start	The date is specified in the format DD.MM.YYYY; Example: 01/08/2019.
Start time	The time is given in the format HH: MM; Example: 05:30.
Date Extinguishing	The date is specified in the format DD.MM.YYYY; Example: 01/08/2019.
Extinguishing Time	The time is given in the format HH: MM; Example: 05:30.
Municipality	The place of fire can be assigned to the name of the community.
Village	The location of the fire can be assigned to the name of the village within the municipality.
Space Description	there are 150 different object names: from agricultural area, agricultural installation, air transport, airport to warehouses general, waste places, wooden bridges and woodland.
Event Characterization	the event is characterized by the following terms: other cases, finding a missing person, opening doors, water pump, release from elevator, road release, removal of objects - collapses, people rescue, animal rescue, escape of dangerous, snowcents , large, medium, patient transport, transport of people, small, tank filling, floor washing, road washing, roof washing, preventive fire protection, saw drop, car accidents, false announcement

<b>Term</b>	<b>Description</b>
Total Fire. Vehicles	The number of fire engines used per event is given with a clear number; in 2019 the numbers were in the interval from 1 to 79.
Total Fire. Forces (in men and women)	The number of firefighters deployed per event is given with a unique number; in 2019 the numbers were in the interval from 0 to 728.
Total Firefighters Shipping	This term cannot be interpreted, so it is unclear; in 2019, the digits were in the interval from 0 to 8.
Accident Type	The accident types are also classified with the following three terms: rescue, release, accident.
Number of people involved by type	The number of people involved in each event is given with a unique number; in 2019 the digits were in the interval from 1 to 9.
Injured	The number of people affected by the event is given with a unique number; in 2019 the digits were in the interval from 0 to 5.
Deaths	The number of people affected by the event is given with a unique number; in 2019 the digits were in the interval from 0 to 3.
Disasters	The inputs "0" or "1" are available here; this is probably the definition for "1" - event is classified as a disaster.
Burns	The number of people affected by the event is given with a unique number; in 2019 the digits were in the interval from 0 to 4. The difference to "Injured" is unclear.



## K. DIAGNOSTIC SHEET FOR HUNGARY

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### K1. TERMINOLOGY ISSUES

References of existing database/studies

*Fire Damage Statistics Database (Tűzkárstatisztikai Adatbázis).*  
*The national database is not open for public.*

Summaries of existing database

- *data connecting to the following interventions:*
  - *fires*
  - *technical rescues*
  - *wildfires*
  - *fire investigations*
  - *carbon-monoxide incidents*
- *technical data of fire vehicles*

Existing definitions

*There's a guide on how to provide data from incidents.*

Are there differences within the same country?

*There is only one unique database and data collecting system for the whole country. There are no other levels of databases.*

Are there differences and contradictions with other domains?

*Only the Disaster Management organization is collecting fire statistic data.*

### K2. STATISTICS COLLECTION ISSUES

Fire department responsibilities

*Firefighting and technical rescue.*

Fire response organisation

- *Professional fire brigades (Disaster Management at national, county and local level)*
- *Municipal fire brigades*
- *Voluntary Fire Fighting Associations*
- *Industrial fire brigades*
- *Military fire services*

Who collects data?

*Local fire brigades collect:*

- *Basic fire data:*
- *Number of fires by size*
- *Number of victims (deaths, injured, rescued persons, missing persons)*
- *Fires by fire objects (buildings types, sectors of industry, etc.)*
- *Fire damage*

County Directorate for Disaster Management collects:

- Fire causes

Who issues the data?

*The National Directorate General for Disaster Management (NDGDM) annually issues the requested data for the Central Statistics Bureau.*

Are there different levels of collection?

*There is only one type of data collection and database, so there are no differences in collection.*

Identify disparities in data feedback

*If the NDGDM finds missing or wrong data, they call and warn the fire brigade responsible for collecting the data to fill in the missing data.*

Where is the data stored?

*At national level on the National Directorate General for Disaster Management.*

### **K3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

*The National Inspectorate General for Fire Services at National Directorate General for Disaster Management.*

Purpose for which data is collected

*Database is analysed to determine the need of any other special vehicle, device etc. to work more effectively, or which field of fire prevention needs more propagation in the coming period, etc.*

*For example we analysed the wildfires and we experienced that the wildfires size are mostly under 1 hectare, therefore we purchased fast response, easy moving pickup trucks equipped with special water mist system designed for wildfires.*

*Data is provided to the public, national or international organizations, when it is requested.*

*Data is mostly use data internally, to develop the rescue fire protection and fire prevention.*

Is there follow up to data collected ?

*The data uploaded to the database are randomly checked by the National Inspectorate General for Fire Services at National Directorate General for Disaster Management.*

### **K4. ANALYSE EXISTING DATA**

Pinpointing issues and limitations

Data is not public.

Examples

- The fire protection system in Hungary is structured centrally. For this reason, the numbers for the fire statistics are also recorded and evaluated centrally.
- In the publications, the focus is mainly on the number of fires and their victims.
- With regard to fire damage, a distinction is essentially made between industry, agriculture and private housing.
- The results of the analyzes are presented in tables, graphs and on the map of Hungary.

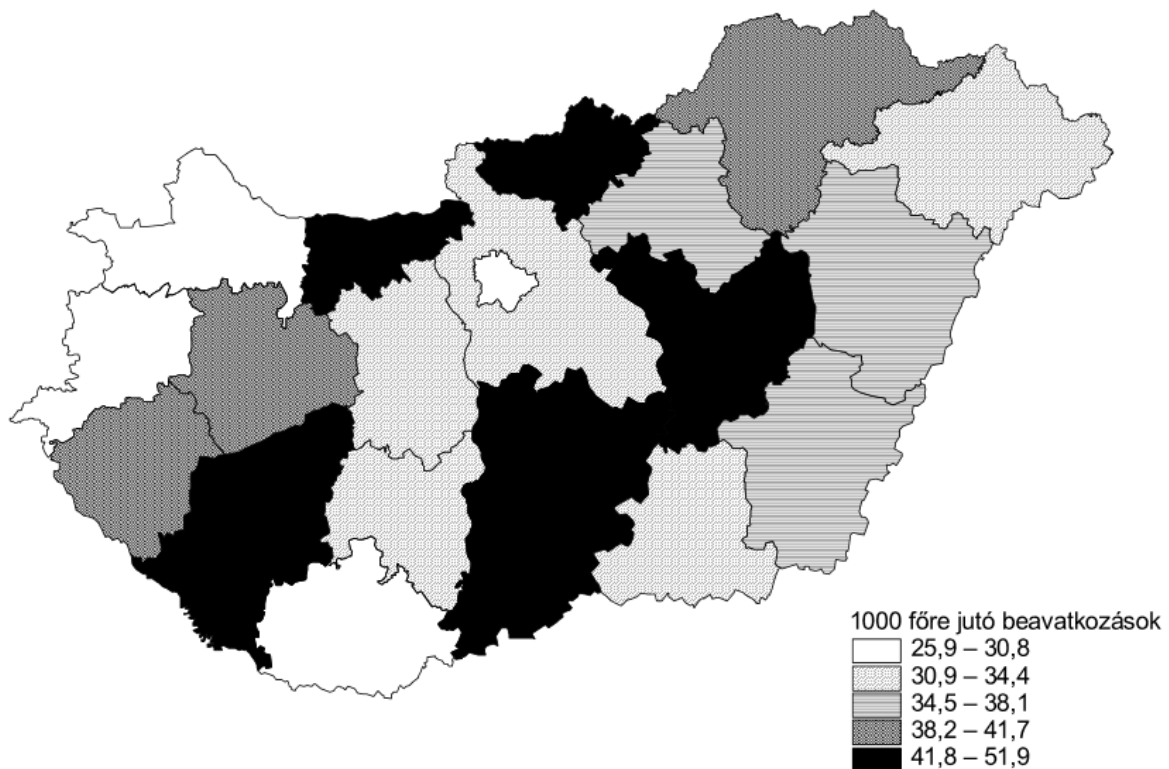


Figure 1: Number of firefighting's and technical rescues per 1000 people, 1998–2005 average

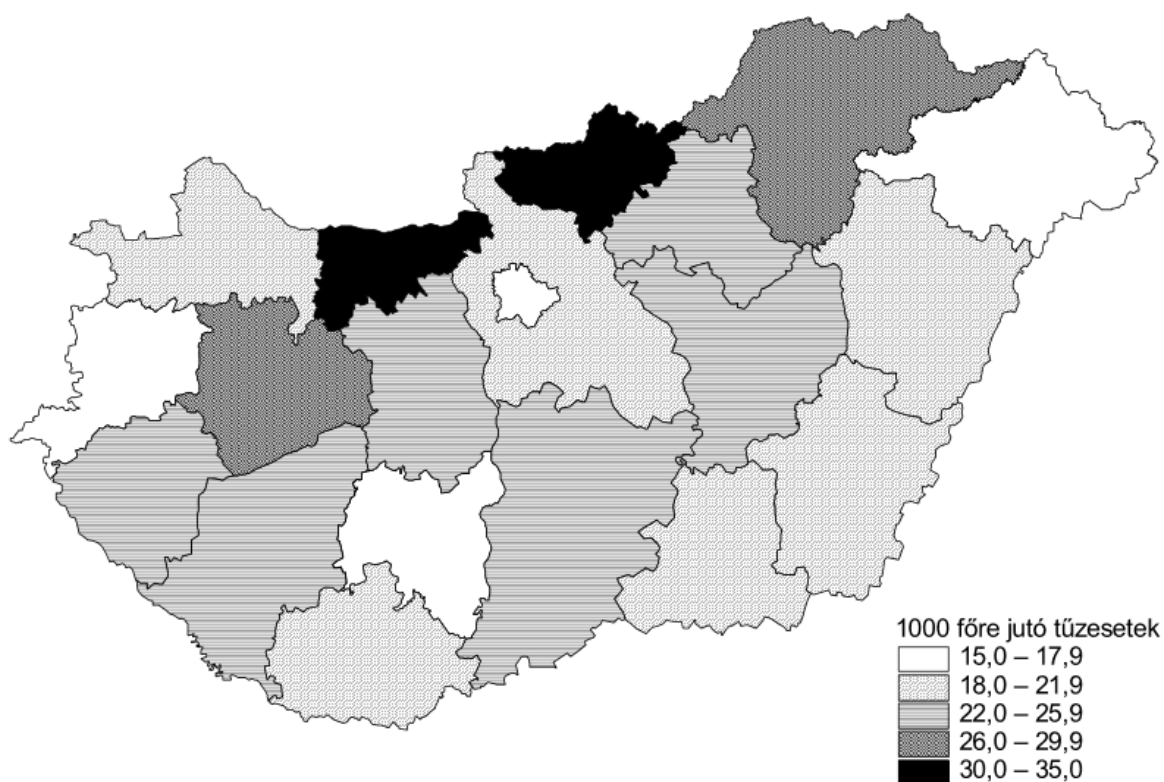


Figure 2: Number of fires per 1000 inhabitants, 1998–2005 average

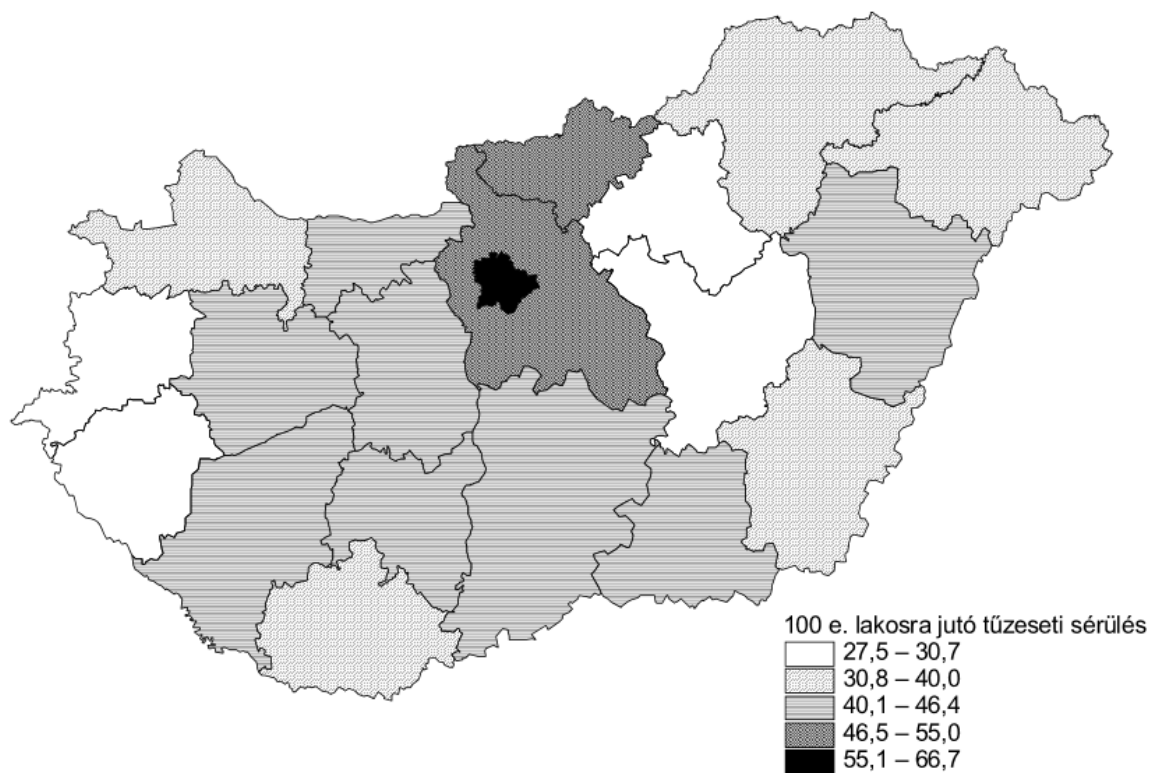


Figure 3: Fire injuries per 100 thousand inhabitants, average 1998–2005

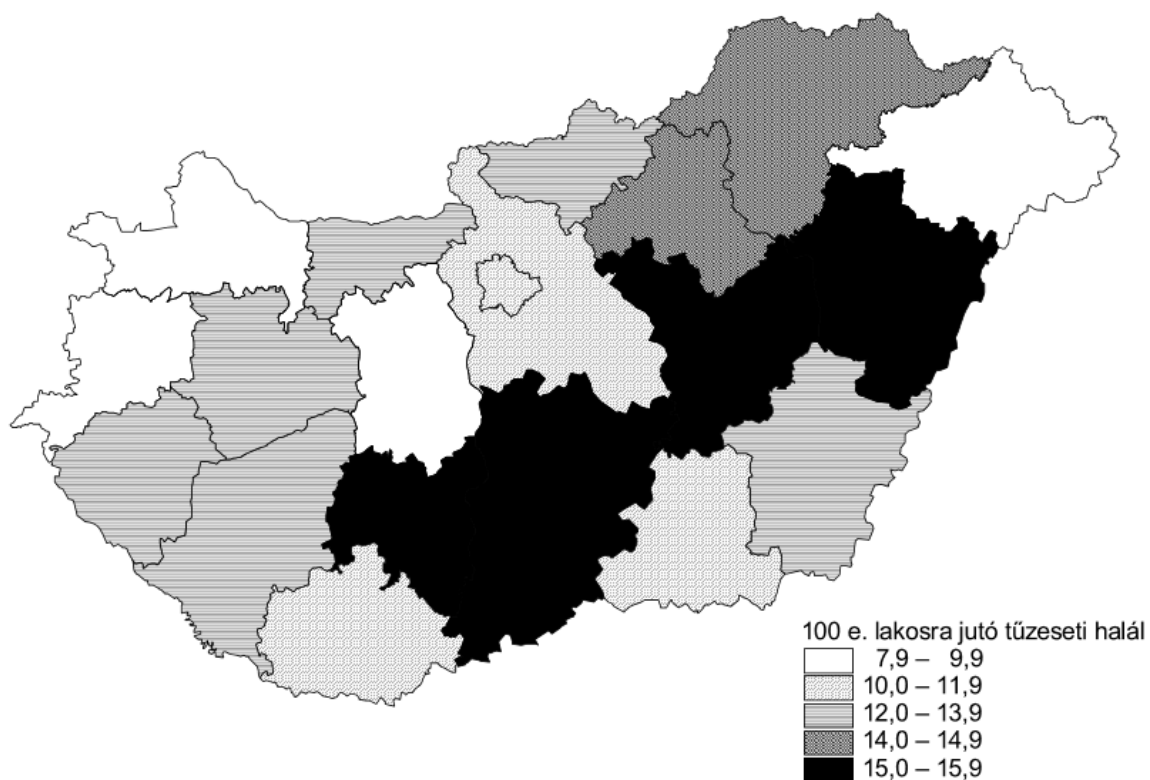


Figure 4: Fire deaths per 100,000 inhabitants, average 1998–2005

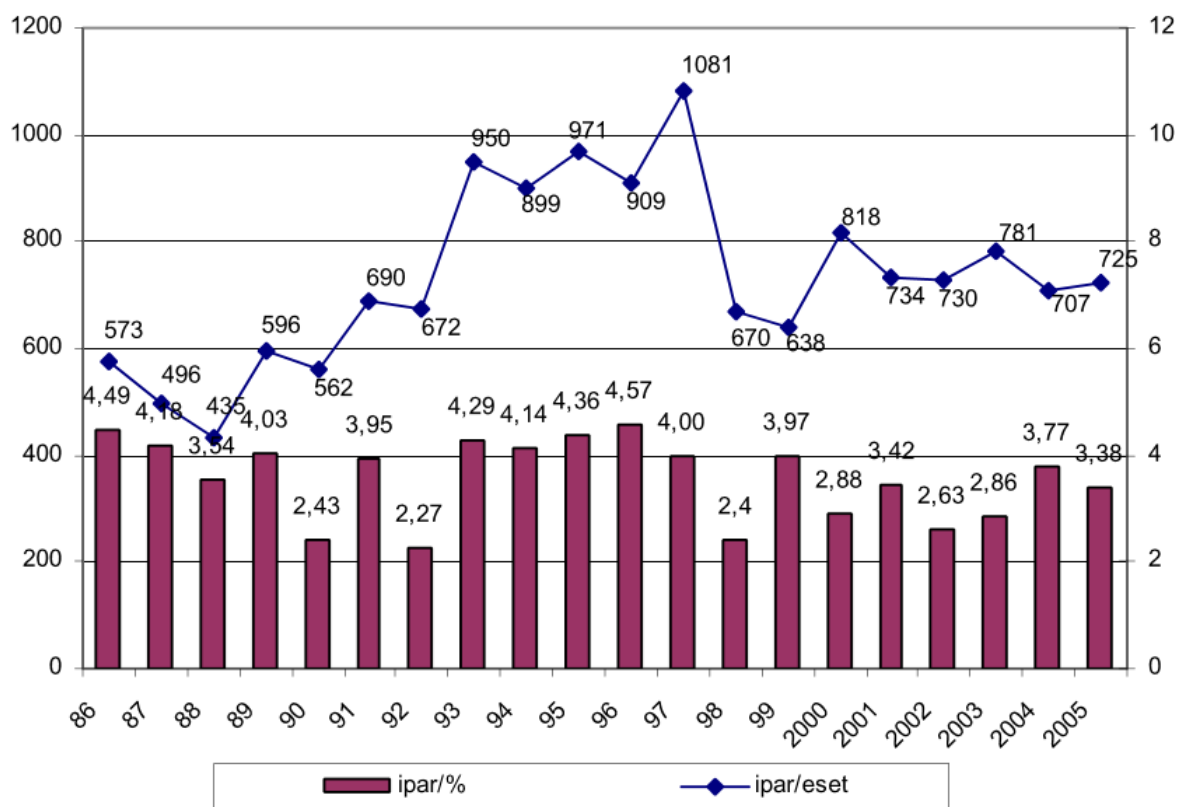


Figure 5: Number and proportion of industrial fires relative to total fires

## L. DIAGNOSTIC SHEET FOR ITALY

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### L1. TERMINOLOGY ISSUES

References of existing database/studies

Statistica interventi, Corpo Nazionale Vigili del Fuoco:  
<http://www.vigilfuoco.it/asp/page.aspx?ldPage=450>

Summaries of existing database

- Urgent technical rescue events performed at national level;
- Interventions of urgent technical rescue held at regional level;
- Interventions of urgent technical rescue carried out at provincial level;
- Time distribution of rescue interventions;
- Relations and statistical analysis of the interventions data;
- Urgent technical rescue interventions referred to the human resources of the fire departments;
- Fuel consumption;
- Victims and injured detected during the rescue events;
- and Prevention and fire surveillance [1].
- Information is mainly about incident types, causes, substances, time distribution of rescue intervention, victims and injured people
- 

Existing definitions

No definitions available. Detailed classification for each field recorded is provided.

Are there differences within the same country?

No differences within the same country. However, data are subdivided into provincial, regional and central levels.

### L2. STATISTICS COLLECTION ISSUES

Fire department responsibilities

“The Italian National Fire Brigade is included in the Ministry of Internal Affairs, as structure committed to public rescue within the whole nation, also for what concerns civil defence, prevention and extinction of fire, in order to ensure the safeguard human life and the protection of goods and of the environment”.

“Moreover, the National Fire Brigades Corp, thereafter often alias ad CNVVF (as by the Italian Corpo Nazionale dei Vigili del Fuoco), is the fundamental component of the national system for civil protection, acting in case of natural disaster in coordination the main authority in this field - the National Civil Protection Department” [1].

Fire response organisation

“To deliver on its institutional mandate, in compliance with the principle of proximity to the citizens’ needs, the CNVVF is articulated in Regional Directions (Direzioni Regionali), Provincial Fire Departments (Comandi Provinciali), Fire Stations of Professional Fire Fighters (Distaccamenti Vigili del Fuoco Permanenti), Fire Stations of Voluntary Fire Fighters (Distaccamenti Vigili del Fuoco Volontari)” [1].

Who collects data?

“The collection of data is conducted by the STA-RI (Statistics and Report of Intervention) web-based software, used by the crew commander while compiling the intervention report on digital support on a standardized frame called “VF-41” [1].

Who issues the data?

“The Central Statistics Service has been editing the Statistic Annual Report of the CNVVF for several years, with the aim to standardize and spread out the information, in a fully available way also for users outside the Administration, as well as to acknowledge of the work for the CNVVF” [1].

Are there different levels of collection?

Data are subdivided into provincial, regional and central levels.

Where is the data stored?

“New centralized web platform configured as a web portal, through which it is possible to access the new STAT-RI web procedure, as well as other services, such as the online consultation of all documentation related to the procedure (management and configuration manuals), information regarding development groups, ways to require technical support, other collateral services” [1].

### **L3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

“The circular letter n°1 dated 2 Jan. 2003, sentenced the institution of the Statistical Service of the C.N.VV.F., articulated as follows

- Central Statistic Service at the Cabinet of the Head of the CNVVF (Bureau of Direct Collaboration of the Head of the C.N.VV.F);
- Regional Statistic Services inside the Regional Directions of the C.N.VV.F;
- Statistical Services inside the Provincial Fire Departments” [1].

Purpose for which data is collected

“Statistics plays a crucial role, both for planning of the operative actions and for the more general execution of the institutional tasks, to support continuous institutional update, through the monitoring and analysis of the activities, as well as the effective use of available resource and the bettering of the services delivered to the community” [1].

What are the methods used to fill the gaps where information is missing?

“STAT-RI application that allows the electronic compilation of the same data included in the VF-41 form, such as time and place, type of accident, cause, substance involved, injured/deads, etc.

This application is perfectly integrated with SO115 software, - the software used in the operating rooms - allowing the person compiling the form to import, thanks to the card code, all information already inserted by the operator in the control room. At the same time, this mechanism ensures the integrity of all data treated by SO115 and STAT-RI system” [1].

Is there follow up to data collected ?

“The National Fire Brigades use a Business Intelligence software for the analysis of the synthetic data of the activities done by the Fire Fighters. The acronym BI stands for process of search, collection, handling and transformation of data in information, to be used in the decision taking activities. These software, by exact, updated and pertinent info given on the referring scenarios, make possible to the managerial levels to determine the so-called strategical decisions” [1].

Analyse potential cause and consequences in trends

“The Central Statistic Service has been editing the Statistic Annual Report of the CNVVF for several years, with the aim to standardize and spread out the information, in a fully available way also for users outside the Administration, as well as to acknowledge of the work for the CNVVF” [1].

#### **L4. ANALYSE EXISTING DATA**

Determining the level of confidence

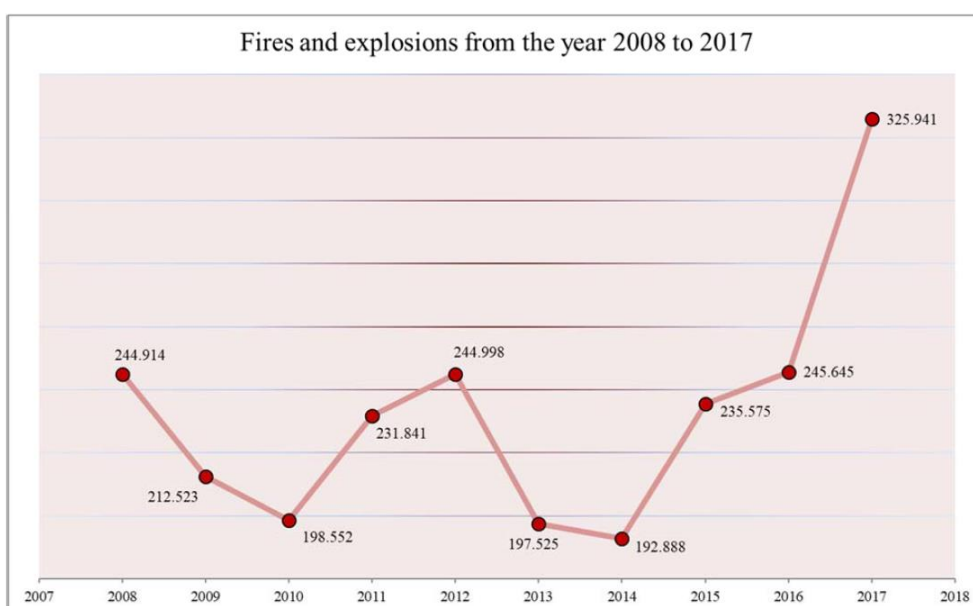
“The mechanism adopted ensures the integrity of all data treated by SO115 and STAT-RI system” [1]. No other comments are present related to the level of confidence of the data.

Pinpointing issues and limitations

Limitations are given by the limited fields recorded in terms of pre and post fire conditions of buildings subjected by fire incidents. For example, it would be important to collect data related to the quantification of damage.

Example

Reference period: January 1, 2017 - December 31, 2017



**Figure 24: Fire and explosions from 2008 to 2017 [1]**



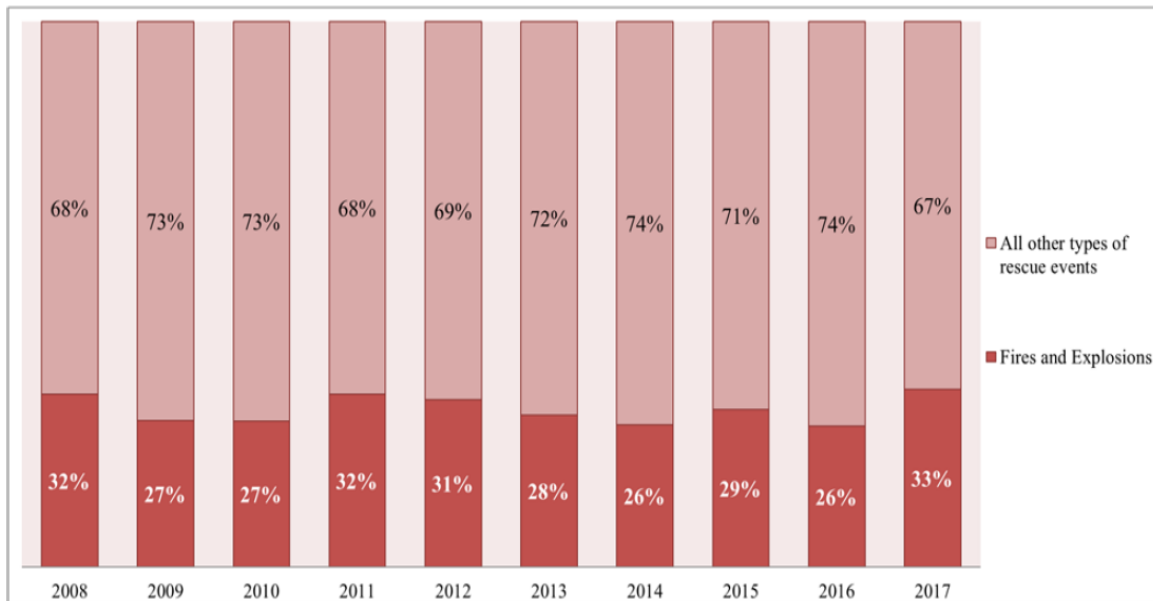


Figure 25: Percentage, year by year, of the type “Fires and Explosions”, vs. the total amount of rescue events [1]

Table 13: Places with frequency of fire higher than 0.2% for the “Fires and Explosions “type [1]

PLACE	DETAIL OF THE PLACE	Fires and Explosions	
		No.	%
Places for Specific Uses	Others	1.317	0,4%
Residential Places and Homes	Private flats and Homes	36.661	11,2%
	Generic Building	10.466	3,2%
	Others	5.835	1,8%
	Private Parkings	2.026	0,6%
	Gypsis Camps	1.674	0,5%
	Temporary Buildings	936	0,3%
	Waste Storage Rooms	718	0,2%
	Switchboard Room	670	0,2%
Storages of Solid Combustibles	Storages of Waste	1.182	0,4%
	Storages of Forages and Straw	1.101	0,3%
Commercial and Sales Stores	Restaurant and Canteens	979	0,3%
Agricultural and Farming Places	Fields	52.112	16,0%
	Rural Areas	22.601	6,9%
	Forest and Woods	22.301	6,8%
	Others	4.683	1,4%
	Tree Covered Areas	4.487	1,4%
	Agricultural Building	1.439	0,4%
	Storage Buidings	1.357	0,4%
Traffic and Parking Areas	Urban Roads and Squares	58.577	18,0%
	Extrurban Roads	26.381	8,1%
	Highway and High Density Urban Roads	4.538	1,4%
	Inner Yard of Buildings	3.771	1,2%
	Out door Parking	2.400	0,7%
	Gardens	1.876	0,6%
	Rail Areas	915	0,3%
	Others	757	0,2%
Mountain Areas	Others	1.111	0,3%
Other Places	Others	3.160	1,0%
	River and Inland Water	1.293	0,4%
	Seashore Areas	1.159	0,4%
*	*	28.953	8,9%
<b>Total</b>			<b>94,3%</b>

(\*) Rescue event report still open, data partially inserted.

Table 14: Causes with frequency of fire higher than 0.1% for the “Fires and Explosions“ type [1]

CAUSE	DETAIL OF THE CAUSE	Fires and Explosions	
		No.	%
Causes provoking need of Rescue to Persons	Not Being Possible to Evaluate	1.299	0,4%
Causes of Accident of Transportation Means and Vehicles	Lack of Attention	424	0,1%
Cause of Fire Ignition	Chimney and/or Owen Ducts	13.101	4,0%
	Cigarette Butts and Matches	6.499	2,0%
	Electrical Causes	11.796	3,6%
	Fault on Heating Production Plants	333	0,1%
	Fireworks	361	0,1%
	Glitter from Friction of Mechanical Parts	650	0,2%
	Household Appliances	1.025	0,3%
	Lack of Safety and Cautional Measures of Management	1.612	0,5%
	Lighting	579	0,2%
	Other	20.547	6,3%
	Over Heating of Engines and Machines	1.470	0,5%
	Selfcombustion	1.784	0,5%
	Malicious / Intentional Causes	Probably Fault Originated Causes	2.790
Probably Malicious/Intentional		13.129	4,0%
Not Being Possible to Evaluate	Not Being Possible to Evaluate	202.480	62,1%
Causes of Other Types of Intervention	Bad Working of Plants and or Machinery	927	0,3%
	General Lack of Attention	2.356	0,7%
	Others	6.870	2,1%
	Unforeseen Causes	3.429	1,1%
*	*	29.569	9,1%
<b>TOTAL</b>			99,1%

(\* ) Rescue event report still open, data partially inserted.

REFERENCE:

- [1] Ministero dell'Interno, “Statistical yearbook of the Italian National Fire Brigades,” 2018.

## M. DIAGNOSTIC SHEET FOR LUXEMBURG

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### M1. TERMINOLOGY ISSUES

#### References of existing database/studies

The CGDIS uses two main databases:

- One database with all the operational information from the coordination center
- One database with the reports of the incident commanders

#### Summaries of existing database

The database with all the operational information from the coordination center includes the different timestamps (hour of emergency call, departures and arrival times of vehicles, etc.) as well as a list of all alerted vehicles and staff.

The database with the reports of the incident commanders includes details on the incidents like the type of incident, the number of victims, the type of burning object, the size of the fire, etc.

#### Existing definitions

Fire statistics make the difference between burning objects (includes vegetation), vehicles or buildings. Each category has several under-categories to specify the data.

#### Are there differences within the same country?

No, one organization for the whole country.

#### Are there differences and contradictions with other domains?

Unknown

#### 12.1.2. Identification of missing information

Both databases are not linked yet, so the full data cannot be compared and analyzed automatically. To get all the information, the data has to be combined manually with a lot of invest.

### M2. STATISTICS COLLECTION ISSUES

#### Fire department responsibilities

Rescue service (ambulances & medical aid)

Fire prevention & fire fighting for all types of fire (structural, industrial, vegetation, airport...)

CRBN operations

Technical assistance

Public warning, information and training

#### Fire response organisation

The Luxembourgish Fire and Rescue Corps (CGDIS) is a Public establishment under the supervision of the Minister of Home Affairs. It reunites all public rescue services in Luxembourg.

The operational staff are all civilians (volunteers & full-time professionals) who are supported by a civil administrative and logistic staff.

Who collects data?

The CGDIS collects all data on interventions of fire and rescue services.  
The police collects all data on fire victims and fire deaths.

Who issues the data?

The CGDIS has specialized staff for analyzing and treating the data.

Are there different levels of collection?

All data are collected on a national level but always with details on the incident location, so that a more precise analysis (e.g. for a town) is possible.

Identify disparities in data feedback

Unknown

Where is the data stored?

On secured servers within the CGDIS organization.

### **M3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

The CGDIS has specialized staff for analyzing and treating the data, so that the interpreting is intern.  
On demand, the CGDIS can also provide statistics for other public authorities, like the police or the ministry.

Purpose for which data is collected

- Requirements planning and improvement of the service capacities
- Documentation in case of questions or jurisdiction
- Quality management

What are the methods used to fill the gaps where information is missing?

Feedback from the users is collected, analyzed in working groups and if necessary, the databases and reporting systems are adapted.

Is there follow up to data collected ?

Not yet, but planned to be implemented.

Analyse potential cause and consequences in trends

unknown

### **M4. ANALYSE EXISTING DATA**

Determining the level of confidence

High for the data that is collected mainly automatically (like the time of the emergency call) and can therefore not be changed.

Medium for the data that is collected mainly manual (like the incident reports) and therefore always has a subjective influence.

## N. DIAGNOSTIC SHEET FOR THE NETHERLANDS

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### N1. TERMINOLOGY ISSUES

#### Methods of estimation

The Netherlands fire database is managed by IFV since 2018, till 2018 it was managed by CBS. Since 2014 the number of subjects to reporting are minimized and collected automatically via the incident control room of the Safety Regions.

Since 2008 the Fire Service Academy of the Institute for Safety (IFV) gathers data on fatal residential fires in the Netherlands. In this process the Fire Service Academy cooperates with the fire brigades and fire investigation teams involved in these fires. The collection, content check and analysis is carried out by researchers.

#### **Fires subject to reporting**

Yes

Both IFV and CBS report the total incidents, telephonically reported incidents, automatically reported incidents, and the fires in which the fire brigade unit arrived on site, also per hour and week and per Safety Region.

#### **Fire deaths subject to reporting**

Yes

CBS collects the fire deaths based on a doctor's report. Including homicide and suicide.

IFV collects the fire deaths due to a fatal residential fire. The definition of a fatal residential fire is 'a fire involving civil fatalities due to fire, which took place in a building with a residential function or another 'housing related' object and is not caused intentionally. Including i.e. care homes. Excluding arson, homicide and suicide.

#### **Fire injuries subject to reporting** (ISO 17755-1, page 9)

Yes, number of people with burns entering the emergency room via 'LetseL Informatie Systeem (LIS)' and number of hospital admissions due to burns via 'Landelijke Basisregistratie Ziekenhuiszorg (LBZ)'

#### **Victim characteristics** (ISO TR 17755-1 page 13)

Yes

National database:

- Gender
- Age of victims

Fatal Residential Fire database:

- Gender
- Living situation
- Age of victims
- Degree of ability to leave without assistance
- Ways of discovering the fire and first reaction
- Locations of victims
- Moment of finding and situation of victim
- Moment and circumstance of death

#### **Property damage subject to reporting** (ISO TR 17755-1 page 26)

Yes, National database until 2014

#### **Other losses subject to reporting** (ISO TR 17755-1 page 30)

#### **Location of fire** (ISO TR 17755-1 page 32)

Yes

National database: till 2014

The CBS separates the locations of fire in

- small interior fire

- (medium) large interior fire
- chimney fire
- outdoor fire
- room of fire origin (for residential fires)
- type of building function (office, residential, industry etc)
- type of residential building

**Fatal Residential Fire database:**

- Location of room of fire origin.
- Location of fire related to location of victim
- Type of residential building: Houseboat, Basement home, Home above business/store, Home divided in apartments, Recreational home/caravan/chalet, Blocks of flats with a communal stairwell that serves as an entrance hall, Single-family home (detached), Gallery flat with indoor partitioning structure/closed gallery, Single-family home (Not detached) and a Gallery flat with an open gallery.
- Degree of smoke development
- Degree of fire spread

**Reporting of type of construction (ISO TR 17755-1 page 52)**

yes

**Fatal Residential Fire database:**

- type of construction if it has contributed to the fire or smoke development

**Reporting on building height and other building characteristics (ISO TR 17755-1 page 54)**

Yes

- year of construction of the building
- position of internal doors
- smoke alarms

**Reporting and estimation of deliberately set fires (ISO TR 17755-1 page 56)**

Yes, in national database till 2014

Not in Fatal Residential Fire database

**Other causes of fire:**

Yes (in national database till 2014)

- **Reporting and estimation of natural cause fires (ISO TR 17755-1 page 60)**
- **Reporting and estimation of exposure fires (ISO TR 17755-1 page 62)**
- **Reporting and estimation of smoking materials and open flame fires (ISO TR 17755-1 page 65)**
- **Reporting and estimation of heating and cooling equipment fires (ISO TR 17755-1 page 67)**
- **Reporting and estimation of cooking and kitchen equipment fires (ISO TR 17755-1 page 71)**
- **Reporting and estimation of clothes dryer fires (ISO TR 17755-1 page 74)**
- **Reporting and estimation of entertainment equipment fires (ISO TR 17755-1 page 76)**
- **Reporting and estimation of office equipment fires (ISO TR 17755-1 page 78)**
- “
- **Reporting of electrical and electrical distribution or lightning equipment fires (ISO TR 17755-1 page 62)**

**Presence and type of sprinkler or other extinguishing equipment (ISO TR 17755-1 page113)**

No

**Performance of sprinkler or other extinguishing equipment (ISO TR 17755-1 page115)**

No

**Presence and type of detection or alarm equipment (ISO TR 17755-1 page118)**

Yes, in Fatal Residential fire database

**Performance of detection or alarm equipment (ISO TR 17755-1 page122)**

Yes, in Fatal Residential fire database



**Presence of extinguishers or other manual extinguishing equipment (ISO TR 17755-1 page125)**

No

**Presence of smoke management or control equipment (ISO TR 17755-1 page127)**

No

**Reporting on fire doors, fire walls and other compartmentation (ISO TR 17755-1 page128)**

No

References of existing database/studies

<https://www.cbs.nl/en-gb/news/2020/10/fire-service-attending-to-more-non-fire-incidents>

<https://opendata.cbs.nl/statline/#/CBS/en/dataset/37441eng/table?ts=1597787694644>

<https://opendata.cbs.nl/statline/#/CBS/en/dataset/37511eng/table?ts=1597787941845>

<https://www.ifv.nl/kennisplein/Documents/20170307-BA-Fatal-residential-fires-in-the-Netherlands-2016.pdf>

<https://kerncijfers.ifv.nl/dashboard/fatale-woningbranden>

Summaries of existing database

**National database** (Statistics Netherlands (CBS) / Institute for Safety (IFV), Fire Service Academy)

Until 2014, CBS collected data on firefighting organisation, fires and emergency services via questionnaires. These were filled in by the fire brigades after each indication. Fewer fire brigades supplied data in recent years. The quality of the data also decreased due to the fact that 'unknown' was ticked more often.

The CBS published an extensive annual publication of the data up to and including 2013. In 2014, a different method of data collection was used, based on the data from the control room registrations. The data collection has now been transferred to the IFV.

Since August 2020, the IFV's Knowledge Centre for Information-Oriented Safety, in cooperation with the safety regions, now publishes the Key Incident figures of the fire brigade every month. Up to 2019, the CBS published the figures for fires and emergency services. A different calculation method and definitions have been used for the new dashboard. As a result, it is not possible to compare the CBS and IFV figures.

The Key Incident figures provide insight into the number and type of incidents received by the fire brigade control rooms and into the response times of the fire brigade for these incidents. The data is published monthly afterwards in an online dashboard.

Subjects:

- Number of fires for which fire service is called
- number of fires at which fire service was 'on scene'
- Number of residential fires for which fire service is called
- Number of residential fires at which fire service was 'on scene'
- Median of handling time fire incidents
- Median of extinguishing time fire incidents
- Median of driving time fire incidents
- Median of turnout time fire incidents (processing time + of extinguishing time + driving time)

**Fatal Residential Fires** (Institute for Safety (IFV), Fire Service Academy)

Started in 2008. Survey is based on result of scientific study (PhD) 'Understanding Human Behaviour in Fire'. The Fire Service Academy of the Institute for Safety (IFV) structurally gathers data on fatal residential fires in the Netherlands. In this process the Fire Service Academy cooperates with the fire brigades and fire investigation teams involved in these fires. They provide data on fatal residential fires through a questionnaire. The respondents are approached based on information from press reports about a fatal residential fire in their region. In this way fatal residential fires where the fire service did not assist are

included. An example of this is a fire that has already been extinguished at the time of discovery.

The subjects in the survey are related to four types of aspects, namely 'Building characteristics', 'Fire characteristics', 'Human characteristics' and 'Intervention characteristics'. Subjects:

- Fire cause
- Object of fire origin
- Room of fire origin
- Moments of occurrence, of reporting and response time
- Fire dynamics
- Accelerating factors
- Type of home
- Year of construction and housing tenure
- Smoke detectors
- Position of internal doors
- Contribution of structural characteristics
- Injured and in first instance rescued victims
- Living situation, gender and age of fatal victims
- Degree of ability to leave without assistance
- Ways of discovering the fire and first reaction
- Locations of victims
- Moment of finding and situation of victim
- Moment and circumstance of death

The data is published in an annual report. In addition, data is published every quarter via an online dashboard. These data are provisional data and are updated every quarter.

#### Existing definitions

National database (until 2014):

##### *Professional fire brigade personnel*

The part of the fire brigade staff that has fire brigades as their main job.

##### *Indoor fire*

Fire in a (more or less) closed space, e.g. in buildings.

##### *Fire (legal)*

Smoke or fire development from which a fire report is received by the fire brigade. A distinction is made between chimney fires, indoor fires and outdoor fires.

##### *Fire report*

Report for firefighting to the fire brigade; including discharge alarms.

##### *Fire brigade*

Public organisation responsible in particular for fire prevention, firefighting and technical assistance. The organisation is part of a safety region.

##### *Exterior fire*

Fire in the open air, which generally does not involve buildings.

##### *Large or medium-sized indoor fire*

Indoor fire where the first extinguishing unit to be extinguished requires the strengthening of at least one other extinguishing unit.

##### *Minor internal fire*

Inner fire where the extinguished unit does not need reinforcement. Lower fire-fighting personnel Fire-fighting personnel at grade levels

*Release alarm*

Deliberate or unintentional fire report or emergency assistance report to the fire brigade, which does not subsequently prove to be a fire or required assistance.

*Response time of the fire brigade*

Time lapse between the moment when a fire is reported and the moment when the first fire engine reaches the scene of the fire. The emergence time is equal to the sum of the extinguishing time and the driving time of the fire brigade.

*Rescue by fire brigade*

The liberation of people by the fire brigade from a situation they cannot get out of on their own. The situations concern events that do not involve a fire, but in which the help of the fire brigade is called in.

*Driving time of the fire brigade*

Time it takes for the first fire engine to leave the fire station to reach the site of the fire.

*Chimney fire*

Fire in a smoke duct.

*Victim of fire*

Dead or injured as a result of an event for which the assistance of the fire brigade has been called in, for example in the event of a fire. This may also involve an aid worker.

*Breakdown time of the fire brigade*

Time lapse between the moment a fire is reported and the moment the first fire engine leaves the barracks.

*Safety region*

The safety region is a form of cooperation between municipalities in a region, which jointly arranges the assistance of the fire brigade, ambulance services, police and municipal services. As of 1 January 2014, all fire-fighting tasks have been transferred to the safety regions.

*Voluntary fire brigade personnel*

Fire brigade personnel who have fire brigade duties as an extra job. This part of the fire brigade staff is on call in the event of calamities and also attends training courses for this purpose. In return, they receive compensation and an annual statement of this compensation.

**Database Fatal Residential Fires**

*Fatal Residential Fire*

A fatal residential fire is a fire involving civil fatalities due to fire, which took place in a building with a residential function or another 'housing related' object and is not caused intentionally.

Note:

These are the residential fires with fatal outcome where it is certain that there was no arson, murder or suicide. Residential fires with a fatal outcome intentionally caused by accountable adults are excluded from the study. Other types of arson are included in the analysis, for example, fires caused by children playing or confused adults.

Are there differences within the same country?

The regional registration methods have been changed for a number of control rooms from 2013 to 2014. This has had a particular impact on the 2013 figures for some regions.

Due to the calculation method used by the CBS, whereby specific demarcations and definitions are used, the figures in the table may differ from the administrative reports of the safety regions.

Are there differences and contradictions with other domains?

Possibly.

CBS publishes data on causes of death. The cause of death codes used are taken from the list of 'three-character categories' of the International Statistical Classification of Diseases and Related Health Problems (ICD, 10th revision) of the World Health Organization (WHO).

For each deceased person, a death cause declaration (B form) is filled in by a doctor who examines the deceased person. This is usually the attending physician, sometimes an acting physician, a municipal coroner or a physician appointed by the Public Prosecutor.

Identification of missing information

#### **National database**

No information

#### **Database Fatal Residential Fires**

Fire Service Academy of the Institute for Safety (IFV) checks that the questionnaire is complete. In case of unclear or missing information, the respondent will be contacted.

## **N2. STATISTICS COLLECTION ISSUES**

Fire department responsibilities

The safety region is responsible for firefighting in that region. The safety region has the following tasks relating to fire brigade care:

- Preventing, limiting and fighting fires.
- Limiting and fighting the risk to people and animals in the event of an accident.
- Other authorities and organizations advise on fire care, fire fighting and fire prevention.
- Prevent, limit and fight accidents involving hazardous substances.

The fire brigade also carries out tasks that fall under disaster control and crisis management. The fire brigade is led by a commander.

Fire response organisation

The fire brigade is a government organization. The repressive service consists of about 20% professional staff and 80% volunteers. Professional staff and volunteers must meet the same requirements in terms of education, training and mental and physical condition.

Each safety region employs fire investigators. These officers often have a repressive background and have received national training as fire investigators.

Who collects data?

#### **National database**

Control room Services Centre of the Police in Driebergen provides the data

The data for this statistic comes from the registration system Integrated Control Room System of the 112 alarm centers in the Netherlands.

The processing of GMS data is based on the national and regional protocols used by control rooms for registration in GMS.

#### **Database Fatal Residential Fires**

The Fire Service Academy of the Institute for Safety (IFV) gathers data on fatal residential fires in the Netherlands.

The fire brigades and fire investigation teams involved in the fires provide data on fatal residential fires.

Who issues the data?

Statistics Netherlands (CBS)

Institute for Safety (IFV)

Identify disparities in data feedback

In the study on Fatal Residential Fires we observed that if the collected data is published in useful information for policy making, the respondents are more likely to provide the data.

Where is the data stored?

Statistics Netherlands (CBS)

Institute for Safety (IFV)

### **N3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

Statistics Netherlands (CBS)

Institute for Safety (IFV)

Purpose for which data is collected

- Insight in risk factors
- Policy making
- Fire safety campaign

Is there follow up to data collected?

National database: No

Database Fatal Residential Fires: Yes

Analyse potential cause and consequences in trends

Yes, for fatal residential fires

### **N4. ANALYSE EXISTING DATA**

Determining the level of confidence

High for Fatal Residential Fires, because of the completeness, input of data by fire investigators, and verification of data by researchers

Arguable for the actual national database, as the data is gathered automatically by the emergency control room, without a thorough check for accuracy, and collected for other purposes, not in first place for statistics. However, the data has a high degree of completeness and a the method can be completed with a thorough check for accuracy

Pinpointing issues and limitations

The data is only as reliable as the effort put into registering the data correctly. The necessity and usefulness of the data collection must be made clear on the input side. It is desirable that the person who has an interest in correct output is also responsible for the input. Frequent sharing and interpretation of the data (to those who provide the data) helps to improve the quality of the input.

In the Netherlands, the investigation into Fatal Residential Fires has actually led to changes in the law. For example, based on the results of the study, the requirement for smoke detectors in existing homes has been established. The results were also used for the annual fire prevention campaigns. For example, because of a relatively large number of elderly people who died in fire, the campaign focused on the elderly. This relationship between statistics and application ensures that there is a great will to contribute. On the other hand, the effort is not that great either, because it only concerns a limited number of incidents that are extensively registered.

## O. DIAGNOSTIC SHEET FOR NORWAY

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### O1. TERMINOLOGY ISSUES

References of existing database/studies

DSB (The Norwegian Directorate for Civil Protection): <https://www.brannstatistikk.no/brus-ui/>

Some older studies of fatal fires (2005-2014) by a independent, state owned Swedish institute (RISE)  
Link: <https://risefr.no/media/publikasjoner/upload/2017/a17-20176-1-analyse-av-dodsbranner-i-norge-i-perioden-2005-2014.pdf>

Summaries of existing database

It is an overview over all the reported fires by the fire department. (for public use)  
You can get a more detail information from the fire department in specific cases. (BRIS Rapport)  
There is also published a yearly report.

Existing definitions

Unknown.

The fire brigade officers, regardless if they are fulltime / halftime / professionals or volunteers – they fill in information in partly “drop down field” database.

More detailed information require most likely interviews with DSB-officers (task 1)

Are there differences within the same country?

No, Norway only have this national system for reporting.

Are there differences and contradictions with other domains?

Most likely / because no definitions / free text / only 30% manual input by fire brigades, other institutions (health authorities, police etc.).

Identification of missing information

Cause of fire is only a best guess from the fire department... The police are only reporting about 25-30% of their findings about the fire, so there is lack of correct information.

Insurance are investigating fires, but the data is not collected – There would probably more accurate information here.

Generally it also depends on the firefighter / officer who put´s in the information (lack of definitions).

### O2. STATISTICS COLLECTION ISSUES

Fire department responsibilities

Fires and other incidents – according to the department for justice and emergency.

See also: [https://lovdata.no/dokument/SF/forskrift/2002-06-26-729/KAPITTEL\\_3#KAPITTEL\\_3](https://lovdata.no/dokument/SF/forskrift/2002-06-26-729/KAPITTEL_3#KAPITTEL_3)

Fire response organisation

Professionals and volunteers – according to the Norwegian laws :

See also : <https://lovdata.no/dokument/SF/forskrift/2002-06-26-729?q=dimensjonering%20av%20brannvesenet>

Who collects data?

Fire department collects all aspects of the fire.  
Police collects only 25-30% data from the fire that they are working with.

Who issues the data?

DSB (The Norwegian Directorate for Civil Protection)

Are there different levels of collection?

Only National / DSB

Identify disparities in data feedback

Lack of definitions which can lead to misunderstanding – 30% detailed information / 70 % automated-

Where is the data stored?

DSB (The Norwegian Directorate for Civil Protection)

### **O3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

DSB (The Norwegian Directorate for Civil Protection) / respectively the ministry of justice / emergency

Purpose for which data is collected

Fire preventive actions – and probably also other purposes (response time, etc.)

What are the methods used to fill the gaps where information is missing?

30 % of the fires are reported more detailed where police and other departments are involved afterwards – and contribute to the database.

Is there follow up to data collected ?

We don't know that (yet)

Analyse potential cause and consequences in trends

For example: <https://www.dsb.no/reportasjearkiv/brannstatistikk-2018/> - a link to a yearly report – see diagrams. But statistics include all kind of fires (not only buildingfires) and are naturally also focused on fatalities and other general data (not very detailed).



#### **O4. ANALYSE EXISTING DATA**

Determining the level of confidence

Lack of definitions / automatic input versus manual (70/30)

Pinpointing issues and limitations

The statistics will not be accurate as long as the data is not correct.. it will be difficult to make preventing actions when they only make best guess in cause of fire.

Police is only reporting in 25-30% of the fires they are working with.

Insurance, who investigate most fires are not reporting to the DSB (The Norwegian Directorate for Civil Protection). So a lot of data is missing in the official reports.

## P. DIAGNOSTIC SHEET FOR POLAND

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### P1. TERMINOLOGY ISSUES

References of existing database/studies

All statistical data collected by SFS State Fire Service.

<https://www.gov.pl/web/kgpsp/interwencje-ppsp-lata-2010-2019-zestawienia> and  
<https://dane.gov.pl/institution/22.komenda-glowna-panstwowej-strazy-pozarnej>. Collected fire data include, e.g. building description, fire consequences with costs, fatalities and wounded, fire response time, etc.

Summaries of existing database

The main area with are covered by the information from the intervention are:

- type of the incident (fire, local threats, false alarm),
- location of the incident, facility and owner (closed catalog),
- operational times of the incident,
- forces and resources used during the incident,
- types of rescue operations (closed catalog),
- equipment used in rescue operations (closed catalog),
- place of activities (inside the facility, floor, etc.),
- consumption of water, extinguishing agents,
- medical rescue operations, fatalities and casualties,
- the size of the event, the size of the facility, estimated losses, estimated property rescued,
- preventive data about the facility: presence and operation of fire prevention measures, access to the facility, etc.,
- personal data of persons managing rescue operations and medical rescue operations
- descriptive data of the event: description of the course of rescue operations, threats and difficulties, used and damaged equipment, etc.

Existing definitions

Unknown.

Are there differences within the same country?

No. All data are collected, processed and analyzed in the State Fire Service Decision Support System (DSS). The functional and informative scope of the software covers all areas of the SFS activity, with particular emphasis on the tasks performed by the rescue units. The main task of the DSS is to support the duty service in handling reports and events, coordinating rescue operations, and preparing documentation of the actions carried out.

### P2. STATISTICS COLLECTION ISSUES

Fire response organisation

Volunteers and professionals.

Who collects data?

Fire brigades for building fires. Also Police, State Medical Rescue and emergency call centers have their own Decision Support Systems but only in their authority (law enforcement, medical rescue and emergency call).

Who issues the data?

The State Fire Service (SFS) of Poland, supervised by the Minister of the Interior and Administration

Are there different levels of collection?

Only on state level

Where is the data stored?

All data are collected, processed and analyzed in the State Fire Service Decision Support System (DSS). The functional and informative scope of the software covers all areas of the SFS activity, with particular emphasis on the tasks performed by the rescue units. The main task of the DSS is to support the duty service in handling reports and events, coordinating rescue operations, and preparing documentation of the actions carried out. The detailed scope of data collected by the SFS from the intervention of fire protection units is specified in Annex 6 to the Regulation of the Minister of Interior and Administration of July 3, 2017 on the detailed organization of the National Firefighting and Rescue System (Journal of Laws 2017, item 1319).

Who is interpreting the statistics

State Fire Service

#### **P4. ANALYSE EXISTING DATA**

Examples

Definition for fire by size

<b>BASIC DEFINITIONS</b>			
<b>FIRE CLASSIFICATION</b>			
<b>SIZE</b>	<b>Typical objects</b> F – surface; V - volume	<b>Cultivations, Forests</b> F - surface	<b>Fire streams (FS)</b>
<b>SMALL FIRE</b>	- F do 70 m <sup>2</sup> - V do 350 m <sup>3</sup>	F < 1 ha	FS < 4
<b>MEDIUM FIRE</b>	- F 71-300 m <sup>2</sup> - V 351-1500 m <sup>3</sup>	1 < F < 10 ha	5 < FS < 12
<b>LARGE FIRE</b>	- F 301-1000 m <sup>2</sup> - V 1501-5000 m <sup>3</sup>	10 < F < 100ha	13 < FS < 36
<b>VERY L. FIRE</b>	- F > 1000 m <sup>2</sup> - V > 5000 m <sup>3</sup>	F > 100 ha	FS > 36

The main fire causes in Poland for 1993-2003

	Major causes of fires	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		[%]										
1	Arson	34,5	31,8	32,8	40,1	41,3	41,7	41,7	41,7	41,7	42,7	46
2	Carelessness	33,4	35,2	34,8	32,2	31,7	30,4	32,4	31,9	29,1	31,3	32,4
3	Unknown	10,3	10,3	9,4	8	8,4	9,4	9,2	10,5	9,7	10,9	10,4
4	Others	6,9	5,8	5,9	5,2	5,2	5,4	5,9	5,9	5,9	3,1	2,7
5	Electric appliances	8,8	7,6	7,4	6,6	6,3	6,2	5,5	4,9	5,2	4,4	2,9
6	Heating devices	2,6	4,6	5,4	5	4,4	4,5	2,8	2,4	4,3	3,7	2,9
7	Means of transport	2,5	2,7	2,5	2,1	1,9	1,8	1,8	1,7	2,1	1,8	1,4
8	Technological processes, storages	1	2	1,8	0,8	0,8	0,6	0,7	0,6	2	2,1	1,3
TOTAL		100	100	100	100	100	100	100	99,6	100	100	100

Structure of interventions in Poland for 1993-2003

Year	Interventions		Fires		Local threats		False alarms	
	Number	[%]	Number	[%]	Number	[%]	Number	[%]
1993	113 378	100	72 401	63,9	30 109	26,6	10 868	9,5
1994	148 389	100	96 954	65,3	39 751	26,8	11 684	7,9
1995	159 356	100	96 595	60,6	52 028	32,7	10 733	6,7
1996	186 282	100	109 388	58,7	67 152	36,1	9 754	5,2
1997	240 448	100	119 448	49,7	111 669	46,4	9 331	3,9
1998	218 538	100	115 557	52,9	93 981	43	9 000	4,1
1999	250 168	100	136 284	54,5	103 640	41,4	10 244	4,1
2000	269 846	100	135 889	50,4	122 983	45,6	10 974	4
2001	293 761	100	116 601	39,7	166 911	56,8	10249	3,5
2002	360 294	100	151 026	41,9	197 491	54,8	11 777	3,3
2003	402 883	100	220 885	54,8	169 221	42	12 807	3,2

## Q. DIAGNOSTIC SHEET FOR ROMANIA

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### Q1. TERMINOLOGY ISSUES

#### Existing definitions

The definitions used for fire statistics are so far unknown.

#### Are there differences within the same country?

The fire data are recorded uniformly across the country.

#### Are there differences and contradictions with other domains?

No, there is only one nationally authorized body for fire statistics.

#### Identification of missing information

Since there is no overview of the data structure, no assessment can be made with regard to missing data.

### Q2. STATISTICS COLLECTION ISSUES

#### Fire department responsibilities

National emergency/ disaster management authority: General Inspectorate for Emergency Situations, Ministry of Internal Affairs

Main tasks:

- Coordinating the implementation of emergency management actions and measures on national territory.
- Coordinating all organizations involved in the management of emergencies according to international regulations.
- Communicating the decisions made by the Government or by the National Committee (through its Technical Secretariat) to the authorities of central public administration in order to secure coordinated management of emergencies.

#### Fire response organisation

There are around 350 fire stations in Romania. Around 700 fire engines and 120 fire ladders are available. The fire brigade staff is divided as follows: 26,900 professional firefighters and around 103,000 volunteer firefighters.

#### Who collects data?

General Inspectorate for Emergency Situations, Ministry of Internal Affairs

#### Who issues the data?

General Inspectorate for Emergency Situations, Ministry of Internal Affairs

#### Are there different levels of collection?

Nationwide data collection

Identify disparities in data feedback

Unknown

Where is the data stored?

General Inspectorate for Emergency Situations, Ministry of Internal Affairs

### **Q3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

General Inspectorate for Emergency Situations, Ministry of Internal Affairs

Purpose for which data is collected

- Reducing the environmental damage caused by fires
- Creation of stable fire-resistant infrastructure
- Reducing fire damage
- Elimination of the main causes of fire
- Increasing fire safety in the most important fire objects
- Increasing fire safety for children and the elderly
- Reducing the number of fires
- Reduction in the number of fire victims

### **Q4. ANALYSE EXISTING DATA**

Determining the level of confidence

The database is not freely accessible. Written inquiries should be directed to the General Inspectorate for Emergency Situations, Ministry of Internal Affairs.

Examples

- In Romania, only statistical information on fires is available from the CTIF sources.
- The state's fire protection system is structured centrally.
- Statistical information is available on the number of fires, the number of technical assistance missions, the number of medical rescues and for false alarms.
- A distinction is made between building fires, chimney fires, vehicle fires, forest fires and other fires.
- In terms of the number of victims, a distinction is made between the dead and the injured. Information on fire fighters who have had an accident also exists.
- There is information about the causes of fatal fires. A distinction is made between victims who have lost their lives through fire smoke or who have had an accident through trauma. However, it is not possible to distinguish whether fire victims were surprised in their sleep or whether they lost their lives due to alcohol or drugs.

<b>Statistical data (year 2006)</b>	<b>ROMANIA</b>	<b>BUCHAREST</b>
<b>Population (thous. inh)</b>	<b>21.537</b>	<b>1.931</b>
<b>Area (sq.km)</b>	<b>238.391</b>	<b>238</b>
<b>Total number of calls a year</b>	<b>42.309</b>	<b>2.679</b>
<b>-fires</b>	<b>12.926</b>	<b>1.549</b>

Statistical data (year 2006)	ROMANIA	BUCHAREST
-accidents	3.259	451
-technical aid	-	-
-medical aid	16.001	103
-false calls	2.412	189
-other	7.711	387
<b>Total number of fires</b>	<b>12.926</b>	<b>1.549</b>
-structure (without chimneys)	5.091	663
-in chimneys	1.563	58
-vehicle	1.335	208
-forests	136	-
-grass, bushes	1.306	236
-rubbish	312	1
-other fires	3.283	383
<b>Number of fire deaths</b>	<b>220</b>	<b>27</b>
<b>Number of fire injuries</b>	<b>348</b>	<b>49</b>
<b>Number of firefighters death</b>	-	-
<b>Number of firefighters injuries</b>	<b>28</b>	<b>15</b>
<b>Number of firefighters</b>	<b>169.885</b>	<b>3.019</b>
-professionals (full time)	19.969	1.926
-part time	-	-
-volunteers	149.916	1.093
<b>Additional data</b>		
<b>Number of fire deaths in structure fires</b>	<b>220</b>	<b>27</b>
<b>by cause of fire deaths:</b>		
-burns	138	13
-smoke installation	69	12
-physical trauma (fracture, injury...)	13	2
-other	-	-
by conditions before injury:		
-asleep	no available	no available
-impaired by alcohol or other drugs	no available	no available
-physical handicap	no available	no available
-other	no available	no available

## R. DIAGNOSTIC SHEET FOR RUSSIA

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### R1. TERMINOLOGY ISSUES

#### References of existing database/studies

The creation of the fire statistics of the Russian Federation is based on a law, the content of which can be read at the following link:

<https://bazanpa.ru/mchs-rossii-prikaz-n625-ot24122018-h4304693/>.

There are many articles regarding fire statistics available.

For example this link:

<https://sites.google.com/site/statistikapozaro/articl>.

Publications are in Russian language.

#### Summaries of existing database

The name of the related law is: Order of the Ministry of the Russian Federation for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM of Russia) dated 12.24.2018 N 625 "On the formation of electronic databases for accounting for fires and their consequences" (together with the "Procedure for filling out and submitting a fire accounting card")

Data is collected for every fire that occurred in the country for one year.

Each fire is characterized by approximately 100 parameters.

The database consists of the following parts:

1. General information
2. Object of fire
3. Consequences of fire
4. Saved (evacuated) by fire
5. Development and extinguishing the fire
6. Firefighting forces and means
7. Information about the dead and injured
8. Additional Information

### **Brandtote in Russland (Fire deaths in Russia)**

#### Report/source:

S. Sokolov, P. Wagner, Brandtote in Russland, vfdb 2/2014 Vereinigung zur Förderung des Deutschen Brandschutzes e.V. (vfdb), Postfach 4967, 48028 Münster

#### Purpose:

Investigation about the Russian situation regarding fire safety of the citizens.

#### Data:

Russian fire statistics 2012

#### Key finding (s):

About 74 % of fire fatalities are male. Regarding the age pensioners are at highest risk of dying in a fire.

Most fatalities in residential building fires are found in living and bed rooms.

Cigarettes, together with matches, lighter and candles are the most frequent fire causes.

Although number of fires in Russia is lower than in Germany the fatalities per million citizens are significantly higher.

#### Existing definitions

All 100 parameters have definitions.

The definitions of the parameters are described in the appendix to this document.



Are there differences within the same country?

No, the database is uniform for the entire federation and is legally binding.

Are there differences and contradictions with other domains?

The EMERCOM of Russia is the sole responsible ministry.

Identification of missing information

The content of the database completely covers the quality and quantity of data on fire incidents required in the state.

## **R2. STATISTICS COLLECTION ISSUES**

Fire department responsibilities

State (federal) fire service is responsible for data collection. A fire record card is used for this.

The main activities of State Fire Service described as follows:

- Organization of the development and implementation of state measures aimed at preventing fires;
- Increasing the efficiency of fire protection of settlements and enterprises;
- Organization and implementation of state fire supervision;
- Extinguishing fires and carrying out related priority emergency rescue operations in settlements and at facilities;
- Professional training of personnel for fire-fighting rescue operations.
- Research and development work in the field of fire safety.

Fire response organisation

State (federal) fire service EMERCOM of Russia

Who collects data?

State (federal) fire service EMERCOM of Russia

Who issues the data?

State (federal) fire service EMERCOM of Russia

Are there different levels of collection?

Data is collected for each fire (about 100 parameters), which can be analyzed at different levels.

There are some kinds of fire service in Russia:

1. professional - state (federal) and state (territorial) fire service
2. professional local (municipal),
3. volunteer fire service,
4. private fire service,
5. some ministries have own fire services (for example Ministry of Defense).

But State fire service is responsible for fire statistics in the Russian Federation. All fire brigades collect the data and send them to EMERCOM who will analyse the data.

Identify disparities in data feedback

The data collection work is essentially easy and clear based on the criteria given for each parameter. Only a very small proportion of data records contain errors.

Where is the data stored?

All-Russian Scientific Research Institute of Fire Protection EMERCOM of Russia.

### **R3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

Mainly departments of State fire service, scientific and educational organizations EMERCOM of Russia.

Purpose for which data is collected

To monitor the situation with fires in the country

What are the methods used to fill the gaps where information is missing?

It is allowed that some of the database fields may be empty.

Is there follow up to data collected ?

There is a period of time when the database can be updated

Analyse potential cause and consequences in trends

Fire safety report published annually.

National fire safety programs (reduce fires and fire deaths at some objects and etc.) are also periodically developed.

### **R4. ANALYSE EXISTING DATA**

Determining the level of confidence

The owner of the database is the state fire service, but other organizations can obtain permission from the database.

General statistics are publicly available (annual report in PDF format), but permission from the fire department is required to obtain detailed database data.

Pinpointing issues and limitations

The owner of the database is the state fire service, but other organizations can obtain permission from the database.

General statistics are publicly available (annual report in PDF format), but permission from the fire department is required to obtain detailed database data. Any person or organization can analyze and interpret statistics.

Examples

The Russian Federation extends over 17 vegetation zones, which have corresponding influences on the lives of the people living there. Russia is divided into eleven time zones. The Civil Protection Ministry of the Russian Federation (abbreviation, English EMERCOM) is the Civil Protection Ministry of the Government of Russia.

The organization was founded on December 27, 1990. In 1994 it became a ministry and since 2002 the fire brigade has been subordinate to it. Russian State Fire Service is the highest fire service body of the Russian Federation. A part of the Ministry of Emergency Situations since 2001, the State Fire Service is divided into the Federal Fire Service and the Fire Service of the Federal Subjects of Russia. State Fire Service's 220,000 personnel operate out of 13,600 buildings and structures, including 4,000 plus fire stations containing 18,634 fire appliances and 49 fireboats. The State Fire Service divisions participate in over two million operations a year, rescue over 90,000 lives, save property evaluated as high as 120 billion rubles.

Regarding the system of fire statistics one can say:

- A nationwide uniform system was created.
- Differentiated analyzes depending on the part of the country, administrative zone, etc. are possible.
- The detection takes place via a card for fire detection and comprises 8 parts. More than 100 parameters characterize all conceivable situations.

## S. DIAGNOSTIC SHEET FOR SLOVAKIA

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### S1. TERMINOLOGY ISSUES

#### References of existing database/studies

For the purposes of statistical monitoring of fires, District Head-Offices of the Fire and Rescue Corps via fire investigators process data on fires that have occurred in their territory

[https://www.minv.sk/?Kontakty\\_PTEU](https://www.minv.sk/?Kontakty_PTEU)

Every year a statistical yearbook is published by the Ministry, the last English version is from 2011 (uploaded document).

#### Summaries of existing database

In detail, basic recorded data on fires include: date of receiving a notification of fire, date of fire observation, time of receiving a notification, time of fire observation, address, owner, user, information whether the object is insured, direct damage, consequential damage, salvaged values, number of fatalities, number of injured persons, ownership, nature of damage, branch of economic activities in which the fire occurred, place and space of fire origin, fire cause, ignition source, material first ignited, subsequent burning material. Depending on whether it is a building or a car, data are further specified.

At the beginning of each month the above mentioned data are sent to the Fire Research Institute of the Ministry of Interior of the Slovak Republic, where they are further processed and analyzed according to various indicators.

The basic statistics resulting from collected data include: number of fires, direct damage, number of fatalities, number of injured persons, salvaged values and consequential damage.

### S2. STATISTICS COLLECTION ISSUES

#### Fire department responsibilities

Fire, technical rescue operations, medical assistance, rescue works during floods, rescue activities in heights

#### Fire response organisation

In 2011 members and employees of fire units (common name for different firefighter's formations) in the Slovak Republic carried out 53 258 runs on the whole. Thereof, 16 046 attendances were due to fires, 29 634 ones were due to rescue and technological responses including traffic accidents, ecological accidents and floods, 3 116 ones were due to false alarms and 6 204 runs were performed within variety of trainings.

There were 33 115 runs performed by the FRC members in the year 2011; there of 13 891 were by reason of fire; 16 681 were by reason of rescue and technical rescue operations (traffic accidents – 6 656; ecological interventions – 938; medical assistance, rescue works during floods, rescue activities in heights, on and under water surface and other aid – 15 743); 919 alarms were false and 1 624 attendances were made in terms of tactical and verification trainings. In comparison to the year 2010, the total number of the FRC members' runs fell by 2 539, while the fire interventions rose by 3 912, the number of rescue, technical rescue and ecological interventions fell by 6 408, the number of false alarms fell by 131 and the number of runs in terms of training reasons rose by 88 against the last year.

### S3. ANALYSE EXISTING DATA

Examples

Table 1: Structure of fire brigade calls (interventions) in Slovakia for year 2018 and 2019

Structure of Fire Brigade Calls	<b>2018</b>	<b>2019</b>
fire	9 288	9 602
technical intervention	10 693	11 330
car accident	8 454	8 185
dangerous substance	873	899
training	1 348	1 330
false alarm	670	647
<b>together</b>	<b>31 326</b>	<b>31 993</b>

Table 2: Slovakia - Injured and killed persons in fires in 2009 - 2019

Year	Deaths	Injured
2009	56	245
2010	41	244
2011	56	267
2012	44	232
2013	45	210
2014	44	196
2015	54	242
2016	52	201
2017	55	224
2018	49	194
2019	45	343

Table 3: Slovakia – Fires by fire objects in 2018 - 2019

	<b>2018</b>	<b>2019</b>
buildings and objects	2646	2489
means of transport	1057	976
external environment	4804	5316
other fire	781	821
Total	9288	9602

Table 4: Slovakia – consequences of fires in 2015 - 2019

	2015	2016	2017	2018	2019
Fires	10999	8807	10312	8973	9304
Direct Damage, €	42010875	33590660	31648830	40094650	36979615
Indirect damage, €	332825	99280	866730	10257305	865180
Saved property, €	213712185	177630250	198196560	321740940	229741925
Killed	54	53	55	49	41
Injured	242	206	224	195	296
Population	5426000	5435000	5443000	5450000	5458000

The following comments can be made to the high fire statistics of Slovakia:

- In 2018 and 2019, a little more than 30,000 fire service calls were registered in Slovakia. Fires of the order of 9,000 to 10,000 are to be found among these operations.
- The country's fire statistics also show information on deaths and injuries in fires.
- The fire statistics also differentiate between fire objects. The majority of all fires occur outdoors. This was followed by buildings and other objects.
- The consequences of the fires are characterized using various parameters. The direct fire damage and the indirect fire damage should be emphasized. The statistics also show the material values that could be saved from fires.
- The number of fire deaths and the number of people injured in fires has been comparatively stable in recent years.
- When it comes to the causes of the fire, the statistics differentiate whether it was caused by a known person or whether the perpetrator was unknown. Cases of suicide are also reported.
- Particular attention is paid to the question of whether children are to be found among the causes of fires.
- If the causers of the fires are adults, the following parameters are examined: smoking, setting fire to waste, correct operation of equipment or careless handling of open flames. The electricity factor dominates among the technical causes.
- The fire statistics of Slovakia examine the distribution of fires over the hours of the day, on the days of the week and also on the months of the year. All parameters already mentioned above are also taken into account.

With regard to the distribution of the fires across the individual economic sectors, the following can be stated. A particularly large number of fires can be found in the housing sector. There are also large numbers of fires in the waste management sector. When it comes to fire damage, the wood processing industry, transport and building management come first.

## T. DIAGNOSTIC SHEET FOR SPAIN

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### T1. TERMINOLOGY ISSUES

#### References of existing database/studies

Fundación Mapfre and APTB (professional association of fire fighters) and publish every year an annual report named “Estudio de víctimas de incendios en España”.

UNESPA (association of insurers) also publishes an annual report (¡fuego! los incendios asegurados) based on data from insurers.

María Fernández-Vigil Iglesias, University of Navarra. Title: Seguridad contra incendios en viviendas de personas mayores en España. Caracterización del problema y propuesta de soluciones". PhD thesis (2020).

Fernández-Vigil, M., Gil Rodríguez, B. & Echeverría Trueba, J.B. Fire Safety Strategies to Reduce Mortality in Dwellings Occupied by Elderly People: The Spanish Case. Fire Technol 56, 2257–2281 (2020). <https://doi.org/10.1007/s10694-020-00972-4>

Fernández-Vigil, M., Echeverría Trueba, B. Elderly at Home: A Case for the Systematic Collection and Analysis of Fire Statistics in Spain. Fire Technol 55, 2215–2244 (2019). <https://doi.org/10.1007/s10694-019-00852-6>

#### Summaries of existing database

##### **Estudio de víctimas de incendios en España**

It is a document prepared on the basis of data provided by the Fire Services themselves of the entire nation and by the Legal Medicine Institutes of the different autonomous communities and provinces

- Example of published data:
- Number of interventions due to fires and explosions;
- number of fire and explosion victims.
- Distribution of fatalities by:
  - Age,
  - Gender,
  - Month, Day, Hour,
  - Region,
  - Type of building.

##### **¡fuego! los incendios asegurados**

To carry out this report, a database has been generated with information on 22 insurers (see annex), which can be estimated to have just over 75% of the Spanish market by turnover. The figures provided by these entities allow us to estimate the aggregate costs of the insured fires in the 2018-2019 period at about 422 million euros. Home and industry insurance are the main components of this cost.

Example of published data:

- Estimated distribution of the cost of insured fires by type of buildings.
- Insured assets from fire, according to the size of the municipality where they are located and cities.
- Distribution of the severity (derived from cost) of fires, by type of insurance.
- Average severity of fires, according to the type of insurance.
- The 50 municipalities with the most insured assets from fires.
- Provincial distribution of fires, insured assets and population.
- Ratio of the average severity of the fire to the average disposable income of the municipality.
- Fire intensity ratios, according to the type of insurance
- Fire intensity ratios, by province.
- Fire intensity ratios, by cities.

### Existing definitions

Fire deaths: all those people who have been counted as fatalities of fire or explosion:

- They have died at the scene of the fire.
- They have died after being hospitalized as a direct consequence of the accident that occurred.
- Deaths in fire or explosion in vehicles have not been taken into account when the cause of death was the forces generated by the collision itself. They have been counted when fire or explosion occurs with accident, but death is due to fire.
- The victims of explosions of pyrotechnic devices intentionally manipulated in popular celebrations, nor the victims of voluntary exposure to fire, firecrackers, etc. have been taken into account.
- Those deaths that have been classified as suicides have not been considered victims of fires.
- Neither have they been considered those caused by fire or explosions intentionally, with the purpose of committing a homicide or as a way to hide a violent death.
- The deaths of accidents caused by people have been counted when there has been no intention to cause physical harm to the victims (at the end of the study).
- When counting the victims of fire or explosion and assigning them to each Fire Service in particular, both the data provided by the Services themselves, as well as data collected through the media, have been taken into account, but provided that are ratified by the Institutes of Legal Medicine (IML). This clarification is necessary since, if a person has died in the hospital as a result of injuries caused in a fire or an explosion, despite the fact that they may not have been counted as deceased by the Fire Service that attended the accident, yes it has been included in this study and, therefore, assigned to said Fire Service. The same occurs in small incidents that have not even been attended by the Fire Services, but in which a death has occurred as a result of any of the type accidents contemplated in this study.

Are there differences within the same country?

No, it covers 100% of the territory of the Spanish State.

Are there differences and contradictions with other domains?

Unidentified.

### Identification of missing information

Information has been obtained on all localized fatalities, although in some cases full details of the victim or the circumstances surrounding the fire have not been obtained.

As it was mentioned above, data is provided by Fire Services. However, there are some Services which do not have collection of data (they are too small, or they don't have enough staff to carry out the collection task), and some others which don't provide their data every year.

In addition, the fire data collection is different in each Fire Service (there is not a national fire incident database), so basic data (as the age of the victim, for example) is missing in several cases.

## **T2. STATISTICS COLLECTION ISSUES**

### Fire department responsibilities

There is a Spanish law (RD 1053/1985) which establishes that Fire Services are in charge of the data collection in each intervention, and the General Directorate of Civil Protection should process the information and publish it each year. However, there are not Official Statistics since 1994, due to lack of funding.

### Fire response organisation

It is different in each municipality, region, community... Sometimes they are volunteers, sometimes they are professionals



#### Who collects data?

Data published by APTB and MAPFRE are developed from data detailed by fire departments on fires with fatalities and crossed with the Legal Medicine Institutes. It is a private-funded initiative.

#### Who issues the data?

Fundación Mapfre and APTB issues the data. However the raw data is not published. Here is the collection process in chronological order:

1. Definition of the work team.
2. Review of the questionnaires to collect the data required for the preparation of the study.
3. Collection of information:
  - Request to complete the questionnaires. Demand made through electronic means and by telephone to collaborating entities and organizations, affecting the network of people who collect data from all the actions of the services involved in fires or explosions.
  - Ratification with the sources of the information collected by the working group: Firefighters with interventions with fatalities.
4. Verification with the Legal Medicine Institutes that the death of the person involved was due to the accident itself, since sometimes it occurs for a different reason before the fire started or an attempt is made to hide a violent death with an intentionally caused fire.

#### Identify disparities in data feedback

In all claims with fatalities, sufficient data have been obtained to be able to treat said information in a homogeneous manner. However, in any case it is still possible that in some fields the classification of the information is not sufficiently standardized and not all the Services have used exactly the same criteria. In an attempt to reflect reality as faithfully as possible, when eventually the information has not been possible to obtain with the due level of detail, the data recorded in previous years have been prorated or used, in which case it has been conveniently indicated in the corresponding boards.

There is a basic standardized document to collect data « Parte Unificado de Actuación », but most of the Fire Services don't use it, and they have their own way to collect data, depending on their resources. It is variable between different regions.

### **T3. STATISTICS INTERPRETATION ISSUES**

#### Who is interpreting the statistics

APTB and MAPFRE (authors of the reports)

#### Purpose for which data is collected

To provide recommendations to regulators and prevention campaigns

Examples from 2018 report:

- Taking into account that 78% of the accidents have occurred in homes, and that in these 70.8% of the deaths have been due to smoke inhalation, it is considered essential to install detection systems in private homes, supporting any legislative initiative that equates us in terms of the installation of detectors in homes to neighboring countries such as France or England, where such devices are mandatory.
- 77.1% of deaths are concentrated in the coldest months of the year, so prevention campaigns should continue aimed at the correct use and maintenance of heating systems in homes, as well as the abandonment of traditional systems but highly dangerous, such as braziers or old stoves.
- Prevention campaigns should be intensified in those municipalities with less than 20,000 inhabitants, and especially in those with less than 5,000, since they are the most affected by the number of deaths

due to the fact that most of them lack their own Fire Service. Faced with the material and economic impossibility of providing each town with a Fire Station, it must be committed to training and informing citizens from the Public Administrations.

- It is essential to have a regulation or legislation that unifies criteria for action, training, equipment and organization of all the Fire Department in Spain. It will be the only way to guarantee the correct development of issues such as fire prevention and investigation

#### Analyse potential cause and consequences in trends

The striking decrease in the number of deaths in 2018 compared to the bad results of 2016 and 2017 can be attributed to the better weather conditions of the year with respect to both previous ones, and with the possible incidence of awareness campaigns and the progressive installation of smoke detectors in the homes of people from risk groups (especially those over 64 who live alone or have some degree of dependency).

**T4. ANALYSE EXISTING DATA**

Determining the level of confidence

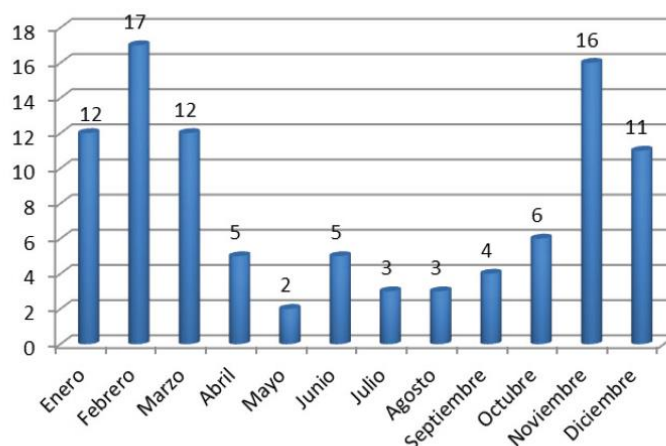
The percentage of data on deaths due to fire or explosions that this study presents reaches 98 percent of the Fire Services of all Spain that have intervened in accidents with deaths, and 97 percent in the case of forensics of the entire territory national.

Pinpointing issues and limitations

Fire investigations are neglected by the Fire Services, which means that in many of the accidents there is not enough data to establish the cause of the fire or the reason for the fire deaths. These data would be useful to improve fire prevention systems.

Examples

Seasonal effect: In the warm months there were 22 deaths (from April to September, both included), compared to the 74 deaths in the cold months. In particular, 17 deaths in February, and 16 in November, those are the two worst months of 2018.



Age effect: The age group >64 years accounts for almost half of the victims in dwellings (in 2018, as every year); the total number of fatalities (96) in 2018 fell to 2.05 deaths per million inhabitants, while that corresponding to the group >64 years accounts for to 4.83 deaths per million.

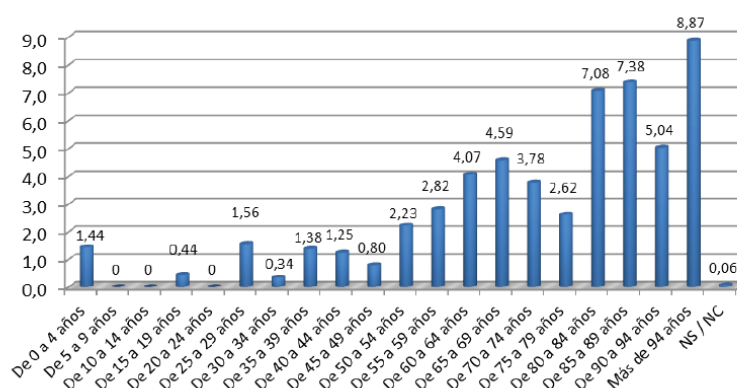
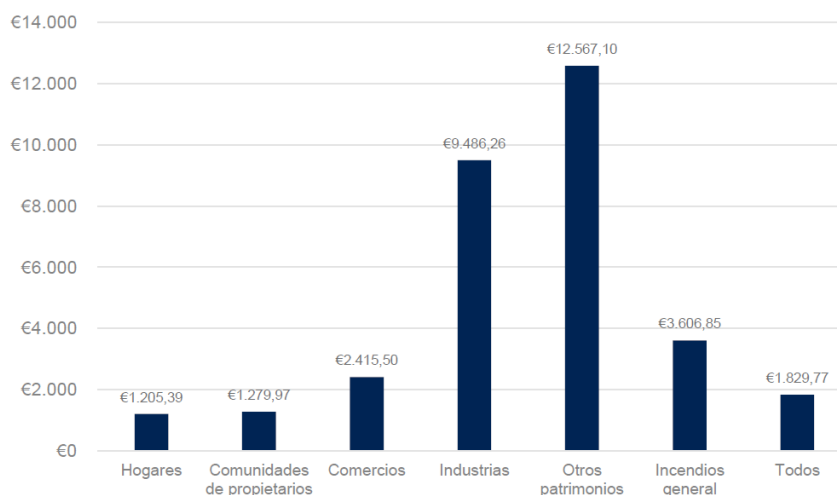


Figura 12. Índice de fallecidos por grupos de edad en viviendas por millón de habitantes.  
Fuente: elaboración propia a partir de los datos de Servicios de Bomberos e IML

The severity of fires is derived from their cost. In other words, the study assumes that the more the insurer has had to pay, the more serious the fire has been. The distribution of costs by type of insurance very considerably reduces the role of the home. Household fires tend to have a lower cost than that produced in businesses and industries, which makes the latter especially gain a weight in costs (that is, in severity or in the aggregate loss generated by the fires).

The impressions derived from the pure distribution of gravity by typologies are fully confirmed when the average costs are found. The average fire in homes causes damages of 1,200 euros. This amount is comparatively much lower than that observed in fires in other types of buildings, such as industries or other assets (where schools, hotels, etc. are located), which are around or exceed 10,000 euros.

Ilustración 6: Gravedad media de los incendios, según el tipo de seguro.



## U. DIAGNOSTIC SHEET FOR SWEDEN

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### U1. TERMINOLOGY ISSUES

#### Methods of estimation

The fire statistics in Sweden are to a large extent based on the incident reports recorded by the municipal fire and rescue service on each incident/accident they respond to. The reporting is conducted in a local IT-system, and most data is sent to a central database at the Swedish Civil Contingencies agency (MSB), who then publish statistics via the IDA system which contains data from 1998.

Prior to 2018 there were three systems (Alamos, Core or Daedalos) used by the fire and rescue services when reporting incidents. However, since 2018-01-01 all fire and rescue services in Sweden report their incidents in Daedalos. The contents of the incident report have been revised in 2005 and 2016. It took the slowest municipal brigade two years to introduce the latest version, called "Händelserapporten". We are currently working on the first revision of händelserapporten, to be implemented by 1<sup>st</sup> January 2022.

The IDA system can be accessed by anyone at [ida.msb.se](http://ida.msb.se). Some basic tables can be accessed without login, one can create one's own tables by logging in. The quality and reliability of the statistics is assessed yearly by MSB<sup>1</sup>.

For e.g. researchers it is also possible to get more detailed data/analysis by making a request to the statisticians at MSB as not all fields in the incident report are available to the public due to e.g personal integrity.

The database contains all type of incidents/accident that the rescue service responds to, not only fires.

Statistics Sweden <https://www.scb.se/en/> keeps statistics on much data in Sweden (economy, number of people in households etc.). Data can be retrieved from there by anyone at <https://www.statistikdatabasen.scb.se/pxweb/en/ssd/>.

Statistics on fatalities is kept by the National Board of Health and Welfare (Socialstyrelsen) <https://www.socialstyrelsen.se/statistik-och-data/register/alla-register/dodsorsaksregistret/>. Socialstyrelsen provides information on all the data in the database (definitions), death cause is organised according to ICD-10. Anybody can get statistics from the database on [https://sdb.socialstyrelsen.se/if\\_dor/val.aspx](https://sdb.socialstyrelsen.se/if_dor/val.aspx).

Socialstyrelsen also have a comprehensive database covering all in-patient treatments in Swedish hospitals. This is an important source for researchers studying fire injuries.

MSB maintain a database on fatal fires and fire victims, and publish statistics on IDA. Data is combined from the relevant authorities so that fire fatalities can be associated with a specific fire incident. In addition, there are cases when rescue services do not respond to a fatal fire, this can e.g. be when someone is living in remote areas and the fatal fire is discovered a couple of weeks after the fire actually occurred. The statistics for the period 1999 – 2015 are considered to be of very high quality due to the use of data from the National Forensic Centre. Unfortunately MSB has not been able to access forensic data from 2016 and until the Swedish government clarify the legal situation, the statistics onwards are considered preliminary <https://ida.msb.se/ida2#page=e3d46ba0-8f87-4ab7-b28d-7b950cd8a43>. A description of the fatal fires database is provided by Johnson et al.<sup>2</sup>

Insurance companies also collect statistics; however, their statistics is not very detailed, and they can in many cases not differ between a fire and a thunder incident. The statistics is available at <https://www.svenskforsakring.se/statistik/skadeforsakring/skadestatistik-per-skadeart/brand-och-aska/>.

Brandskyddsföreningen collects data on fires from media. This data is not available.

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<sup>1</sup> MSB, Kvalitet i MSB:s insatsstatistik 2019,

<https://ida.msb.se/dokument/insatsstatistik/kvalitet2019/Kvalitetsdeklaration2019.pdf>

<sup>2</sup> Jonsson A., Bergqvist A., Andersson R. "Assessing the number of fire fatalities in a defined population", Journal of Safety Research, Vol 55 December 2015, pp 99-103

There has been and collection of more detailed residential fire statistics in the project "Lärande från bostadsbrand" initiated by MSB. Only a few fire and rescue services have participated in this project.

#### Summaries of existing database

The database is online available at MSBs website.

#### Existing definitions

Complete definitions of the different fields in the incident reporting system is available, however it is all in Swedish. Some definitions/terms for residential fires that might be useful are translated below

- Year (År)
- Name of Rescue service (Räddningstjänst), in many cases similar to municipality
- County (Län)
- Municipality (Kommun)
- Type of Municipality (kommungrupp) Suburban to big city, Suburban to larger cities, Rural Municipality, Sparsely populated region, Densely populated region
- Commuter municipality, Big city, Larger city, Tourism city, Production city
- Building (Byggnad) type of building (gas station, student house, vacation house, hotel, jail, defence building, school, industry, farm, dwelling, outside, hospital, etc.)
- Building type (Byggnadsgrupp) (public building, other, dwelling, outside, industry or unknown)
- Month (Månad)
- Day of the month (Dag)
- Day of the week (Veckodag)
- Date (datum)
- Cause of fire (Brandorsak)
- Size of fire upon arrival (Omfattning vid ankomst)
- Total size of fire (Brandens totala omfattning)
- Smoke detector present (brandvarnarförekomst)
- Start room (startutrymme)
- Start item (startföremål)

MSB plan to publish a homepage with an English translation of the entire contents of the revised händelserapport by the end of 2020.

Terminology is also discussed in appendix 2 of Andersson et. al.<sup>3</sup>

#### Are there differences within the same country?

Since it is different fire and rescue services and individuals that report to MSB there will be some differences. However, MSB has developed documentation and an online education (<http://cursnet.srv.se/fortb/hr/start0/>) to support individual fire and rescue services and reporters in the reporting.

Prior to 2018 there were three systems (Alamos, Core or Daedalos) used by the fire and rescue services when reporting incidents. However, since 2018-01-01 all fire and rescue services in Sweden report their incidents into the same system.

#### Are there differences and contradictions with other domains?

Classifications in fire statistics from insurance companies do not correspond to those used by the fire and rescue service.

#### Identification of missing information

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<sup>3</sup> Andersson P, Johansson N, Strömgren M. "Characteristics of fatal residential fires in Sweden" SP-report 2015:53

The quality and reliability of the statistics is assessed yearly by MSB<sup>4</sup>.

There have been issues with missing data when different systems (Alamos, Core or Daedalus) were used at different fire and rescue services.

There has previously been some double counting of incidents when several fire and rescue services from different municipalities/regions are involved. This has been corrected in the yearly quality control done by MSB. The routines at joint incidents have been improved in 2020 and MSB expect this to more or less eliminate problems with double counting.

Due to incident report content revisions and changes in local routines for recording data, there is a potential to over-interpret discontinuities in some time series. MSB has conducted some minor analysis of this. However, it is something that the individual user needs to be aware of and assess if it can be a problem in each individual case.

## **U2. STATISTICS COLLECTION ISSUES**

### Fire department responsibilities

After each incident, the fire and rescue service documents what has happened and which measures that have been taken. Each rescue service has appointed a statistics coordinator, who coordinates their organization's reporting to national statistics.

After an accident it is, according to law<sup>5</sup>, the responsibility of the municipality to a reasonable extent clarify the causes of the accident, the course of the accident and how the operation has been carried out.

MSB continuously monitors the inflow of reports from the respective rescue services and, if necessary, contact the relevant statistics coordinator to inquire about the cause to late reporting or inform about detected errors in the organization reports.

### Fire response organisation

The municipality is responsible for the local rescue service according to law<sup>6</sup>. The Swedish state is responsible for rescue service in the areas of aviation, sea and mountains.

### Who collects data?

The rescue service fills in the incident reports and MSB collects it.

The police conduct fire investigations, often in close cooperation with the local fire and rescue service. Police investigations are not freely available, at least until criminal charges are made.

The National Forensics Centre have detailed information from post mortems for nearly all fire victims.

The Socialstyrelsen collects data on deaths.

### Who issues the data?

MSB

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<sup>4</sup> MSB, Kvalitet i MSB:s insatsstatistik 2019,

<https://ida.msb.se/dokument/insatsstatistik/kvalitet2019/Kvalitetsdeklaration2019.pdf>

<sup>5</sup> Lag (2003:778) om skydd mot olyckor

<sup>6</sup> Lag (2003:778) om skydd mot olyckor

Are there different levels of collection?

All data in the IDA database is national, but it is possible to break down the data on municipality level. It is also possible to break data down into the small areas defined by Statistics Sweden for all detailed local and regional statistics.

Identify disparities in data feedback

Data is used by governmental bodies and research.

Where is the data stored?

In databases hosted by each relevant local or national authority.

### **U3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

Since the data is open everyone can interpret the data.

There are a lot of different publications that has been made using the statistics over the years. These have been issued by MSB and by universities like Lund and Karlstad Universities, as well as research institutes such as RISE. Individual municipalities (often represented through the local fire and rescue service) frequently analyse statistical data as a basis for the local planning.

Purpose for which data is collected

MSB:s statistics are intended to shed light on which accidents the municipal rescue service respond to and what measures are taken in the event of these accidents. The overall purpose is to streamline society's work to protect against accidents through increased knowledge about accidents and measures taken. Society is constantly changing and the need to be able to follow the development of accidents over time is considered particularly important.

What are the methods used to fill the gaps where information is missing?

MSB reviews the quality of the statistics yearly and reports if data is missing.

Is there follow up to data collected ?

The fire and rescue services can update and resubmit the incident report (händelserapport) if they become aware of new information which makes a revision necessary. The statistics published by MSB include all revisions up to the publishing date. For example, if a fire and rescue service update a report from 2018, then the revision will be included in that year's statistics on the next annual release of new statistics.

Analyse potential cause and consequences in trends

It is easy to identify trends with statistical tools. However, there would appear to be quite a lot of random variation and many "trends" that seem to exist in time series are not significant when tested rigorously. It is often extremely difficult to identify what has caused any trend.



#### **U4. ANALYSE EXISTING DATA**

##### Determining the level of confidence

High in the data collected by authorities. The insurance company data is limited.

##### Pinpointing issues and limitations

Regarding data in the IDA database:

- Some double counting in data, usually discovered and corrected by MSB
- Due to changes in the way data is collected there are possible breaks in the time series (2005 and 2018)
- Some issues with missing data due to different systems at different fire and rescue services prior to 2018.

##### Examples of work and conclusions based on previous studies of fire statistics in Sweden

###### Fatal fires

In a report<sup>7</sup> based on publicly available data from MSB (the IDA database, see section 0) the following conclusions were drawn about fatal fires:

- Slightly more than 1% of the residential fires result in at least one fatality
- A fatal residential fire is often large when the rescue service arrives at the scene
- Fatal residential fires occur more commonly in the late night/early morning
- Usually only one person is present in the fire compartment when the rescue service arrives to a fatal residential fire
- There is only marginal differences regarding the presence of smoke detectors in residential fires and fatal residential fires.
- Both fatal residential fires and residential fires are less common in and around larger cities
- Fires starting in beds, sofas, armrest chairs or clothing results more often in fatalities than other start items while fires starting on the stove, in the fireplace or the chimney seldom results in fatalities compared to the number of these fires.
- Fires starting in the living room or bedroom result more often in fatalities than fires starting in other rooms.
- Smoking is a common cause in fatal residential fires while lightning, forgotten stove, chimney fire, technical malfunction and re-ignition seldom results in fatalities compared to the number of this type of fires.
- The likelihood of dying in a residential fire might be somewhat higher for a person living in an apartment than for a person living in a single-family house. However, the differences are small and given the uncertainties in the number of people living in different types of dwellings it might be that there is no difference.
- The number of floors in a building does not seem to differ between fatal and nonfatal fires.
- The fire start floor in an apartment building seems to be slightly higher in fatal fires than in non-fatal fires.

For more information about the study and the conclusions drawn please view the report<sup>2</sup>.

This report is also the basis, together with other Swedish studies on fatal fires, for recommendations on measures to take in order to decrease the number of fatalities in fires<sup>8</sup>. Measures recommended includes:

- Continued work to increase the use of smoke detector in homes, both in terms of number of smoke detectors and better smoke detectors
- Information by e.g., increased awareness of informative webpages like "Din säkerhet (your safety)"

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<sup>7</sup> Andersson, P., Johansson, N. & Strömngren, M. (2015) Characteristics of fatal residential fires in Sweden, SP report 2015:53, Borås, Sweden.

<sup>8</sup> Andersson, P., Arias, S., Arvidson, M., Frantzich, H., Larsson, I., Vermina Lundström, F., Nilsson, D., Runefors, M., (2018) Riskreducerande åtgärder för dödsbränder i bostäder, RISE report 2018 :37, report in swedish

- Increased fire safety for people under home care.
- Fire performance requirements for furniture
- Continued and improved follow up on fatal fires
- More emphasis on fire safety in updates of the building regulations even if it cannot be proven that the measures are cost effective
- Continued research on fire safety for people e.g., on better smoke detectors, tools for evaluating the efficiency of different measures, and on fires with unknown cause.

### School fires

In a recent report<sup>9</sup> based on publicly available data from MSB (the IDA database, see section 0) the following conclusions were drawn about school fires:

- The number of fires in schools building have varied between 300 to 500 during the last 20 years.
- Arson is the most frequent cause (around 50% in average) of school fires.
- There is a steep increase of school and preschool fires in Sweden during after 2015. It is also clear that this increase is due more fire caused by arson.
- There is a clear difference of the room of origin between school fires and preschool fires. This indicates that there are some differences in the characteristics of these fires. It is also clear that fires in "Bathroom/toilet" have increase substantially during the last three years in schools.
- The number of fires during school hours have increased during the last couple of years. There is also an indication that the number of school fires during the night and early morning is decreasing.
- The analysis presented shows that the severe and costly fires have not increased, rather it is the number of small and more moderate fires that have increased. These fires occur during school hours in secluded spaces like toilets and corridors.

For more information about the study and the conclusions drawn please view the report<sup>3</sup>.

### Examples of fire trends in Sweden based on national fire statistics

The following graphs have been developed to illustrate the type of data available in the national fire statistics in Sweden. All the data have been retrieved from the IDA which is maintained by MSB.

#### **Fatal fires**

The database on fatal fires includes a total of 1,871 fire incidents (including 2,046 fatalities) from 1999 to 2015. The following data is a selection of the data from the fatal fires database. Note that data from 2016-2019 is also available in a preliminary dataset (353 fire incidents including 363 fatalities).

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<sup>9</sup> Johansson, N., McNamee, M. & van Hees, P. (2020) ANLAGD BRAND i skolor och förskolor, report 3230, Lund University, Sweden. (report in Swedish)

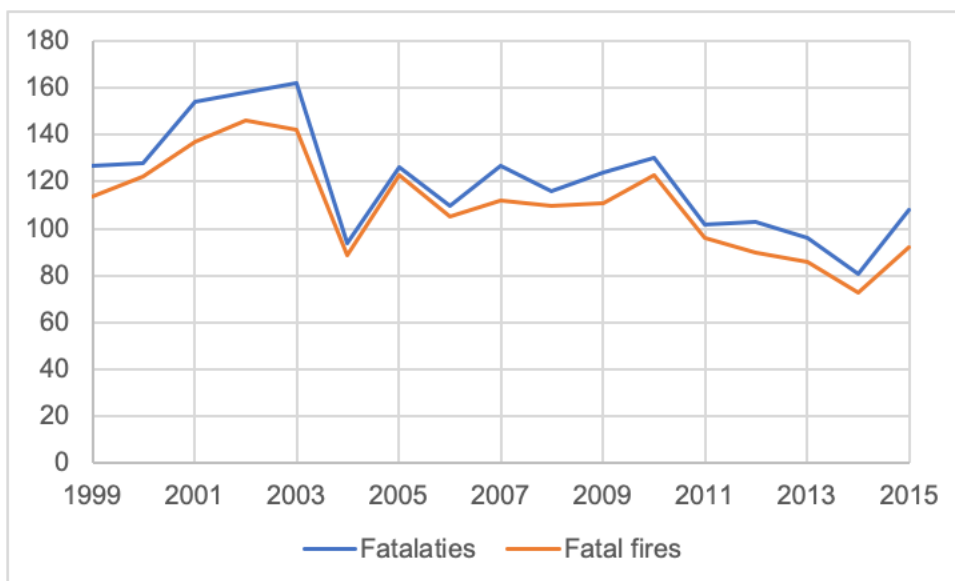


Figure 26 : Number of fatal fires and fire fatalities in Sweden.

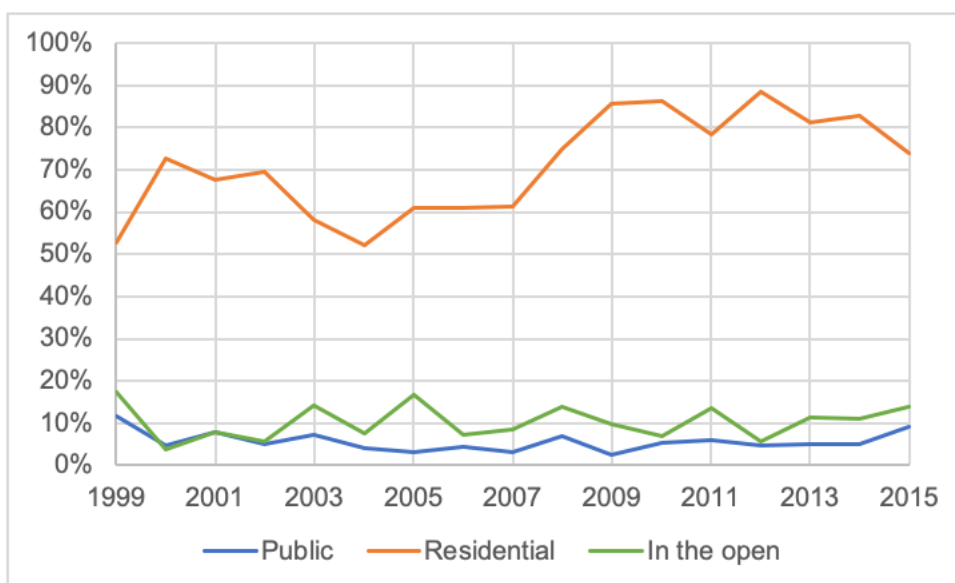


Figure 27 : Distribution of fire fatalities in different building categories.

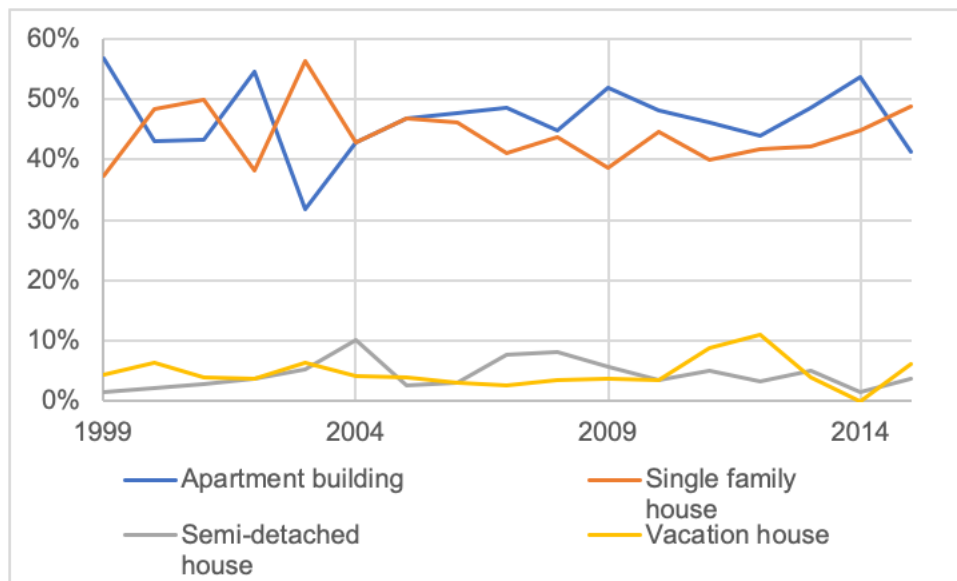


Figure 28 : Distribution of fire fatalities in different types of residential buildings.

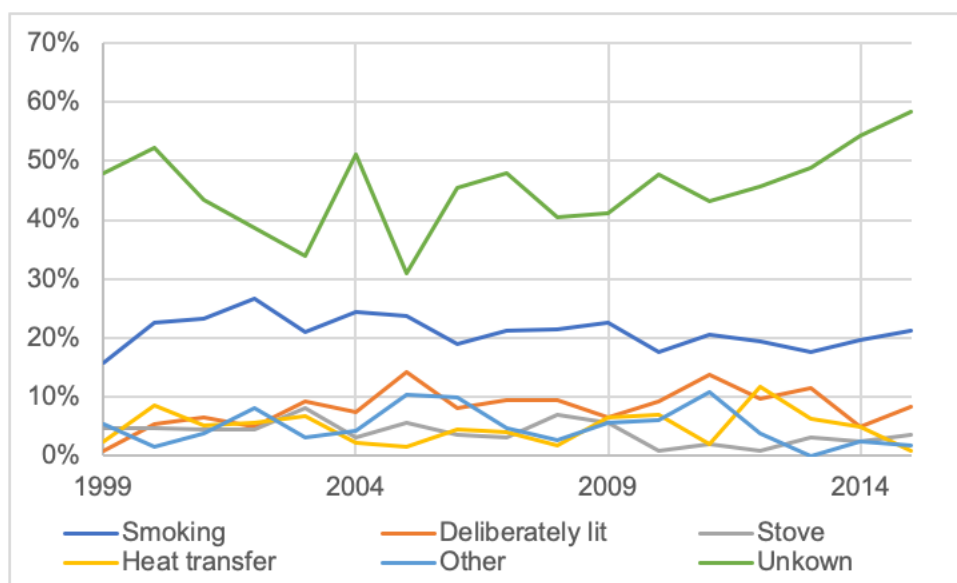


Figure 29 : Distribution of fire fatalities for different fire causes

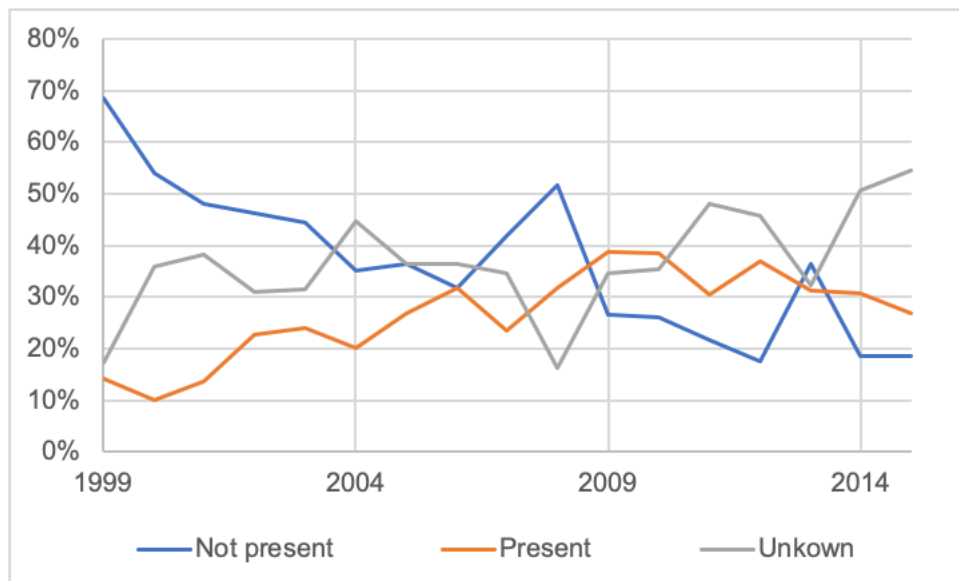


Figure 30 : Smoke alarms presence in fatal fires.

### School fires

The database on building fires includes a total of > 230,000 fire incidents in buildings from 1998 to 2019. The following data is a selection of the data from the building fires database.

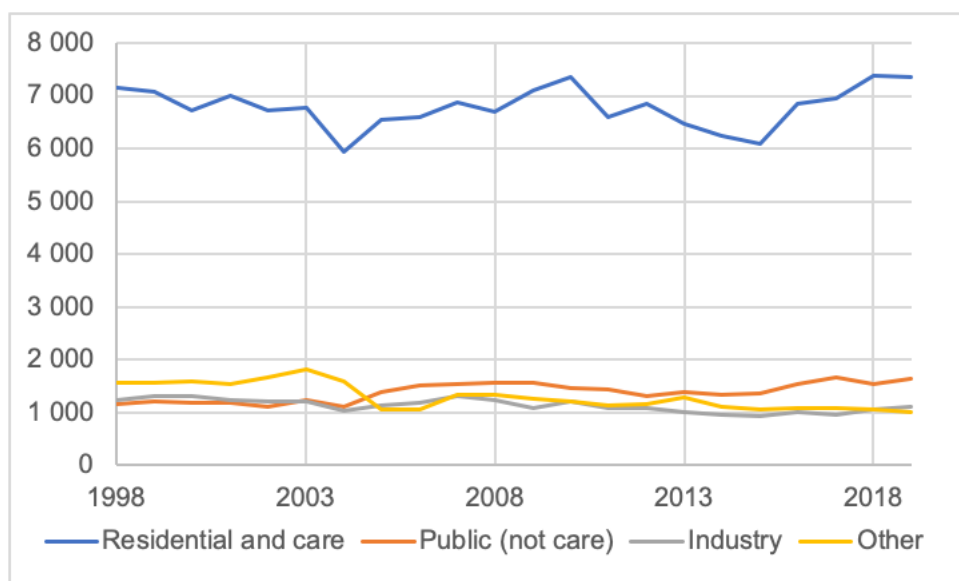


Figure 31 : Number of fires in different building categories.

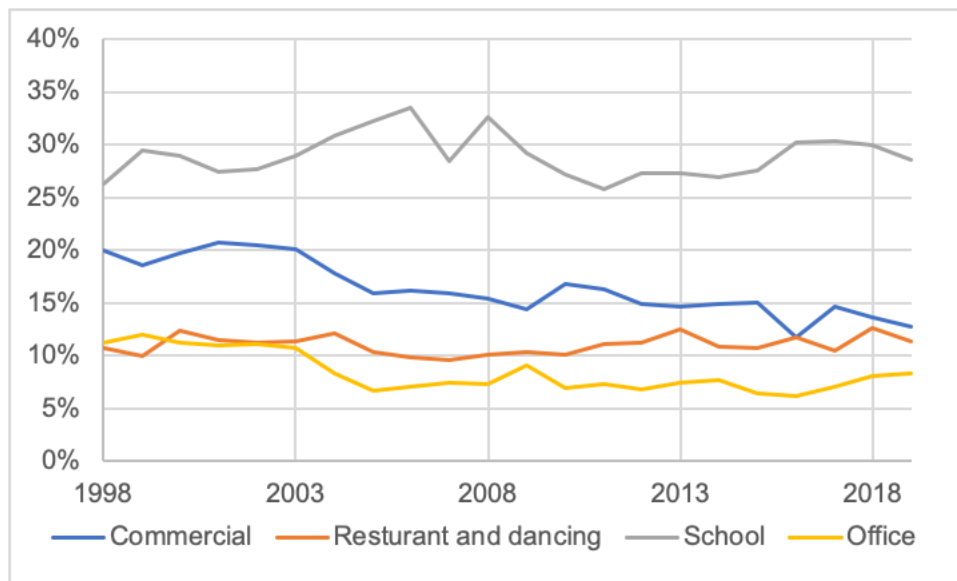


Figure 32 : Distribution of the four most common types of buildings in « Public » building category

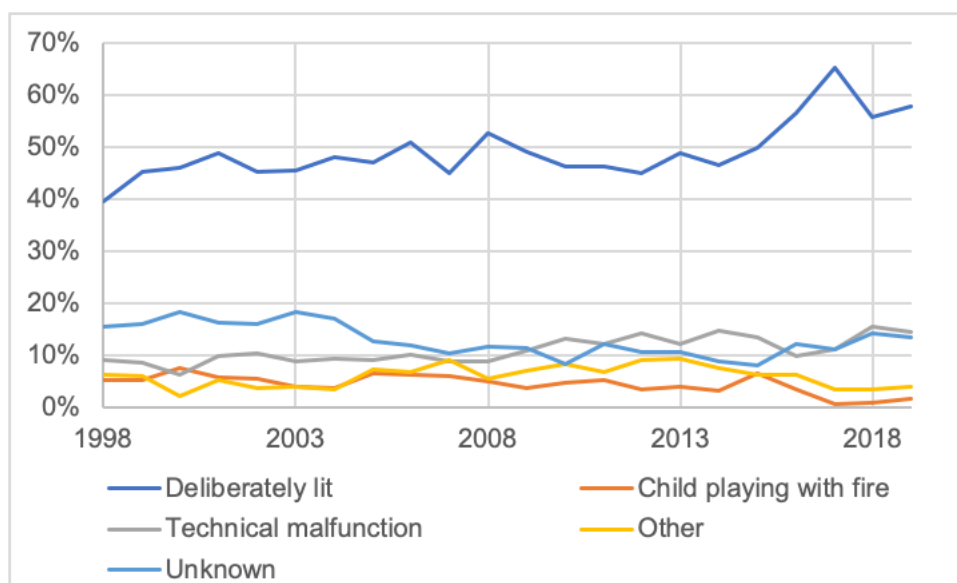


Figure 33 : Distribution of the five most common fire causes in School buildings.

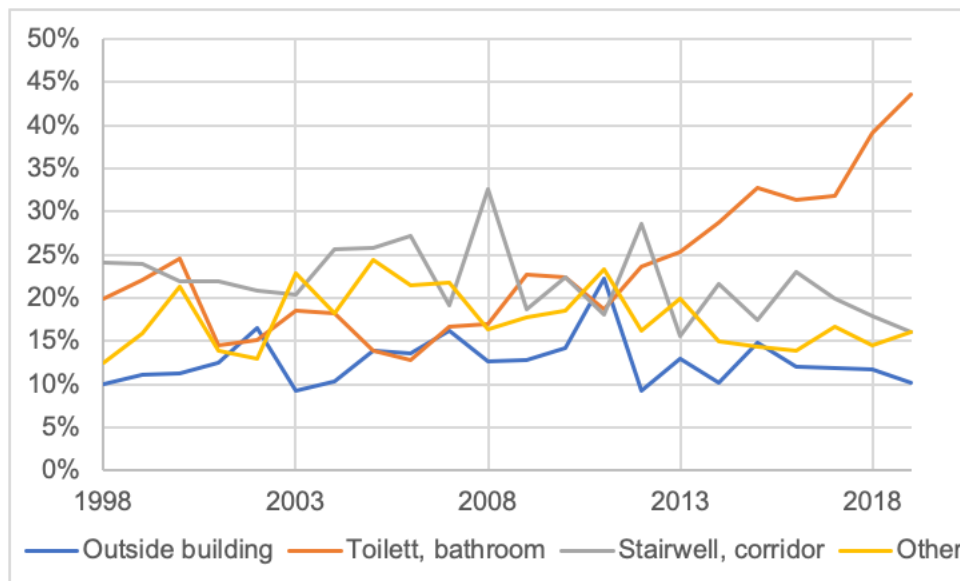


Figure 34 : Distribution of the four most common places of origin in school building fires.

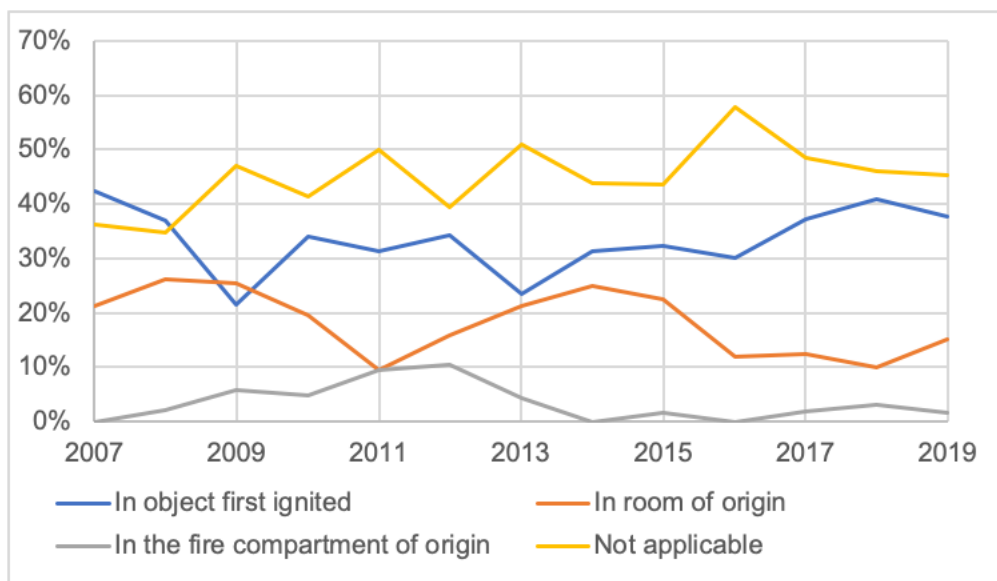


Figure 35 : Damage estimate for "toilet, bathroom" school fires.

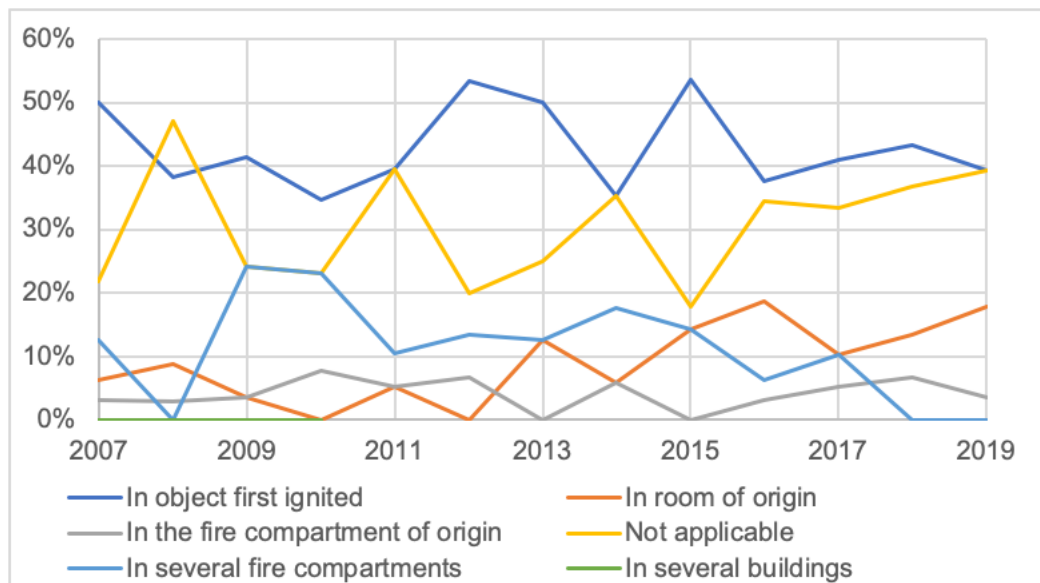


Figure 36 : Damage estimate for “outside building” school fires.



## V. DIAGNOSTIC SHEET FOR SWITZERLAND

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### V1. TERMINOLOGY ISSUES

References of existing database/studies

#### Database

- Statistics from Fire service regarding firefighting interventions (FKS / CSSP)  
**Erreur ! Référence de lien hypertexte non valide.**<https://www.swissfire.ch/der-sfv/fakten-zur-feuerwehr/> (documents uploaded)
- Building damage statistics from APIRE (Association of Public Insurance Companies for Real Estate) or Vereinigung kantonaler Gebäudeversicherungen (VKG) or AECA in French
- Statistics of deaths following building fires from APIRE (Association of Public Insurance Companies for Real Estate) or Vereinigung kantonaler Gebäudeversicherungen (VKG) or AECA in French  
<https://www.vkg.ch/de/versicherung/rueckversicherung?banner=1>

#### Studies

- Vereinigung kantonaler Feuerversicherungen VKF, Personenrisiken aus Brand (fire risks for people) (document uploaded) 2018,
- ETH Zürich. Wirtschaftliche Optimierung im vorbeugenden Brandschutz 2012 (document uploaded)
- Brandprävention und Tabakprodukte, Situation in der Schweiz, Bericht im Auftrag des Bundesamtes für Gesundheit 2010
- Risque pour les personnes en protection incendie, Marcel Bürge & Katharina Fischer, 2018 in Association des établissements cantonaux d'assurance incendie AEAI
- Analyse de données à long terme relatives à des dommages causés à des bâtiments sur plusieurs années – 2011 (AEAI) - (documents uploaded)

Summaries of existing database

Data related to fire:

- Date of fire,
- Fire causes,
- Fire damage,
- Fire deaths,
- Injuries,
- Type of building,
- Insurance value,
- Other data are collected by the insurance but not necessarily analysed or shared with KGV.

Existing definitions

Causes of claims ("AEAI code")

Heating installations

Living room fireplaces  
Stoves  
Central heaters  
Industrial heaters and other large installations  
Smoke channels  
Combustion residues  
Other

Specific household (without heating systems)

- Matches, lighters
- Cigars, cigarettes, pipes
- Candles
- Welding, brazing
- Fireworks
- Other

Spontaneous combustion

- Hay
- Other

Explosions

- Gas explosions
- Explosions of explosive materials (without attacks)

Electricity

- Defective installations
- Defective devices
- Devices used improperly

Lightning

- Direct lightning strikes
- Indirect lightning strikes

Arson

- By the owner or a relative
- By a third party
- By strangers

Other known causes

- Mechanical energy, friction
- Motor vehicles
- Other

Unknown causes

There is a guide for defining 15 building types and their codifications. (Guide to the new assignment code)

Are there differences within the same country?

Yes. The codification of the causes of fire ("AEAI code") and of the assignment of buildings is only for use in cantons with an ECA (Cantonal Insurance Establishment). Private insurances that cover buildings in the other seven cantons do not use this code.

Are there differences and contradictions with other domains?

None identified

## **V2. STATISTICS COLLECTION ISSUES**

Fire department responsibilities

Fires, technical incidents, ambulance, natural hazards

#### Fire response organisation

Organised in regions (Cantons), is part of the military system

85000 active fire fighters in 1300 fire service organisations – 16 professional fire services and 189 company and industrial fire services.

Fire service depends organisational on the insurer of the part of the country (Canton).

#### Who collects data?

Fire services and Public Insurance Companies for Real Estate (PIRE) collect fire data (including fire deaths and fire causes) as the fire services are in the responsibility of the insurer / ministry. Data are then gathered by the insurance association (APIRE) who analyses them. They collect data from 19 out of 26 Cantons; this covers 80% of the country's buildings.

#### Who issues the data?

Fire service, Insurance

#### Are there different levels of collection?

Methodology can differ from canton to canton.

#### Identify disparities in data feedback

The 19 cantons including ECA (Cantonal Insurance Establishment) collect data in a fairly standardized way, but which differs from that of the other seven cantons.

#### Where is the data stored?

In each ECA (Cantonal Insurance Establishment) then it is aggregated by the insurance association (APIRE)

### **V3. STATISTICS INTERPRETATION ISSUES**

#### Who is interpreting the statistics

The insurance association (APIRE)

#### Purpose for which data is collected

Insurance visibility and for prevention campaigns.

Also, the steering group responsible for drawing up the 2025 fire protection prescriptions analysed the statistics to establish the essential bases for decision-making with a view to the new orientation of the fire protection prescriptions.

#### What are the methods used to fill the gaps where information is missing?

Not filled

#### Is there follow up to data collected ?

No

### Analyse potential cause and consequences in trends

The following analyses were made by the steering group responsible for drawing up the 2025 fire protection prescriptions (extracted from: Analyse de données à long terme relatives à des dommages causés à des bâtiments sur plusieurs années – 2011 (AEAI) - (documents uploaded)):

- In over 90% of fatal fires, only one person dies. Fires killing more than 2-3 people are very rare.
- Most deaths occur in residential buildings (CH: over 80% of deaths caused by fires); however, this type of building also represents the majority of the real estate portfolio.
- In relation to their share in the real estate portfolio, the following allocation categories are particularly at risk (in descending order):
  - hospitals and medico-social establishments
  - residential buildings including other uses;
  - hotels and restaurants
  - agricultural housing buildings
- The statistics available do not show any influence on the type of construction or the number of floors.
- Fatal fires are most often (descending order) caused by:
  - Cigarettes, candles, matches, etc.
  - Kitchen equipment, equipment and electrical network
  - Explosions
  - Arson
- Heating installations (international mainly space heatings, not central heating)
- In around a quarter of the deaths in Switzerland, the cause of the fire is undetermined.
- The risk of injury (without fatal consequences) is particularly high in kitchen fires.
- Most fatal fires are man-made (most of the time through negligence, and some of them intentionally). Technical failures play a minor role.
- The most important "thermal loads" in the occurrence of fatal fires are the following objects or materials (in apartments):
  - furniture, especially sofas and armchairs
  - bedding, mattress
  - clothing, textiles
- The main factors of death following the development of a fire in the apartments include:
  - exits or visibility blocked by fire or smoke
  - problems related to escape routes
  - problems related to the flight of victims
- The likelihood of dying in a building fire increases significantly with age.
- The probability of injury in adulthood is much less dependent on age.
- Men are more likely to die in building fires than women.
- For victims, the main risk factors are:
  - be asleep (at the time of the fire)
  - have reduced mobility (especially the elderly)
  - being under the influence of alcohol (more men than women)
- The following socio-economic factors also play a role:
  - Type of household, type of apartment
  - Income, education level, unemployment
- In small municipalities (generally rural), the death rate (relative to the number of inhabitants) is higher than in large municipalities and in cities.
- More than half of the victims die in the room or in the area where the fire started. An even greater percentage of victims are directly involved in the fire, in part of their absence (eg stove left on).
- From a medical standpoint, smoke poisoning (alone or in combination with burns) is by far the most common cause of death.
- Working smoke detectors can reduce the death rate from fires in residential buildings by about half. However, the effectiveness of smoke detectors is reduced by the following:
  - Even in countries where smoke detectors are mandatory, households, where the risk of fire is higher, clearly not all have them.

- The groups most at risk (eg people with reduced mobility, the elderly, smokers, people under the influence of alcohol) do not benefit much from the benefits of smoke detectors in the event of a fire.
- Due to the low potential to save lives, a study carried out in 2012 concluded that, despite the low costs, an obligation to install smoke detectors in Swiss residential buildings is not proportionate. (from the economic point of view at least)
- The following additional measures could help reduce the number of deaths in residential buildings:
  - good maintenance of electrical systems and appliances
  - reduced ignition energy cigarettes (fire safe cigarettes)
  - fireproof bedding, sofas, armchairs or clothing
  - automatic extinguishing systems (residential sprinkler)

#### V4. ANALYSE EXISTING DATA

Determining the level of confidence

Data quality is not sufficient for decision-making.

Pinpointing issues and limitations

- Fire deaths at the hospital or in the ambulance are not accounted.
- Some codifications are very vague, for example in the causes of fire; there is no category for fires from PV panels or from Li-ion batteries.
- Anyone can fill the inspection sheet; can be made by investigators, architects, police or firefighter...

Examples

Extracted from: Analyse de données à long terme relatives à des dommages causés à des bâtiments sur plusieurs années – 2011 (AEAI)

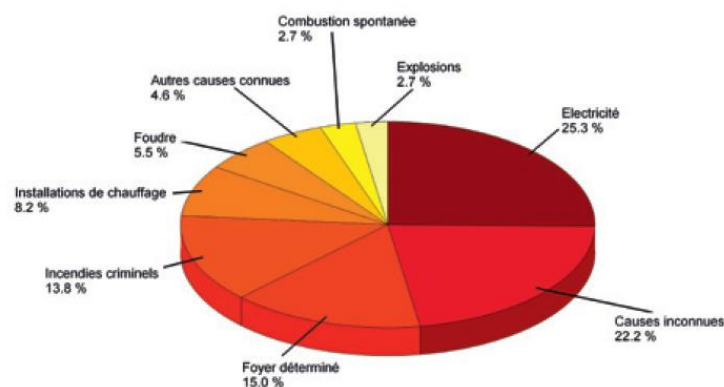


Illustration 47. Part relative des causes d'incendie pour tous les ECA, sur la base du montant de dommages, pour la période de 1991 à 2010 (indexation sur la somme d'assurance).

Figure 47 shows the average share of the different causes of fire in the damage to buildings over the last 20 years. The large proportion of unknown causes raises questions. By definition, these causes cannot be investigated further. The high proportion of fires caused by a particular focus clearly shows the importance of responsible behavior when handling matches or lighters.

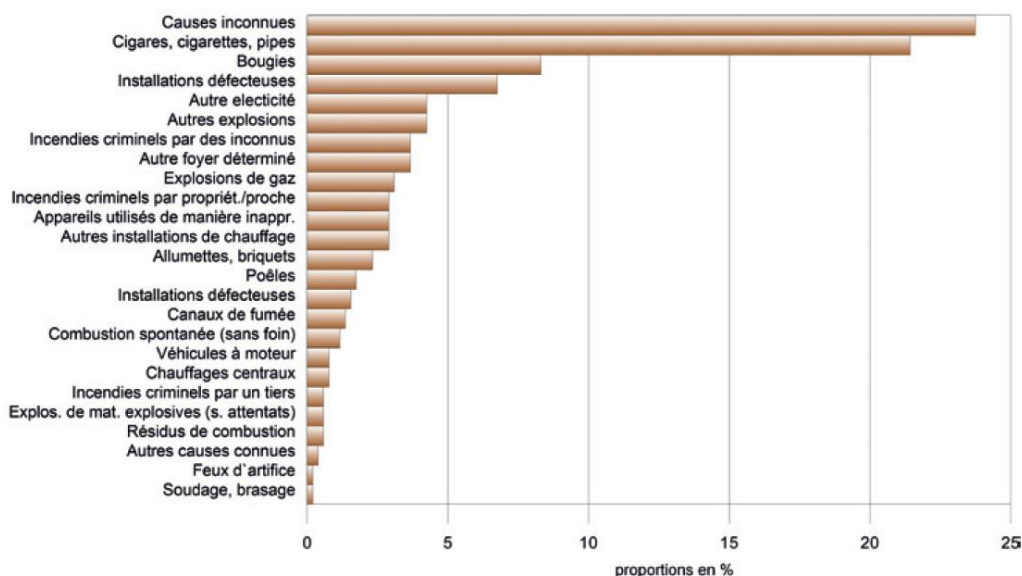


Illustration 59. Causes de décès dus aux incendies en Suisse sur la période de 1991 à 2010.

Figure 59 shows the importance of the causes of fatal fires (usually) attributable to people:

- 30% of cases are due to cigars, cigarettes, pipes or candles and would therefore be easily preventable.
- With 16%, the proportion of cases due to electricity ("defective devices", "defective installations", "devices used inappropriately", "other") is also high. Due to the omnipresence of electricity in our daily lives, the danger associated with this source of energy seems underestimated.
- Representing at least 8% of fatal fires, the share of arson (sum of the three categories) is frightening, not to mention the cases attributed to the category "unknown causes".

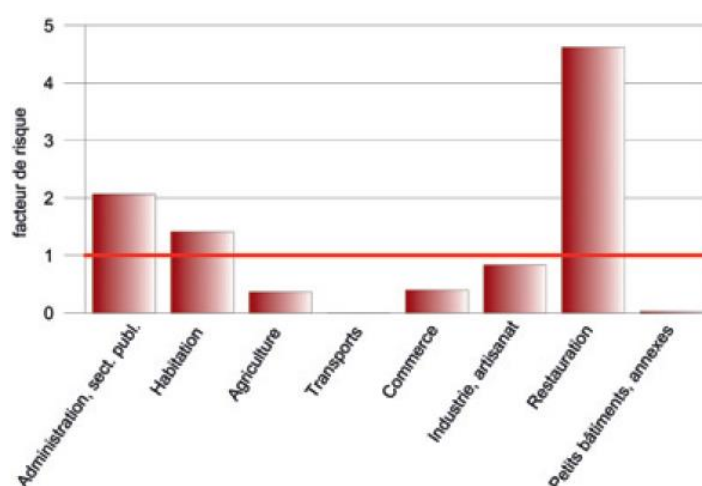


Illustration 62. Risque de mortalité en fonction de l'affectation du bâtiment en Suisse pour la période de 1991 à 2010; risque moyen = 1.

Illustration 62 shows the different risks in the event of presence in buildings of each category of assignment.

It should be noted that in addition to the use of the building, the probability of being in the building (number of people in the building x time spent in the building per day) also largely determines the risk: this probability is relatively high for residential houses as well as for administrative and public buildings; on the other hand, it is low for buildings in the transport category or for small buildings and outbuildings. For administrative buildings and public buildings, however, the increased risk is largely due to the sub-category "hospitals and specialized care homes", which figure 62 indirectly reveals.

Notable fact, but known for a long time: the high risk for buildings in the "hotel" category. The assignment plays a major role here: in these buildings, we work almost 24 hours a day with high temperatures (kitchens), and there are often many rooms equipped with own heating and electrical appliances (television). In addition, large quantities of combustible materials are usually stored there (gas, oil, grease, methylated spirits, cleaning products), and the average number of people present is high. It is to be hoped that the smoking bans that have come into force in recent years will help reduce this risk.

## W. DIAGNOSTIC SHEET FOR THE UNITED KINGDOM

### W1. TERMINOLOGY ISSUES

Information from ISO 17755-1 & -2

#### Methods of estimation (ISO 17755:2014, page 3)

The United Kingdom's Incident Reporting System (IRS) is based on separate reports on each incident requiring a response by a fire brigade. There is a national standard for coding of incidents.

All fire brigades are participants, and all are required to report on all incidents; therefore, the design is a census and there is no adjustment for missing data. Analysis is by counting only.

Most reports are completed by firefighters who lack extensive training in fire investigation, but an estimated 10% of reports are completed by personnel with extensive training in fire investigation.

The U.K. also conducts periodic household surveys, which provide regular estimates of the percentage of all home fires reported to fire brigades. The U.K. estimates that brigades are called to 1/5 of home fires.

#### Fires subject to reporting (ISO 17755:2014, page 5)

A fire is an incident, attended by a local authority, of uncontrolled burning involving flames and/or heat and/or smoke. An unknown number of departments employ truncated/reporting thresholds. These thresholds are determined on a department by department basis. Fire does *not* include the following except when they cause fire or occur as a consequence of fire:

- Explosions\*
- Lightning
- Electrical discharge

\* Fireworks/petrol bombs which extinguish themselves and do not cause damage are not reportable as a fire incident, but instead as a False Alarm, unless firefighting action is required, in which case, it will be a fire incident.

All fires included in the official definition, given in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3", should be reported.

Fires are categorized for analysis and reporting purposes according to major incident type in the following way:

- Primary fire: includes all fires in buildings, vehicles and most outdoor structures or any fire involving casualties, rescues or fires attended by five or more pumping appliances.
- Secondary fire: an incident that did not occur at a Primary location, was not a chimney fire in an occupied building, did not involve casualties (otherwise categorised as a Primary incident) and was attended by four or fewer pumping appliances (otherwise categorized as a Primary incident).
- Chimney fires: any fires in buildings where the fire was contained within the chimney structure and did not involve casualties, rescues or attendance by five or more pumping appliances.

#### Fire deaths subject to reporting (ISO 17755:2014, page 7)

For United-Kingdom, the definition of a fire fatality is given in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" question 3.5: "*Killed/ Fatality - a person who has died as a direct or indirect result of injuries received at the incident*" and specified at question 9.21: "*in general, fire-related deaths are those that would not have otherwise occurred had there not been a fire*".

#### Fire injuries subject to reporting (ISO 17755:2014, page 10)

For United-Kingdom, the definition of a fire injury is given in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" question 3.5: "*Injured/Non fatal - a person injured as a direct result of the incident (but not fatally injured) who required first aid (provided by anyone) at the scene or more medical treatment than could be given at the accident. This includes any person advised to attend hospital or see a doctor, whether or not they actually follow up the advice*".

All should be recorded. Completeness is believed to be good including all physical injuries, not just burns and smoke.

#### Victim characteristics (ISO 17755:2014, page 16)

**Age**

**Gender**

**Ethnicity**

**Where was the victim when the fire started?**

- Room, cabin or compartment of origin



- Different room, cabin or compartment on floor of origin
- Floor above origin (includes mezzanine above floor of origin)
- Two or more floors above origin
- One floor below origin – includes stairway leading down from floor
- Two or more floors below origin
- Outside building, vehicle etc. of origin
- Seat of fire unknown or multi-seated (and above non applicable)
- Location of person unknown
- Not applicable
- Other location

**Where was the victim found?**

- Room, cabin or compartment of origin
- Different room, cabin or compartment on floor of origin
- Floor above origin
- Two or more floors above origin
- One floor below origin
- Two or more floors below origin
- Outside building, vehicle etc. of origin
- Seat of fire unknown or multi-seated (and above non applicable)
- Location of person unknown
- Not applicable
- Other location

**What role did the victim play in the incident?**

- Firefighter on duty
- Other emergency service personnel
- Resident/occupant
- Passer by
- Driver
- Passenger
- Visitor
- Employee in workplace
- Customer in shop
- Other FRS personnel on duty
- Other

**Was victim rescued?**

- Yes
- No

**If rescued, where was the victim rescued from?**

- Room, cabin or compartment of origin
- Different room, cabin or compartment on floor of origin
- Floor above origin (includes mezzanine above floor of origin)
- Two or more floors above origin
- One floor below origin – includes stairway leading down from floor
- Two or more floors below origin
- Roof
- Outside building of origin
- Not applicable
- Other

**Circumstances of fatal casualty**

- Thought to be already dead when firefighter arrived
- Unable to resuscitate, confirmed dead at scene
- Unable to resuscitate, confirmed dead at hospital
- Alive on leaving scene, but died later
- Not known

**Has the casualty been reconciled against the appropriate death certificate? Was the death/injury fire related?**

- Yes (in general, fire related deaths are those that would not have otherwise occurred had there not been a fire)

- No
- Don't know

**What is your understanding of the cause of the death?**

- Overcome by gas, smoke or toxic fumes; asphyxiation
- Burns – severe
- Combination of burns and overcome by gas/smoke
- Shock/anaphylactic shock
- Other medical condition
- Fracture
- Other physical injury
- Cuts/lacerations
- Impalement
- Drowning
- Hypothermia
- Heat exhaustion
- Back/neck injury (spinal)
- Head injury
- Chest/abdominal injury
- Chest pain/Heart condition/Cardiac arrest
- Other
- Unknown

**What were the circumstances of the victim?**

- Bedridden
- Chair-ridden
- Other immobility
- Suspected under influence of alcohol
- Suspected under influence of drugs
- Discovering fire
- Fell onto fire
- Fighting fire (including attempts)
- Trapped by fire because unaware (e.g. asleep)
- Trapped by fire other than unaware
- Trapped by collapse of structure
- Trapped by smoke
- Injured escaping
- Injured rescuing person
- Injured rescuing property or animals
- Injured being rescued
- Injured by blast
- Return to fire
- Intentionally sustained at start of fire (e.g. suicides and attempts)
- Injury accidentally sustained at start of fire
- Not applicable
- Other
- Unknown

**Property damage subject to reporting (ISO 17755:2014, page 27)**

From the document named “Incident Recording System (IRS) Help and Guidance – version 2.3” part “On attendance –Damage, the damages are the total loss to the structure and contents, including contents damaged by fire, heat, smoke, water.

Monetary damages are not included in national analyses, which defer to insurance companies. Measures used at the national level are:

**— Indoor area damaged (for example, square meters in a building):**

- Should be reported as required in the document named “Incident Recording System (IRS) Help and Guidance – version 2.3” **question 8.20**, “the estimated flame and/or damage on arrival”.
- Should be reported as required in the document named “Incident Recording System (IRS) Help and Guidance – version 2.3” **question 8.24**, “the horizontal area damaged by flame and/or heat at stop”.

- Should be reported as required in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" **question 8.25**, "the horizontal area damaged by flame and/or heat and/or smoke and/or water at stop".

— **Outdoor area damaged (for example, acres in a wildfire):**

- Should be reported as required in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" **questions 8.35 and 5.16a**, "the estimated outdoor fire damage by flame and/or heat and/or smoke".

— **Number of rooms damaged:**

- Should be reported as required in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" **question 8.20**, "the estimated extent of flame and/ or heat damage on arrival".

- Should be reported as required in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" **question 8.22**, "the extent of flame and/or heat damage at stop".

— **Number of floors damaged:**

- Should be reported as required in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" **question 8.20**, "the estimated extent of flame and/ or heat damage on arrival".

- Should be reported as required in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" **question 8.22**, "the extent of flame and/or heat damage at stop".

Spread from one primary property to another primary property (or a secondary property) will only show the damage for the first property damaged. Only the distance, in meters, between the incident location and the neighbouring property(s) will be shown.

Spread from 'secondary' (e.g. some outdoor structure types) property to a primary property (including all vehicles & buildings that are not derelict) will only show the damage to the primary property.

**Other losses subject to reporting** (ISO 17755:2014, page 29)

— Deaths and injuries of firefighters, fire officers, fire brigade personnel, and other emergency responders due to acute fire effects.

— Other fatal or non-fatal injuries or illnesses of firefighters, fire officers, fire brigade personnel, and other emergency responders sustained while on-duty.

**Locations of fires based on survey responses** (ISO 17755:2014, page 32)

The U.K. has 295 categories, including 21 dwelling categories (private residential), 18 other residential, and 160 non-residential buildings. The complete list can be downloaded from <https://www.gov.uk/government/publications/incident-recording-system-for-fire-and-rescue-authorities>.

**Specific types of buildings and other structures** (ISO 17755:2014, page 33)

The UK is not present in this section.

**Specific types of rooms and other areas** (ISO 17755:2014, page 46)

**For Dwellings**

- Airing/drying cupboard
- Bathroom/toilet
- Bedroom
- Bedsitting room
- Chimney
- Conservatory
- Corridor/hall
- Dining room
- External fittings
- External structures
- Garage
- Indoor swimming pool
- Kitchen
- Lift/lift shaft/motor room
- Living room
- Refuse store
- Roof space
- Roof
- Sauna

- Stairs
- Under stairs (enclosed storage area)
- Utility room
- Open plan area
- Other
- Not known

**For Other Residential**

- Airing/drying cupboard
- Bar/canteen/restaurant/mess
- Bathroom/toilet
- Bedroom
- Bedsitting room
- Boiler room
- Cell
- Chimney
- Class room
- Cloakroom
- Common room/staff room/day room
- Conservatory
- Corridor/hall
- Dining room
- Dormitory
- External fittings
- External structures
- Garage
- Indoor swimming pool
- Kitchen
- Laundry room
- Lift/lift shaft/motor room
- Meeting room
- Office
- Power house/plant/generator
- Reception area
- Refuse store
- Roof space
- Roof
- Sauna
- Stairs
- Store room
- Under stairs (enclosed storage area)
- Utility room
- Ward/sick bay
- Other
- Not known

**For Non Residential Building**

- Barn
- Bathroom/toilet
- Boiler room
- Canteen/restaurant
- Chimney
- Cloakroom
- Conservatory
- Corridor/hall
- External fittings
- External structures
- Garage
- IT server/mainframe room
- Kitchen
- Lift/lift shaft/motor room

- Meeting room
- Office
- Parking garage
- Power house/plant/generator
- Process/production room
- Reception area
- Refuse store
- Roof space
- Roof
- Shop floor/showroom/display hall
- Stairs
- Store room
- Under stairs (enclosed storage area)
- Utility room
- Other
- Not known

Other areas are specified for each of several types of vehicles.

**Reporting of building height and other characteristics (ISO 17755:2014, page 54)**

- Number of stories
- Level or floor where fire began. Floor 0 = ground floor.
- Structure status, such as vacant, under construction, or under demolition. Under “Is the building normally occupied?”, there are these choices:
  - Yes – occupied
  - No – unoccupied permanently (vacant) - No – under construction

**Reporting and estimation of deliberately set fires (ISO 17755:2014, page 57)**

Yes (under Question 5.15 – Cause/Motive) reported as “Deliberate – own property”, “Deliberate – other’s property” and “Deliberate – unknown owner”. Also (under Question 8.1 – Cause of the fire), each of three types of deliberate fire is subdivided as to

- Bomb or incendiary device
- Suicide (including attempted suicide): setting fire to self
- Homicide (including attempted homicide): setting fire to other person
- Heat source and combustibles brought together deliberately

All four loss measures reported as well as fire brigade deaths and injuries

Classification as deliberate – some by trained arson investigators, some by fire officers on the scene with no arson training

Statistical analysis of deliberate fires includes some fires with unknown cause or cause still under investigation  
Reporting of fireplay (under Question 8.1 – Cause of the fire) as Accidental – Playing with fire, and no fires are categorized as both deliberate and fireplay. Coding manual emphasizes that there are no presumptions about age of firesetter.

Other information relevant to motive (under Question 8.3 – Caused by) can be used to isolate juvenile firesetters:

- Child (age 9 or younger) — Youth (age 10-17)
- Adult (age 18-64)
- Elderly (age 65 or more) — Age not known

**Reporting and estimation of natural cause fires (ISO 17755:2014, page 61)**

Yes, reported as “Accidental/Natural occurrence” under Question 8.1, Cause of the fire, and as “Natural occurrence” under Question 8.4, Main source of ignition. No detailed breakdowns reported.

**Reporting and estimation of exposure fires (ISO 17755:2014, page 62)**

Yes, reported as “Spread from secondary fire” under Question 8.4, Main source of ignition. No detailed breakdowns reported.

**Reporting and estimation of smoking material and open flame fires (ISO 17755:2014, page 65)**

Yes, can be reported under Main Source of Ignition:

- Match
- Candle
- Cigarette lighter
- Smoking materials, including cigarettes, cigars and tobacco
- Oil or incense burners (listed under “Smoking Related” but not listed with smoking materials for any other country and can be analyzed separately)
- Welding or cutting equipment (listed under “Industrial Equipment”; grouped with open flame heat source for some countries but not others)
- Naked flame

**Reporting and estimation of heating and cooling equipment fires** (ISO 17755:2014, page 68)

Yes, can be reported under Main Source of Ignition:

- Heater/Fire, including open fire
- Patio heating equipment
- Central heating/hot water
- Other heating equipment
- Separate water heating
- Food warming equipment (not cooking); listed under heating equipment but would be analyzed with cooking equipment in some other countries
- Chimney; also can be checked as a property having fire, separating such fires from all other fires in or on a building

A separate data element records fuel or power source for equipment.

**Reporting and estimation of cooking and kitchen equipment fires** (ISO 17755:2014, page 72)

Yes, can be reported under Main Source of Ignition:

- Cooker including oven
- Ring or hot plate as separate appliance
- Microwave oven
- Grill or toaster
- Barbecue
- Camping stove
- Deep fat fryer
- Other cooking appliance
- Refrigerator or freezer
- Dishwasher
- Electric kettle

A separate data element records fuel or power source for equipment.

**Reporting and estimation of clothes dryer fires** (ISO 17755:2014, page 75)

Yes, can be reported under Main Source of Ignition:

- Washing machine
- Tumble dryer
- Spin dryer
- Combined washer/dryer

A separate data element records fuel or power source for equipment.

**Reporting and estimation of entertainment equipment fires** (ISO 17755:2014, page 77)

Yes, can be reported under Main Source of Ignition:

- Television
- Audio equipment
- Video/DVD
- Other electrical visual equipment, including closed circuit television and satellite receivers

A separate data element records fuel or power source for equipment.

**Reporting and estimation of office equipment fires** (ISO 17755:2014, page 78)

Yes, can be reported under Main Source of Ignition:

- PC (personal computer) equipment, domestic use only
- Copier or printer
- Vending equipment

- PC (personal computer)
  - Other computer equipment
  - Telephone, answering machine, or fax machine
- A separate data element records fuel or power source for equipment.

**Reporting of electrical and electrical distribution or lighting equipment fires 8 (ISO 17755:2014, page 82)**

Yes, can be reported under Main Source of Ignition:

- Battery charger
- Fairy lights
- Spot lights
- Other incandescent light bulbs
- Fluorescent lights
- Other lights
- Power source apparatus – batteries, generators
- Wiring, cabling, or plugs

A separate data element records fuel or power source for equipment.

**Reporting of other appliance and equipment fires 8(ISO 17755:2014, page 86)**

Yes, can be reported under Main Source of Ignition:

- Vacuum cleaner
- Iron
- Trouser press
- Extractor fan
- Electric blanket
- Hair dryer
- Blow lamp/paint remover
- Gardening equipment
- Other domestic style appliance
- Kiln, oven or furnace
- Industrial dryer
- Manufacturing equipment
- Lift or dumb waiter
- Other industrial equipment
- Other categories for use with vehicles only
- Other appliance or equipment

A separate data element records fuel or power source for equipment.

**Reporting of item first ignited in terms of form and function (ISO 17755:2014, page 97)**

Yes, can be reported under Item First Ignited:

- Trees
- Crops
- Grassland/heath/scrub
- Straw/stubble
- Leaves
- Hedge
- Other vegetation
- Cooking oil or fat
- Other food
- Animal products
- Bedding
- Clothing
- Other textile
- Bed or mattress
- Upholstered furniture
- Other furniture
- Floor covering
- Window covering
- Lampshade

- Other or unspecified furnishing
- Roof
- External fitting
- Other structural, fixture or fitting – external
- Internal fitting
- Wiring insulation
- Other structural, fixture or fitting – internal
- Raw foam
- Raw rubber
- Raw plastic
- Fireworks (also listed under Major Source of Ignition)
- Explosives or ammunition (also listed under Major Source of Ignition)
- Gas
- Petrol or oil product
- Paint, varnish, resin, or creosote
- Chemical in raw state
- Decoration
- Christmas tree
- Rubbish or waste
- Recycling of paper or cardboard
- Recycling other
- Paper or cardboard
- Other paper or cardboard
- Garden shed
- Other wooden objects including fence
- Other item

**Reporting of item first ignited in terms of material composition** (ISO 17755:2014, page 101)

Yes, all coding is integrated into coding for item first ignited in terms of form and function, in Table 20c (Reporting of item first ignited in terms of form and function

Reporting of factors in ignition)

Yes. These are the factors under the Accidental section of “What was the cause?” excluding those already cited for intentional and fireplay fires:

- Faulty fuel supplies (separately for gas, electricity, and petrol product)
- Faulty leads to equipment or appliance
- Fault in equipment or appliance
- Cooking (separating deep fat fryers from other equipment but not isolating unattended cooking or other specific behavioral errors)
- Negligent use of equipment or appliance
- Careless handling due to sleep or unconsciousness
- Careless handling due to careless disposal
- Careless handling due to knocking over
- Combustible articles too close to heat source or fire (and vice versa)
- Person too close to heat source or fire
- Vehicle crash or collision
- Chimney fire
- Bonfire going out of control
- Other intentional burning going out of control
- Accumulation of flammable material
- Natural occurrence
- Overheating due to unknown cause

Also a separate data element captures human factors contributing to ignition

- Disabled
- Distraction
- Temporary lack of physical mobility
- Other medical condition or illness
- Falling asleep or asleep
- Excessive and dangerous storage



- Other
- And there is a Yes/No data element on suspected drugs/alcohol as a contributory factor

**Reporting of factors in ignition (ISO 17755:2014, page 106)**

Yes. These are the factors under the Accidental section of “What was the cause?” excluding those already cited for intentional and fireplay fires:

- Faulty fuel supplies (separately for gas, electricity, and petrol product)
- Faulty leads to equipment or appliance
- Fault in equipment or appliance
- Cooking (separating deep fat fryers from other equipment but not isolating unattended cooking or other specific behavioral errors)
- Negligent use of equipment or appliance
- Careless handling due to sleep or unconsciousness
- Careless handling due to careless disposal
- Careless handling due to knocking over
- Combustible articles too close to heat source or fire (and vice versa)
- Person too close to heat source or fire
- Vehicle crash or collision
- Chimney fire
- Bonfire going out of control
- Other intentional burning going out of control
- Accumulation of flammable material
- Natural occurrence
- Overheating due to unknown cause

Also a separate data element captures human factors contributing to ignition

- Disabled
- Distraction
- Temporary lack of physical mobility
- Other medical condition or illness
- Falling asleep or asleep
- Excessive and dangerous storage
- Other
- And there is a Yes/No data element on suspected drugs/alcohol as a contributory factor

**Reporting of factors in fire growth (ISO 17755:2014, page 108)**

Yes. Item Mainly Responsible for Spread of Fire uses same choices as Item First Ignited (see Table 20D, Reporting of item first ignited in terms of material composition). Also some data elements on explosions, dangerous substances involved.

**Presence and type of sprinkler or other extinguishing equipment (ISO 17755:2014, page 114)**

Yes, included in reporting under “Active Firefighting Systems present in vicinity of fire (origin of fire).”

Question 7.11 is whether any active safety system was present, yes or no.

**Type of system; multiple types of systems can be checked:**

- Sprinklers
- Water mist
- Gaseous system – halon
- Gaseous system – other
- Drencher
- Foam
- Powder
- “Other” [which could be automatic extinguishing equipment or other active firefighting system]

**Location of system relative to fire:**

- In room of origin
- On same floor
- Different floor

**Performance of sprinkler or other extinguishing equipment (ISO 17755:2014, page 116)**

**Whether the system operated, answered for each system:**

- No
- Yes but did not raise alarm
- Yes and raised alarm

**Number of sprinkler heads operating (asked only for sprinklers).**

Answers are 0,1,2,3,4,5, more than 5, and unknown.

**System's impact upon fire:**

- Extinguished
- Contained or controlled
- Did not contain or control
- Unknown

**Main reason why system did not function as intended**

- System not set up correctly or not installed correctly
- System damaged by fire
- Fault in system (such as defective system, lack of maintenance, heads painted over)
- System turned off
- Fire in area not covered by system
- Other
- Unknown

**Presence and type of detection or alarm equipment (ISO 17755:2014, page 119)**

Yes, included in reporting.

**How the fire was discovered.**

- Automatic fire alarm
- Person
- Other, including discovery by animal

**Was any active safety system present?**

- Yes
- No

**Type of system.**

- Smoke alarm – 1 year battery
- Smoke alarm – long life battery
- Smoke alarm – mains
- Smoke alarm – mains and battery
- Smoke alarm – battery type not known
- Mains security system including smoke alarm — Other, including system with central panel **Location**

**relative to fire:**

- In room of origin
- On same floor
- Different floor

**Performance of detection or alarm equipment (ISO 17755:2014, page 123)**

**Did the system operate? Answered for each system:**

- No
- Yes but did not raise alarm
- Yes and raised alarm

**Main reason why system did not function as intended**

*Reasons allowed when answer to above is No*

- Alarm battery missing
- Alarm battery defective
- System not set up correctly
- System damaged by fire
- Fire not close enough to detector
- Fault in system
- System turned off
- Fire in area not covered by system
- Detector removed
- Alerted by other means

*Reasons allowed when answer to above is Yes but did not raise alarm*

- Alarm was raised before the system operated
- No person in earshot
- Occupants did not respond
- No other person responded

*Reasons allowed in all cases*

- Other
- Unknown

**Was anyone in the building at the time of the fire?**

- Yes
- No

**Is the building normally occupied?:**

- Yes – occupied
- No – unoccupied permanently (vacant) [excludes derelict properties]
- No – under construction [and not habitable]
- Not known

**Presence of extinguishers or other manual extinguishing equipment** (ISO 17755:2014, page 126)

Yes, included in reporting under main action taken by “the general public” prior to arrival [of fire brigade] – clarified to mean the **main method of firefighting**. Fire extinguishers and use of hose reels are two of the coding options; these are the others:

- Removal from heat source
- Fuel supply disconnected
- Smothering
- Water from bucket/container
- Water from garden hose
- Beaten out
- Work team [clarified to mean a trained private team and not just a fire warden]
- Other

Not known

**Possibly relevant are the choices on fixed firefighting facilities present:**

- Dry risers
- Wet risers
- Firefighting lift
- Firefighting shaft
- Foam makers/drenchers/downcomers
- Smoke extraction/ventilation
- Other

For each type checked above, a separate data element asks whether it was used, Yes or No. Another data element asks for reasons if it was not working:

- Poor maintenance
- Vandalism
- Damaged by fire

**Presence of smoke management or control equipment** (ISO 17755:2014, page 127)

Yes, “smoke extraction or ventilation” is one of seven choices included in reporting under fixed firefighting facilities. One data element can be used to indicate presence of the equipment, a second data element can be used to report whether it was used, and a third data element can be used to record reasons if it was not working:

- Poor maintenance
- Vandalism
- Damaged by fire

**Reporting on fire doors, fire walls and other compartmentation** (ISO 17755:2014, page 129)

Yes, included in reporting.

**Compartmentation performance**

- Stopped/checked spread
- Breached – current building work (refers to construction work currently underway)
- Breached – previous building work (refers to construction work completed)
- Breached – fire doors left open or incorrectly fitted (includes smoke doors)

- Damage to compartmentation
  - Fire spread through gaps or voids in construction (for example, ducts)
  - No compartmentation in building [examples cited are warehouses and supermarkets, where there are large undivided spaces]
  - Other
- Elements related to compartmentation under **Means of Escape**:
- Okay – no visible concerns
  - Exits locked
  - Exits blocked (for example, materials stored blocking exit)
  - Exit route blocked by smoke/flames
  - Poor implementation such as doors swing the wrong way or complicated exit path — Contents contributing to abnormal fire spread/smoke production
  - Other

#### References of existing database/studies

##### DATABASES:

England, Home Office

Website: <https://www.gov.uk/government/collections/fire-statistics>

Dwellings fire statistics dataset [1]

Other building fire statistics datasets [2]

Northern Ireland, Northern Ireland Fire and Rescue Service:

Website: <https://www.nifrs.org/?s=fire+statistics>

Scotland, Scottish Fire and Rescue Service [3]

Website: <https://www.firescotland.gov.uk/about-us/fire-and-rescue-statistics.aspx>

Wales, Welsh Government [4]

Website: <https://gov.wales/fire-and-rescue-incident-statistics>

##### STUDIES:

- Manes, M., & Rush, D. (2018). A Critical Evaluation of BS PD 7974-7 Structural Fire Response Data Based on USA Fire Statistics. *Fire Technology*, 55(4), 1243–1293. <https://doi.org/10.1007/s10694-018-0775-2>
- Manes, M., & Rush, D. (2020). Assessing fire frequency and structural fire behaviour of England statistics according to BS PD 7974-7. *Fire Safety Journal*. <https://doi.org/10.1016/j.firesaf.2020.103030>
- Ramachandran, G. (1993). Early detection of fire and life risk. *Fire Engineers Journal*, 53(171), 33–37.
- Ramachandran, G., & Charters, D. (2011). *Quantitative risk assessment in fire safety*. Routledge. <https://doi.org/10.4324/9780203937693>
- Rutstein, R. (1979a). The estimation of the fire hazard in different occupancies types. *Fire Surveyor*, 8(2), 21–25.
- Rutstein, R. (1979b). The probability of fire in different sectors of industry. *Fire Surveyor*, 8(1), 20–23.
- Rutstein, R., & Cooke, R. A. (1979). The value of fire protection in buildings. Home Office, Scientific Reserach and Development Branch.

#### Summaries of existing database

Data is subdivided into England, Northern Ireland, Scotland and Wales.

**England** fire statistics of the Home Office presents fire safety data related to fire incidents, causes, consequences, fatalities/casualties, response time, alarms and automatic extinguishing systems.

Fire statistics in **Northern Ireland** is not publicly available.

The fire statistics in **Scotland** of the Scottish Fire and Rescue Service contains information related to Incident type, property type, fatalities and casualties, fire stations and workforce.

In **Wales**, the fire statistics of the Welsh Government publicly available covers fire incident, location, cause, motive, casualties, response time, smoke alarms.

#### Existing definitions

The complete list of definitions is available in the following documents:  
**England** [1], [2]; **Scotland** [3] and **Wales** [4]

#### Are there differences within the same country?

Yes, a unique national database is not available, and the fire safety data are subdivided into England, Northern Ireland, Scotland and Wales. Northern Ireland Fire and Rescue Service statistics does not use the IRS system and does not publish comparable statistics.

#### Are there differences and contradictions with other domains?

Yes, there are differences in the fields recorded in the various statistics within the same nation.

#### Identification of missing information

England statistics appears to provide the highest number of fields publicly available after a fire incident while Scottish fire statistics does not have data on the quantification of damage and presence of alarms or automatic extinguishing systems. Finally, Welsh fire statistics has fire safety data also on fire causes and motive and only on smoke alarms.

## **W2 - STATISTICS COLLECTION ISSUES**

#### Fire department responsibilities

**England:** When the Fire and Rescue Service attends an incident, the details are uploaded to the Incident Recording System.

**Scotland:** When the Scottish Fire and Rescue Service attends an incident, the details are uploaded to the Incident Recording System run by the Home Office.

**Wales:** When the Fire and Rescue Authorities in Wales attend an incident, the details are submitted to the Home Office.

#### Fire response organisation

The Fire Service in the United Kingdom operates and follows different administrative legislations in England, Northern Ireland, Scotland and Wales.

#### Who collects data?

**England:** fire safety data are collected by the Fire and Rescue Service in the aftermath of an incident.

**Scotland:** fire safety data are collected by the Scottish Fire and Rescue Service in the aftermath of an incident.

**Wales:** fire safety data are collected by the Fire and Rescue Authorities in Wales in the aftermath of an incident.

#### Who issues the data?

**England:** the vast majority of statistics for England are produced by the Home Office.

**Scotland:** “Prior to October 2015, these statistics were produced by the Scottish Government and accredited by the United Kingdom Statistics Authority as National Statistics (signifying full compliance with the Code of Practice for Statistics). Subsequently they have been produced by SFRS in voluntary compliance with the Code of Practice for Statistics. However, as SFRS are not currently named in legislation as producers of Official Statistics, it was no longer possible for these statistics to be designated as National Statistics. SFRS are continuing to work towards becoming named as producers of Official Statistics with a view to regaining accreditation as National Statistics for this series. SFRS has agreed to being named as producers of Official Statistics in upcoming legislation” [3].

**Wales:** the Welsh Government compiles the statistics in the bulletin based on reports submitted by FRAs to the Home Office.

Are there different levels of collection?

Currently no national data is collected, and they are published according to their origin (England, Scotland and Wales)

Where is the data stored?

**England:** databases are stored in the archive of the Home Office.

**Scotland:** databases are stored in the archive of the Scottish Fire and Rescue Service and accessible through the Scottish Governments ScotStat service.

**Wales:** databases are stored in the archive of the Welsh Government.

### **W3. STATISTICS INTERPRETATION ISSUES**

Who is interpreting the statistics

**England:** “Data received by the Home Office undergo a quality assurance process to ensure the data is fit-for-purpose and published to the highest possible standard. Any data quality issues are flagged and subsequently resolved with FRSS” [5].

**Scotland:** “The SFRS Data Services team run exception checking scripts on the IRS database to identify potential errors which are subsequently manually checked” [3].

**Wales:** Welsh Government applies further validation and verification to the data extract from the IRS.

Purpose for which data is collected

In **England**, the uses of fire statistics are:

- Informing the general public;
- Policy making and monitoring;
- Fire and rescue service;
- Third parties;
- Informing public marketing campaigns;
- The Office for National Statistics;
- Inspections and auditing;
- and National and international comparisons.

Users are:

- Ministers;
- Members of Parliament;
- Fire and rescue authorities and services;

- Other colleagues within the Home Office;
- Other government departments HMICFRS;
- Trade Unions;
- Journalists;
- Chartered Institute of Public Finance and Accountancy;
- Local Government Association;
- Individual citizens and private companies;
- Students, academics and universities;
- and Charities [5].

In **Scotland**: all the users who may be interested, use a range of fire statistics or are involved in the production of fire and rescue related statistics.

In **Wales**: the uses of fire statistics are:

- to advice to Ministers;
- to measure government targets and key performance indicators;
- to provide context and evidence for the Welsh Government's policies;
- fire service comparisons and benchmarking;
- to compare fires and the fire service in Wales with other countries;
- to inform the debate in the National Assembly for Wales and beyond;
- to assist in fire research and analysis;
- and to provide information on FRSs' performance and activities to citizens and communities in Wales.

Users are:

- Ministers;
- Assembly Members and the Members Research Service in the National Assembly for Wales;
- The Office for National Statistics;
- Department for Communities and Local Government;
- Chartered Institute of Public Finance and Accountancy;
- Fire and Rescue Authorities and Services;
- Welsh Local Government Association;
- Students, academics and universities;
- Other colleagues within the Welsh Government;
- Other government departments;
- Individual citizens and private companies;
- and Charities [6]

What are the methods used to fill the gaps where information is missing?

In **England**: "Information about the incident attended is input by a member of the attending fire crew and then quality assured by their line manager. The IRS consists of up to 175 questions, not all of which are asked for every incident. The IRS has on-line data entry with in-built validation rules which ensures that basic validation errors are avoided. However, there is more detail on the QA process in the previous section. Following the transition to the online IRS in 2009, the main types of errors in the data is thought to relate to recording and classification errors. The level of missing data on fields is very low, with such missing data reported as unknown and therefore no grossing, imputation or other estimation methods are used" [5].

In **Scotland**: "The officer in charge of an incident enters data to the IRS using software forms with inbuilt validation rules. The SFRS Data Services team then run exception checking scripts on the IRS database to identify potential errors which are subsequently manually checked. Further quality assurance is completed by cross checking incidents details with control room logs" [3].

In **Wales**: "due to time and resource constraints, we sometimes either record data as missing or we seek to impute the data. If we impute or change any data, then we inform the data provider of this and give them a chance to comment or challenge this. This is a compromise to resolve validation issues and does not impact significantly on the usability of the dataset" [6].

Is there follow up to data collected ?

In **England**: “In order to ensure the IRS data is complete, Home Office statisticians carry out monthly monitoring of the number of incidents submitted as discussed in the quality assurance section” [5].

In **Scotland**: “After the most severe fire incidents the SFRS fire investigation team complete a report on the details of the incident. Following these reports the IRS record is amended to reflect the findings where necessary. SFRS Data Services use these reports to crosscheck the IRS records” [3].

In **Wales**: “If we impute or change any data then we inform the data provider of this and give them a chance to comment or challenge this” [6].

Analyse potential cause and consequences in trends

In **England**, the Home Office investigate how causes and consequences vary over the years.

In **Scotland**, the Scottish Fire and Rescue Service publishes reports investigating how causes and consequences vary over the years.

In **Wales**, the Welsh Government publishes reports investigating how causes and consequences vary over the years.

#### W4. ANALYSE EXISTING DATA

Determining the level of confidence

In **England**: “Fire Statistics team run some specific checks before publishing the data.

Accuracy can be broken down into sampling and non-sampling error.

The data requested and provided by FRSs are not required under legislation, but we aim to achieve 100 per cent response for all fire and rescue collections, therefore reducing sampling error to the minimum. In order to ensure the IRS data is complete, Home Office statisticians carry out monthly monitoring of the number of incidents submitted as discussed in the quality assurance section.

Non-sampling error includes areas such as coverage error, non-response error, measurement error, processing error.

We aim to reduce non-sampling error through the provision of guidance about the data collections and the definitions of the data items. There are validation checks within the IRS to ensure that data is of good quality and fit-for-purpose” [5].

In **Scotland**: “the high level totals for primary fires, secondary fires, chimney fires, false alarms and non- fire incidents have a very low margin of error (below 1%) as categorisation issues would largely effect subcategories” [3].

In **Wales**, “the production of Welsh fire statistics follows a quality strategy”. Moreover, “accuracy can be broken down into sampling and non-sampling error. Non-sampling error includes areas such as coverage error, non-response error, measurement error, processing error. The fire data requested and provided by fire and rescue services are not required under legislation but we aim to achieve 100 per cent response for all fire collections. There will only be sampling error where there is missing data.

We aim to reduce non-sampling error through the provision of significant guidance about the data collections and the definitions that should be adhered to. We put the data through multiple validation checks to ensure that data is of good quality and fit for purpose” [6].

Pinpointing issues and limitations



In **England**: despite the review process, “there are likely to be some inaccuracies in the data due to reporting or keying errors, such as misclassification or missing cases” [5].

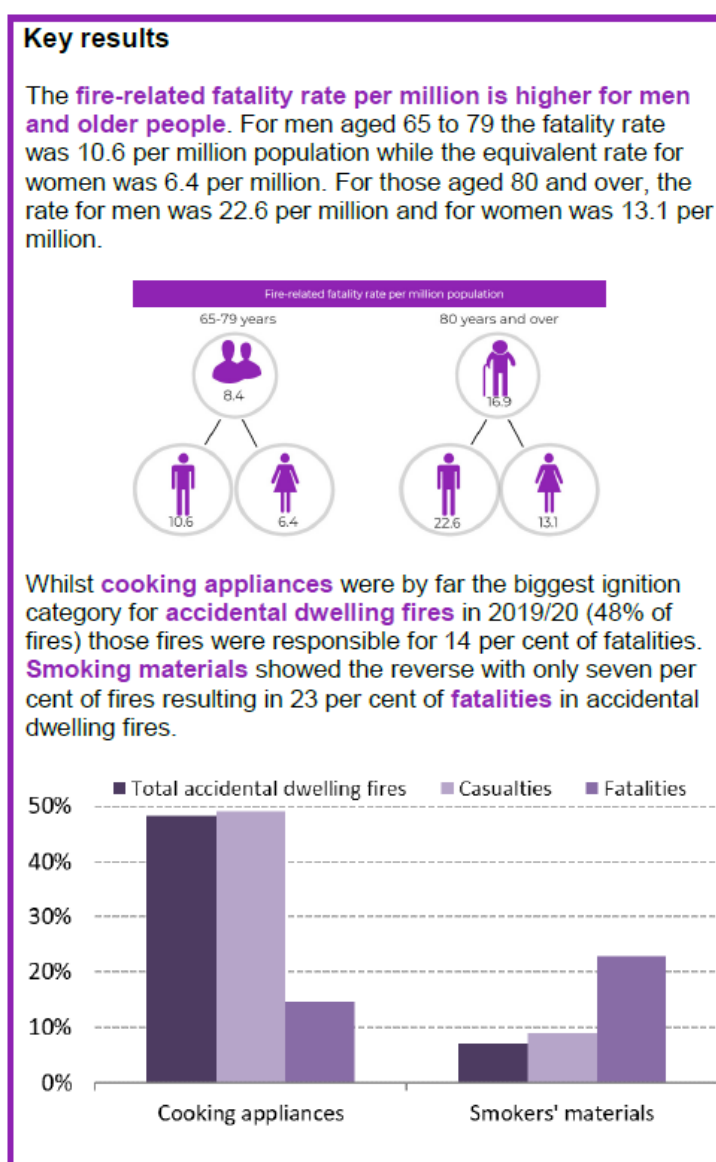
In **Scotland**: “As quality assurance is an ongoing process and we currently have no automated means to cross check the IRS logs with control room logs, it is difficult to accurately estimate the ‘true’ error margin, either at the time of publication or following revision, of the subcategories of incidents or casualties. There may be some miscategorisation which has yet to be addressed, or is not possible to address without access to another data source” [3].

In **Wales**, “due to time and resource constraints, we sometimes either record data as missing or we seek to impute the data. If we impute or change any data then we inform the data provider of this and give them a chance to comment or challenge this. This is a compromise to resolve validation issues and does not impact significantly on the usability of the dataset” [6].

Examples

**ENGLAND**

Period: April 2019 to March 2020



**Figure 37 : Key results England fire statistics [7]**

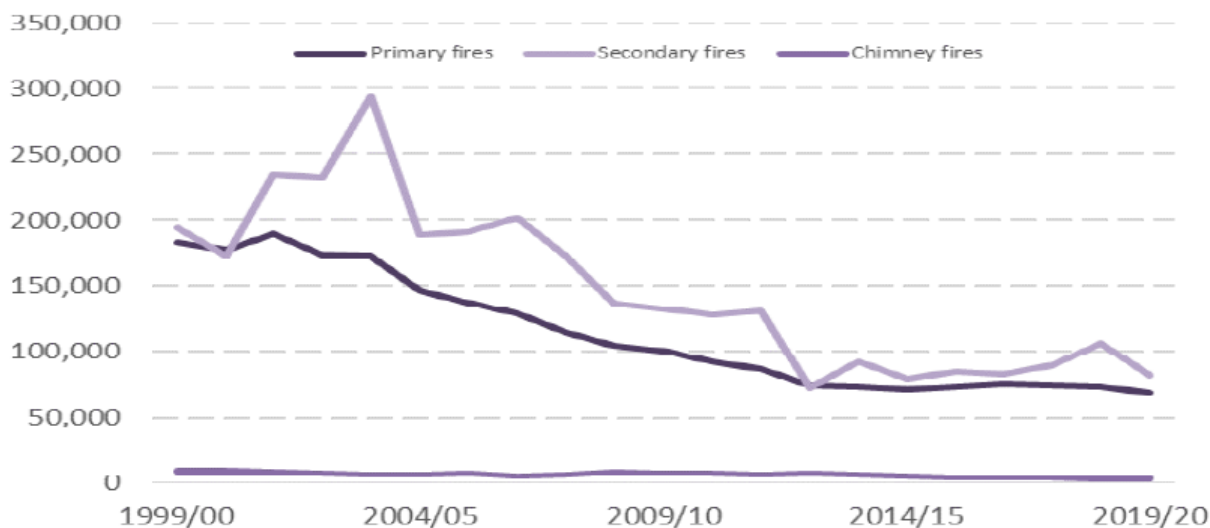
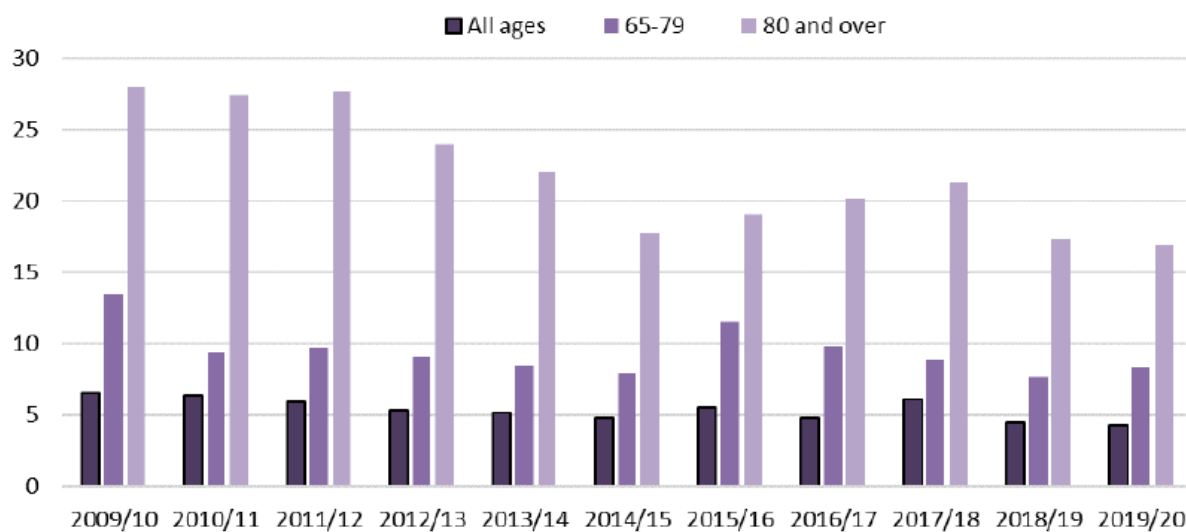
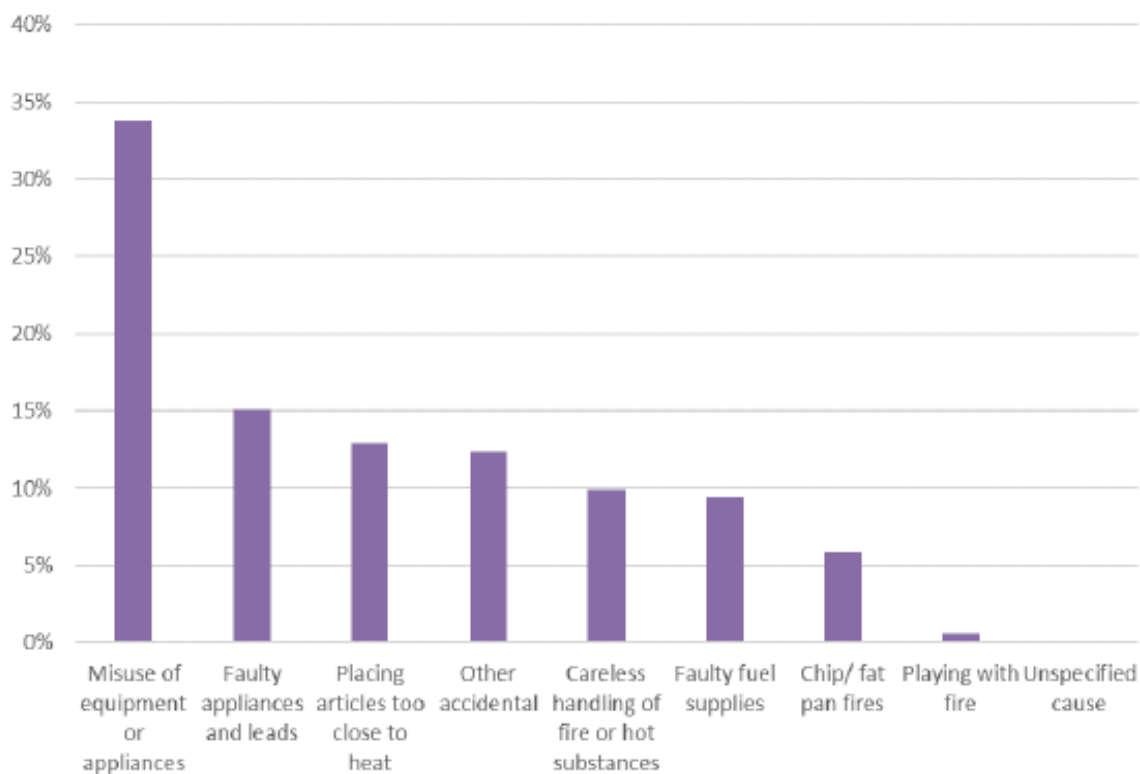


Figure 38 : Fires attended by type of fire, England; 2003/04 to 2019/20 [7]



Source: Home Office. [FIRE0503a](#)

Figure 39 : Fatality rate (fatalities per million people) for all ages and selected age bands, England; 2009/10 to 2019/20 [7]



Source: Home Office, [FIRE0601](#)

Figure 40 : Percentage of fires in accidental dwelling fires by cause of fire, England; 2019/20 [7]

## SCOTLAND

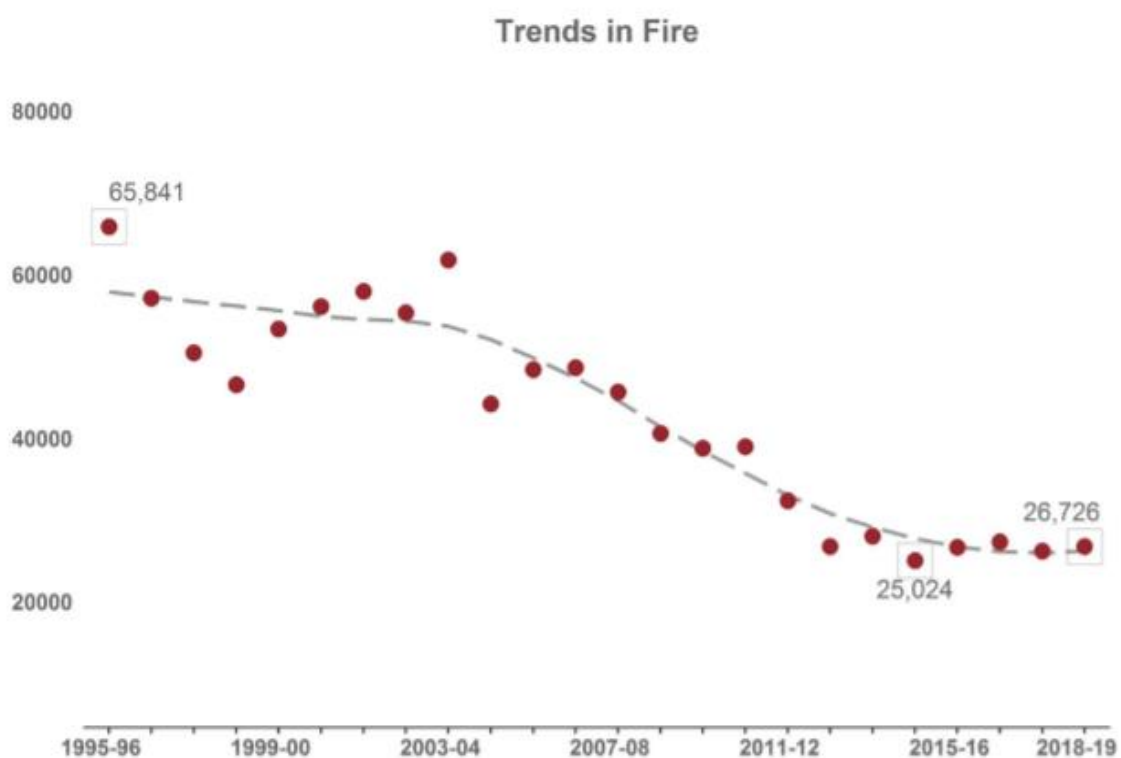


Figure 41 : Long-term trend in fire [8]

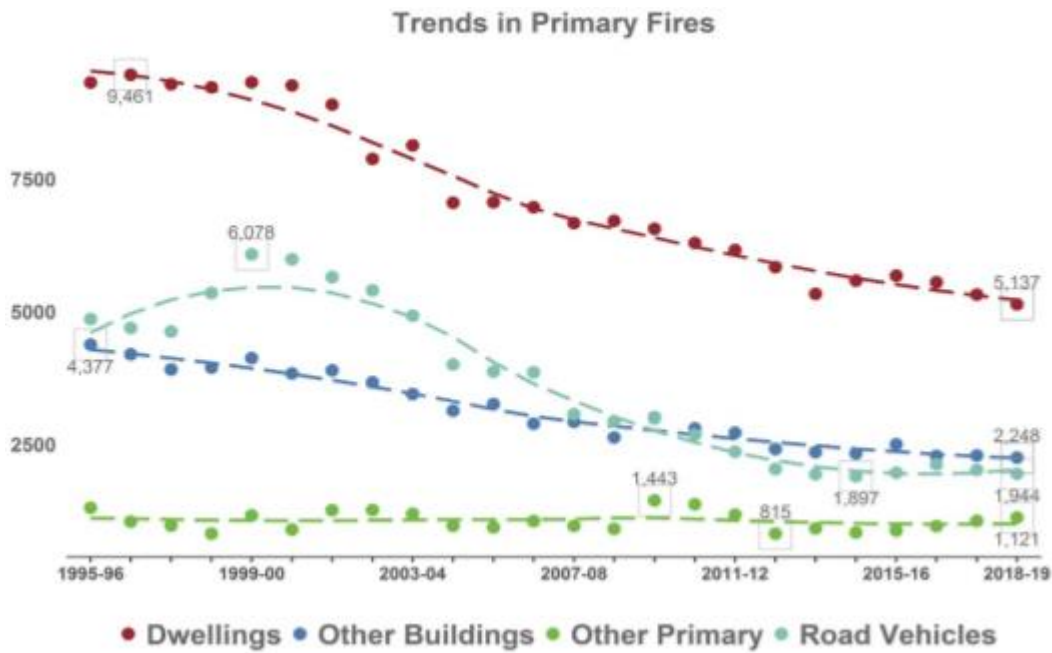


Figure 42 : Primary fire trends [8]

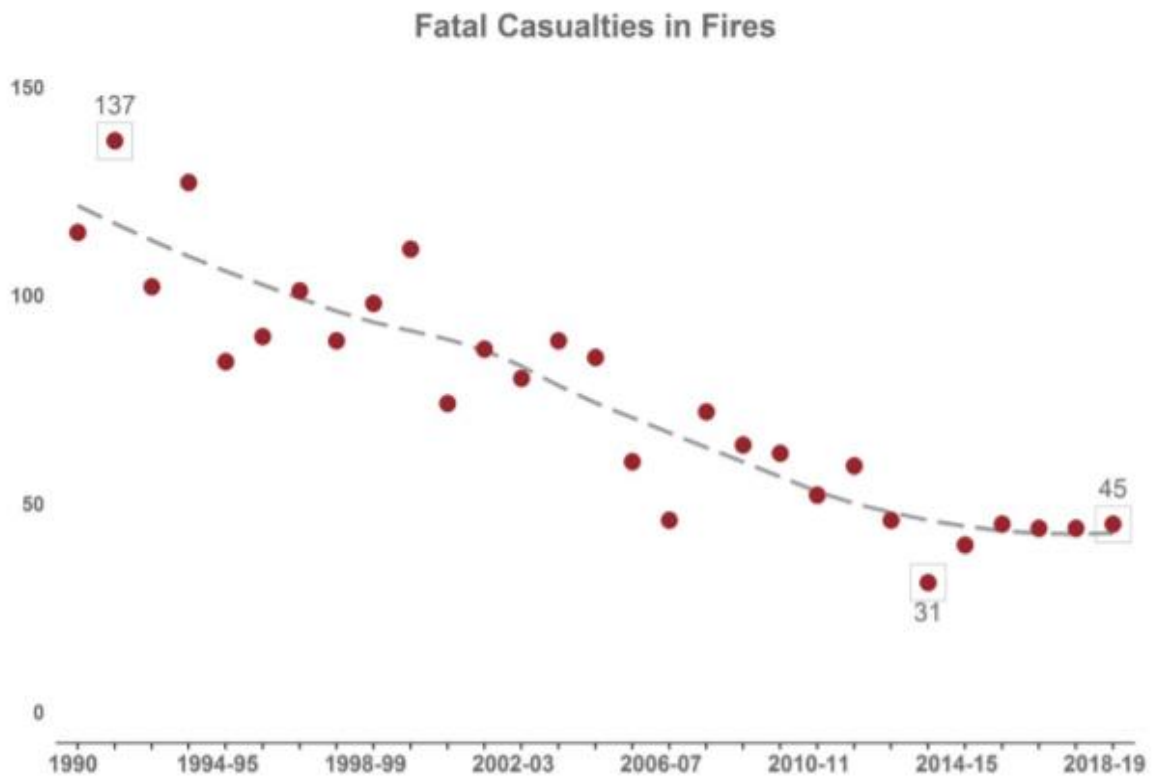


Figure 43 : Long-term trend in fatal fire casualties. Note that the series changed from calendar year to financial year after 1993 [8]

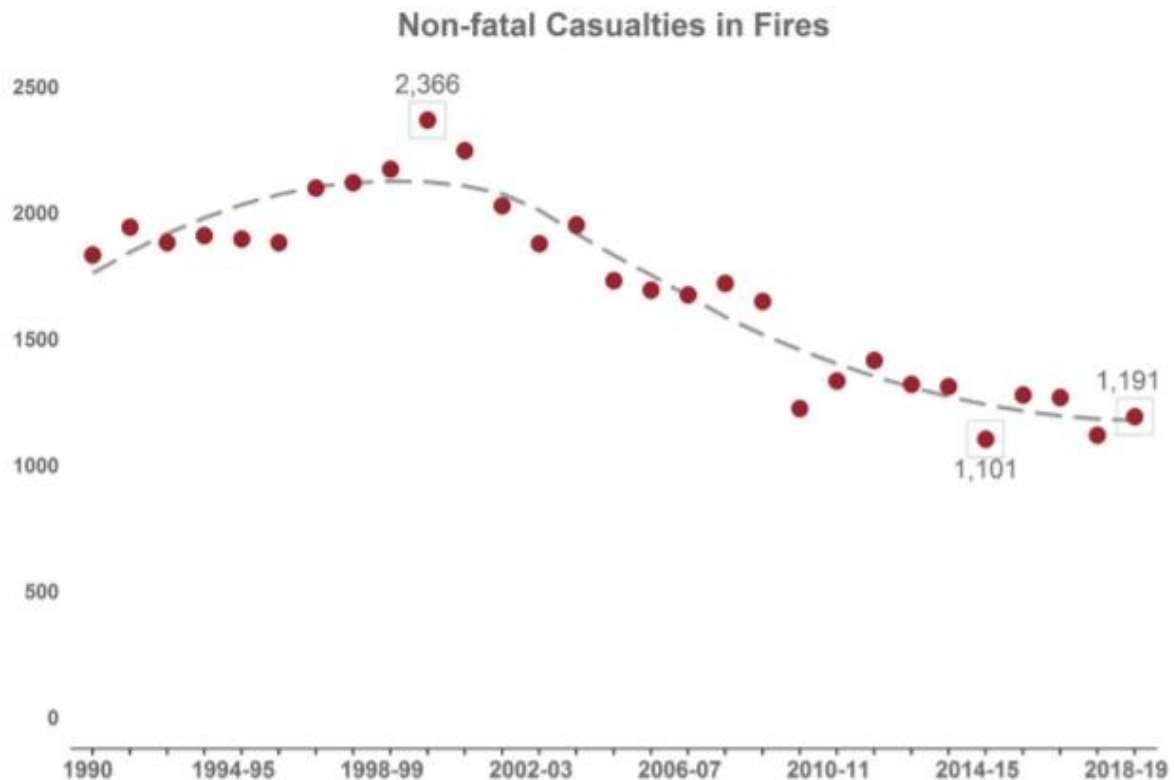


Figure 44 : Long-term trend in non-fatal fire casualties. Note that the series changed from calendar year to financial year after 1993 [8]

WALES

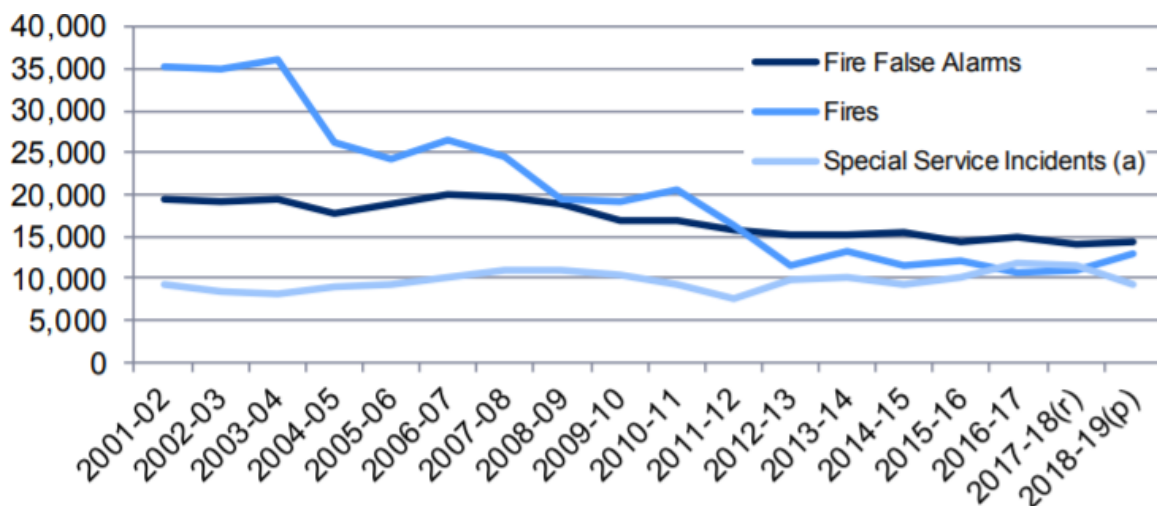
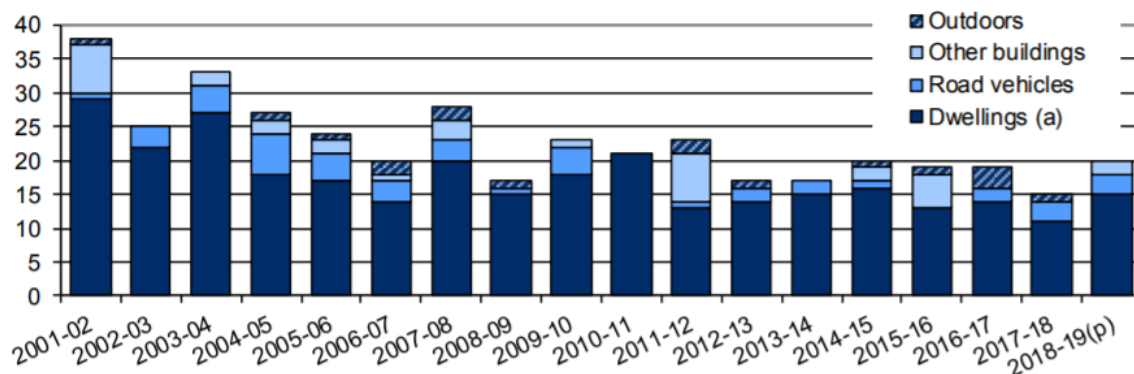


Figure 45 : Number of fire, SSI and fire false alarm attendances [4]



(a) Includes caravans, houseboats and other non-building structures used solely as a permanent dwelling.  
(p) Provisional data.

Figure 46 : Number of fatal casualties from fires by location [4]

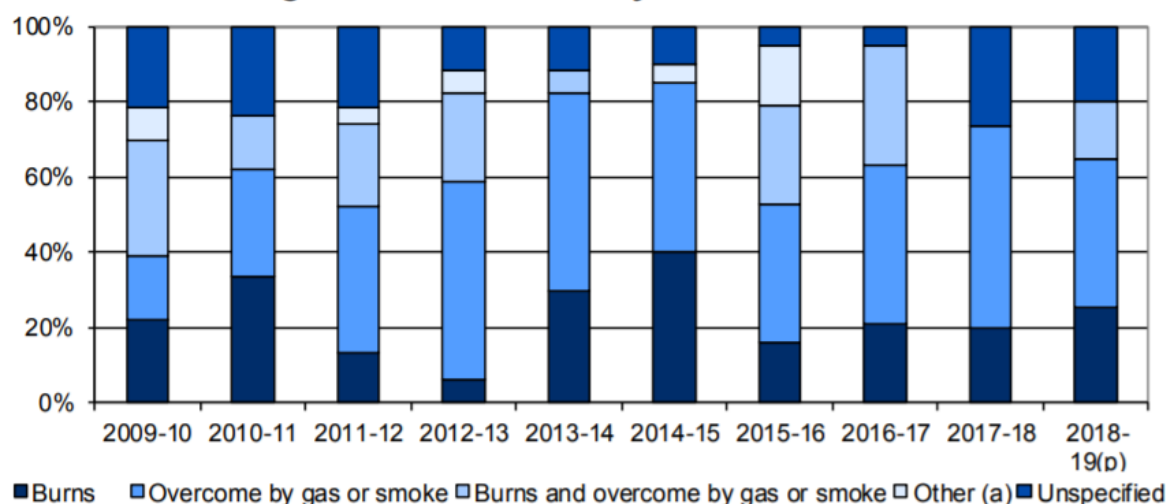


Figure 47 : Percentage of fatal casualties by cause of death [4]

REFERENCES:

- [1] Home Office, "Publishing Incident Recording System data on the fire and rescue service at an Incident Level: Dwelling Fires Dataset Guidance," 2017.
- [2] Home Office, "Publishing Incident Recording System data on the fire and rescue service at an incident level: 'Other building' fires dataset guidance," 2017.
- [3] Scottish Fire and Rescue Service, "Guidance notes on fire and rescue incident statistics (Scotland) 2018-19," 2019.
- [4] Welsh Government, "Fire and Rescue Incident Statistics 2018-19," 2019.
- [5] Home Office, "Fire and rescue incident statistics. Methodology and quality report.," 2020.
- [6] Welsh Government, "Quality Report for Welsh Fire Statistics," 2012.
- [7] Home Office, "Detailed analysis of fires attended by fire and rescue services. England, April 2018 to March 2019," 2020.
- [8] Scottish Fire and Rescue Service, "Fire and Rescue Incident Statistics (Scotland) 2018-2019," 2019.

## X. DIAGNOSTIC SHEET FOR USA

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### X1- TERMINOLOGY ISSUES

Information from ISO 17755-1 & -2

The National Fire Incident Reporting System (NFIRS) is based on separate reports on each incident requiring a response by a fire department and each casualty associated with a reported incident. There is a national manual for coding of incidents, overseen by the U.S. Fire Administration, which administers NFIRS.

Fire department participation is voluntary, which means a significant fraction of fire departments do not participate, and some participating fire departments do not report every year. Therefore, NFIRS data is projected using a second database, the NFPA fire experience survey, which is based on summary information reported from a stratified random sample of fire departments. The methods used by most analysts to combine these databases for analysis are documented, but there is no national standard for analysis.

Most reports (60-89%) are completed by firefighters who lack extensive training in fire investigation, but some (11-40%) are completed by professionals with extensive training.

#### **Fires subject to reporting** (ISO 17755-1, page 5)

All fires that result in a fire department response should be reported. An unknown number of departments employ truncated/reporting thresholds. These thresholds are determined on a department by department basis.

Fires are categorized for analysis and reporting purposes according to major incident type in the following way:

- Structure fire: includes building fire, fire in structure other than a building, four types of mobile properties used as a fixed structure, such as a manufactured home, and six types of “confined” fires, such as a chimney or flue fire, for which detailed reporting is not required
- Vehicle fire: includes nine categories of vehicles
- Outside rubbish or trash fire: includes six categories of trash fires, which also do not require detailed reporting, including outside trash receptacle and two types of landfills
- Vegetation fire: includes four types of cultivated vegetation and four types of other natural vegetation
- Special outside fire: includes outside storage, outside equipment, outside explosion without sustained fire, outside mailbox, and unclassified special outside fire
- Unclassified (other)

The other database used for calibration does not estimate property damage for non-cultivated natural vegetation, which is a problem for estimates of wildland fire damages.

#### **Fire deaths subject to reporting** (ISO 17755-1, page 8)

For United States of America, a fire fatality is ***“a person who is killed as a result of a fire, including death from natural or accidental causes sustained while involved in the activities of fire control, attempting rescue, or escaping from the dangers of the fire”***.

Independent of fire incident data collection, a fire related death will be captured when exposure to fire, fire products, or explosion was the underlying cause of death or was a contributing factor in the chain of events leading to death, as reported on the death certificate through vital records reporting channels.

Examples of circumstances that can lead to exclusion of a death, include automobile collision resulting in fire, in which the fire caused death may not be identified as fire deaths. Deaths captured through coroners/vital records reporting channels are dependent upon recording personnel ability to determine original cause of a fire-related condition that contributes to death.

Examples of deaths that may be missed include deaths that occur after the fire incident report is completed – not necessarily just due to extended time lag. Closing the loop between medical and fire reporting systems requires a degree of coordination that does not happen in an unknown number of instances. Although not common, there may be some fire departments that do not report fire deaths on NFIRS records.

Governmental and Non-Governmental Organizations (NGOs) may choose specific ICD-10 codes for inclusion in analysis of vital records data, depending upon the scope of the study. United States Fire Administration (USFA) uses ICD-10 codes F63.1, W39-W40, X00-X09, X75-76, X96-97, Y25-26, and Y35.1 to define fire deaths.

**Fire injuries subject to reporting** (ISO 17755-1, page 10)

A fire injury is a person who is injured as a result of a fire, including injuries from natural or accidental causes sustained while involved in the activities of fire control, attempting rescue, or escaping from the dangers of the fire.

Injuries are also captured by a sample survey of hospital emergency rooms and reported to the Consumer Product Safety Commission (National Electronic Injury Surveillance System, NEISS).

Fire injuries that occur in a combination of injuries from an overarching event, such as earthquake or automobile accident, may not be recorded as fire injuries, and non-fire injuries in such circumstances may be recorded as fire injuries when they were not fire injuries.

Other injuries that may be missed include injuries discovered after fire department has closed report, injuries masked by pre-existing conditions, and injuries noticed and treated only by the victim. Also, some fire departments may not report fire injuries on NFIRS records, and far more fire injuries occur in (typically small) fires not reported to fire departments than in reported fires.

**Reporting on victim characteristics** (ISO 17755-1, pages 20-25)

**Gender**

**Age**

**Race**

**Ethnicity**

**Severity**

- Minor
- Moderate
- Severe
- Life threatening
- Death
- Undetermined

**Cause of injury**

- Exposed to fire products
- Exposed to hazardous materials other than smoke
- Jumped in escape attempt
- Fell, slipped or tripped
- Caught or trapped
- Structural collapse
- Struck by or contact with object
- Overexertion or strain
- Multiple causes
- Other (unclassified or unknown type) cause of injury
- Undetermined

**Human factor contributing to injury**

- Asleep with no known impairment
- Unconscious
- Possibly impaired by alcohol
- Possibly impaired by other drug or chemical



- Possibly mentally disabled
- Physically disabled
- Physically restrained
- Unattended or unsupervised person
- No factor

**Factor contributing to injury**

- Crowd situation or limited exits
- Mechanical obstacles to exit
- Locked exit or other problem with exit
- Problem with quick-release burglar or security bar
- Burglar or security bar or intrusion barrier
- Window type or size impeded egress
- Other (unclassified or unknown type) egress problem
- Exit blocked by flame
- Exit blocked by smoke
- Vision blocked or impaired by smoke
- Trapped above fire
- Trapped below fire— Other (unclassified or unknown type) fire pattern
- Unfamiliar with exits
- Excessive travel distance to nearest clear exit
- Chose inappropriate exit route
- Re-entered building
- Clothing caught fire while escaping
- Other (unclassified or unknown type) escape
- Roof collapse
- Wall collapse
- Floor collapse
- Other collapse
- Trapped in or by vehicle
- Vehicle collision or rollover
- Other (unclassified or unknown type) vehicle-related factor
- Unvented heating equipment
- Improper use of heating equipment
- Improper use of cooking equipment
- Other (unclassified or unknown type) equipment-related factor
- Clothing burned not while escaping
- Overexertion
- Other (unclassified or unknown type) factor
- No factor

**Activity when injured**

- Escaping
- Rescue attempt
- Fire control
- Returning to vicinity of fire before control of fire
- Returning to vicinity of fire after control of fire
- Sleeping
- Unable to act
- Irrational act
- Other (unclassified or unknown type) activity
- Undetermined

**Location at time of incident**

- In area of origin and not involved in starting the fire
- Not in area of origin and not involved in starting the fire
- Not in area of origin and involved in starting the fire
- In area of origin and involved in starting the fire
- Other location
- Undetermined

**General location at time of injury**

- In area of origin

- In building of origin but not in area of origin
- Outside but not in area of origin
- Undetermined

**Specific location at time of injury – Same choices as for Area of Origin of fire**

**Primary apparent symptom**

- Smoke inhalation
- Hazardous fumes inhalation
- Breathing difficulty or shortness of breath
- Burns and smoke inhalation
- Thermal burn only
- Scald burn
- Chemical burn
- Electric burn
- Cut or laceration
- Stab or puncture wound
- Gunshot or projectile wound
- Contusion or bruise
- Abrasion
- Dislocation
- Fracture
- Strain or sprain
- Swelling
- Crushing
- Amputation
- Cardiac symptoms
- Cardiac arrest
- Stroke
- Respiratory arrest
- Chills
- Fever
- Nausea
- Vomiting
- Numbness or tingling
- Paralysis
- Frostbite
- Other (unclassified or unknown type) sickness
- Miscarriage
- Eye trauma or avulsion
- Drowning
- Foreign body obstruction
- Electric shock
- Poison
- Convulsion or seizure
- Internal trauma
- Hemorrhaging
- Disorientation
- Dizziness, fainting, or weakness
- Exhaustion or fatigue
- Heat stroke
- Dehydration
- Allergic reaction
- Drug overdose
- Alcohol impairment
- Emotional stress
- Mental disorder
- Shock
- Unconscious
- Pain only
- Other (unclassified or unknown type) primary apparent symptom

— Undetermined

**Primary area of body injured**

- Head
- Neck or shoulder
- Thorax
- Abdomen
- Spine
- Upper extremities
- Lower extremities
- Internal
- Multiple body parts

There are additional, more detailed choices for firefighter casualties.

**Property damage subject to reporting (ISO 17755-1, page 29)**

Rough estimation of the total loss to the structure and contents, in terms of the cost of replacement in like kind and quantity. This estimation includes contents damaged by fire, smoke, water and overhaul.

Data exclude indirect loss, such as business interruption, temporary housing for displaced residents, and loss of use of equipment. Some individual FDs use reporting thresholds based on direct dollar loss. Measures used are:

- Monetary value of loss
- Outdoor area damaged (for example, acres in a wildfire)
- Percentage of total area that was damaged
- Number of buildings, structures or vehicles damaged
- In a structure, qualitative confinement of fire (such as confined to object of origin, confined to room of origin)

Damage not readily apparent at time of investigation/reporting may not be reported. Some damage may be present but not reported by fire departments. Also, there may be some fire departments that do not report direct property damage at all on NFIRS records.

**Other losses subject to reporting (ISO 17755-1, page 31)**

- Deaths and injuries of firefighters, fire officers, fire brigade personnel, and other emergency responders due to acute fire effects.
- Other fatal or non-fatal injuries or illnesses of firefighters, fire officers, fire brigade personnel, and other emergency responders sustained while on-duty.
- Deaths and injuries... acute fire effects: Scope of NFIRS includes all injuries, deaths, or exposures to fire service personnel, including casualties that occur in conjunction both with incident responses and with non-incident events such as station duties or training; similar scope for NFPA survey.
- All on duty firefighter fatalities are captured in a separate firefighter fatality database maintained by the USFA, which claims essentially 100% coverage of the nation. This includes deaths temporally distant from the original incident.

Note: there are other federal agencies and non-governmental organizations that collect and report various disparate fire loss data, that go beyond the scope of this survey.

**Locations of fires based on survey responses (ISO 17755-1, page 32)**

- Separate reporting of single family dwellings, buildings with multiple private housing units, and commercial residential properties, such as hotels, dormitories
- All residential properties reported together but distinguished from other buildings
- All buildings with private housing units reported together but distinguished from other buildings.

**Specific types of buildings and other structures (residential only) (ISO 17755-1, page 40)**

**Residential**

- One- or two-family dwelling, including manufactured home
- Multi-family dwelling

- Boarding or rooming house
- Hotel or motel
- Residential board and care
- Dormitory
- Sorority or fraternity house
- Barracks
- Other residential

**Specific types of rooms and other areas** (ISO 17755-1, page 49-51)

**Means of Egress**

- Hallway or corridor
- Exterior stairway
- Interior stairway
- Escalator
- Lobby
- Other egress/exit

**Assembly or Sales Area**

- Assembly area with fixed seats for 100 or more people
- Assembly area without fixed seats for 100 or more people
- Assembly area for less than 100 people
- Common room, den, family room, living room, lounge, sitting room
- Sales area or showroom
- Art gallery, exhibit hall, library
- Swimming pool
- Other assembly or sales area

**Function Area**

- Bedroom for fewer than five people
- Bedroom for five or more people
- Dining room, bar, cafeteria
- Kitchen or cooking area
- Bathroom, checkroom, lavatory, locker room
- Laundry area
- Office
- Personal service area
- Other function area

**Technical Processing Area**

- Laboratory
- Photography area
- First-aid area
- Operating room
- Computer room
- Performance or stage area
- Projection room
- Processing or manufacturing area
- Other technical processing area

**Storage Area**

- Storage room, area, tank or bin
- Closet
- Tool or supply storage
- Records storage
- Shipping or receiving area
- Trash chute
- Garage
- Other storage area

**Service Area**

- Elevator shaft
- Conduit, pipe, utility, or ventilation shaft
- Light shaft
- Laundry or mail chute

- Duct
- Display window
- Conveyor
- Other service area

**Service or Equipment Area**

- Machinery room or area
- Heating room or area
- Switchgear area or transformer vault
- Incinerator area
- Maintenance shop or area
- Test cell
- Pressurized air enclosure
- Enclosure with enriched oxygen atmosphere
- Other service or equipment area

**Structural Area**

- Crawl space or substructure area
- Exterior balcony
- Ceiling/floor assembly or space between stories
- Attic or concealed roof/ceiling space
- Wall assembly or concealed wall space
- Exterior wall surface
- Exterior roof surface
- Awning
- Other structural area

**Reporting of type of construction** (ISO 17755-1, page 53)

No, not included in reporting since 1999. Type of construction was included in fire incident reporting during 1980-1998 with these codes. Definitions are made more specific by reference to the categories of construction defined by model building codes of the time:

- Fire resistive
- Heavy timber
- Protected noncombustible or some type of limited combustible
- Unprotected noncombustible or the other types of limited combustible
- Protected ordinary
- Unprotected ordinary
- Protected wood frame
- Unprotected wood frame
- Unclassified
- Unknown

**Reporting of building height and other characteristics** (ISO 17755-1, page 54)

- Height of building. Stories at or above grade / Stories below grade
- Level or floor where fire began
- Structure status, such as vacant, under construction, or under demolition.

**Reporting and estimation of deliberately-set fires** (ISO 17755-1, pages 58-59)  
(under Cause of Ignition) reported as “Intentional”.

All four loss measures reported as well as fire department deaths and injuries

Classification as deliberate – some by trained arson investigators, some by fire officers on the scene with no arson training, some by police or other law enforcement personnel (through separate database, Federal Bureau of Investigation’s Uniform Crime Reports), some by insurance investigators or other insurance personnel

Statistical analysis of deliberate fires includes some fires with unknown cause or cause still under investigation

Reporting of fireplay (under Factor Contributing to Ignition) and fires can be categorized as

both intentional and fireplay. Under Human Factor Contributing to Ignition, can check "Age was a factor" and then age of person can be entered but is often left blank.

— Optional Arson Module offers data elements to report on:

— Case status (for example, open, closed, inactive)

— Availability of material first ignited (refers to whether fire-starting materials were available at scene or transported to scene)

— Suspected motivation factors (see details below)

— Apparent group involvement (including gangs, organized crime, hate groups)

— Entry method (how the firesetter entered the property)

— Extent of fire involvement on arrival of fire department

— Type of incendiary device used, if any

— Other investigative information (including code violations, other indicators of vulnerability of property, possible motives for fraud, evidence of other criminal activity on site)

— Property ownership

— Initial observations (including status of doors and windows)

— Laboratory used (for analysis of evidence)

— Characteristics of subject (for juvenile firesetters), including age, gender, race, ethnicity, family type, motivation (see below), disposition of case motivation factors (not limited to juvenile firesetters)

— Extortion

— Labor unrest

— Insurance fraud

— Intimidation

— Void contract or lease

— Personal

— Hate crime

— Institutional

— Societal

— Protest

— Civil unrest

— Fireplay or curiosity

— Vanity or recognition

— Thrills

— Attention or sympathy

— Sexual excitement

— Homicide

— Suicide

— Domestic violence

— Burglary

— Homicide concealment

— Burglary concealment

— Automobile theft concealment

— Destroy records or evidence

— Other suspected motivation

— Unknown motivation

Suspected motivation or risk factors (limited to juvenile firesetters)

— Mild curiosity about fire

— Moderate curiosity about fire

— Extreme curiosity about fire

— Diagnosed or suspected attention deficit (hyperactivity) disorder

— History of trouble outside school

— History of stealing or shoplifting

— History of physically assaulting others

— History of fireplay or firesetting

— Transiency

— Other

— Unknown

#### **Reporting and estimation of natural cause fires (ISO 17755-1, page 61)**

Yes, recorded as "Act of nature" under Cause of Ignition.

Also, recorded as any of seven choices under Factor Contributing to Ignition:

- High wind
- Storm
- High water, including floods
- Earthquake
- Volcanic action
- Animal
- “Other” (unclassified or unknown-type) natural condition

Additional details may be provided in the Chemical or Natural Heat Source section under Heat Source:

- Sunlight
- Spontaneous combustion or chemical reaction
- Lightning discharge
- Other static discharge
- Other (unclassified or unknown-type) chemical or natural heat source

“Sunlight” and “lightning discharge” are clearly natural causes and are not identified under any other data element. “Spontaneous combustion or chemical reaction” and “other static discharge” can arise from natural or other causes and so would not be sufficient by themselves to designate a fire as natural, although they would provide additional detail for a fire designated as natural under Cause or Factor Contributing to Ignition.

#### **Reporting and estimation of exposure fires** (ISO 17755-1, page 62)

Yes, recorded in three places.

First, can be reported as Exposure Number greater than zero.

Second, can be reported with any of five choices for mechanism of heat transfer from another fire under Heat Source:

- Direct flame or convection currents
- Radiated heat
- Flying brand, ember or spark
- Conducted heat
- Other (unclassified or unknown-type)

Also, recorded as one of the six choices in the Fire Spread or Control section of Factor Contributing to Ignition, but this is difficult to interpret because another of the six choices in the same section is “Other (unclassified or unknown type) fire spread or control” which could mean some exposure fires and some other fires.

#### **Reporting and estimation of smoking material and open flame fires** (ISO 17755-1, page 65)

Yes, can be reported with any of five choices for mechanism of heat transfer from another fire in the Other Open Flame or Smoking Materials part of Heat Source:

- Cigarette
- Pipe or cigar
- Undetermined smoking material
- Match
- Lighter
- Candle
- Warning or road flare
- Backfire from internal combustion engine
- Flame or torch used for lighting
- Other (unclassified or unknown type) open flame or smoking material

Also, “hot ember or ash” is a choice under the Hot or Smoldering Object part of Heat Source, as are several unrelated categories, all linked to “other (unclassified or unknown type) hot or smoldering object”. Torches are now choices under Equipment Involved in Ignition, as are “cigarette lighter,” “charcoal or utility lighter” and “novelty lighter”. There are four choices for torches:

- Welding torch
- Cutting torch
- Burner
- Soldering equipment

**Reporting and estimation of heating and cooling equipment fires (ISO 17755-1, page 69)**

Yes, can be reported with any of 26 choices under Equipment Involved in Ignition:

- Air conditioner
- Heat pump
- Fan
- Humidifier
- Ionizer
- Portable dehumidifier
- Evaporative cooler or cooling tower
- Masonry fireplace
- Factory built fireplace
- Fireplace with insert
- Heating stove
- Chimney or vent connector
- Brick, stone or masonry chimney
- Metal chimney
- Other (unclassified or unknown type) fireplace or chimney
- Local built-in furnace or heating unit
- Furnace or other central heating unit
- Boiler
- Heater, including floor furnace, wall heater and baseboard heater, excluding two types of heaters listed immediately below (also excludes hot water heater)
- Catalytic heater
- Oil-filled heater
- Heat lamp
- Heat tape
- Water heater
- Steam line, heat pipe, or hot air duct
- Unclassified or unknown type heating, ventilation or air conditioning equipment

Other data elements record fuel or power source and portability.

Fires can be reported as any of six specific types of confined fires – for which much less detailed reporting is permitted – and two of the six refer to types of heating equipment (fuel burner or boiler, chimney or flue).

**Reporting and estimation of cooking and kitchen equipment fires (ISO 17755-1, page 73)**

Yes, can be reported with any of 28 choices under Equipment Involved in Ignition:

- Blender, juicer, food processor or mixer
- Coffee grinder
- Can opener
- Knife
- Knife sharpener
- Coffee maker or teapot
- Food warmer or hot plate
- Kettle
- Popcorn popper
- Pressure cooker or canner
- Slow cooker
- Toaster, toaster oven, or countertop broiler
- Waffle iron or griddle
- Wok, frying pan or skillet
- Bread-making machine
- Deep fryer
- Grill, hibachi or barbecue
- Microwave oven
- Oven or rotisserie
- Range with or without oven
- Steam table or warming drawer or table
- Dishwasher
- Freezer separate from refrigerator
- Garbage disposer



- Grease hood or duct exhaust fan
- Ice maker separate from refrigerator
- Refrigerator or combined refrigerator/freezer
- Unclassified or unknown type kitchen or cooking equipment

Other data elements record fuel or power source and portability.

Fires can be reported as any of six specific types of confined fires – for which much less detailed reporting is permitted – and one of the six refer to types of cooking equipment (cooking vessel).

#### **Reporting and estimation of clothes dryer fires (ISO 17755-1, page 75)**

Yes, can be reported with any of 3 choices under Equipment Involved in Ignition, which are linked along with many other choices to a partially specified choice (other (unclassified or unknown type) personal or household equipment):

- Clothes dryer
- Washer/dryer combination
- Washing machine

Other data elements record fuel or power source and portability.

#### **Reporting and estimation of entertainment equipment fires (ISO 17755-1, page 77)**

Yes, can be reported with any of 21 choices under Equipment Involved in Ignition, which are linked along with many other choices to a partially specified choice (other (unclassified or unknown type) electronic or other electrical equipment):

- Guitar
- Piano or organ
- Musical synthesizer or keyboard
- Other (unclassified or unknown type) musical instrument
- Audio CD (compact disc) player
- Laser disk player, including DVD player or recorder
- Radio, excluding two-way radios
- Two-way radio
- Record player, phonograph, turntable
- Audio speaker as separate components
- Stereo equipment, including receivers, amplifiers, and equalizers
- Tape recorder or player
- Other (unclassified or unknown type) sound recording or receiving equipment
- Cable converter box
- Film, slider or overhead projector
- Television (TV)
- VCR (video cassette recorder) or VCR-TV combination
- Electronic video game
- Camcorder or video camera
- Photographic camera and equipment
- Other (unclassified or unknown type) video equipment

Other data elements record fuel or power source and portability.

#### **Reporting and estimation of office equipment fires (ISO 17755-1, page 79)**

Yes, can be reported with any of 16 choices under Equipment Involved in Ignition, which are linked along with many other choices to a partially specified choice (other (unclassified or unknown type) electronic or other electrical equipment):

- Computer
- External computer storage device, including tape or disk drive
- External computer modem
- Computer monitor
- Computer printer
- Computer projection device, LCD panel, or projector
- Other (unclassified or unknown type) computer device
- Adding machine or calculator
- Telephone or answering machine
- Cash register
- Copier

- Fax machine
  - Paper shredder
  - Postage or shipping meter equipment
  - Typewriter
  - Other (unclassified or unknown type) office equipment
- Other data elements record fuel or power source and portability.

**Reporting of electrical and electrical distribution or lighting equipment fires** (ISO 17755-1, pages 83-84)

Yes, **electrical fires** can be reported with any of 8 choices in the Electrical Failure or Malfunction section of Factor Contributing to Ignition:

- Water-caused short circuit arc
- Short circuit arc from mechanical damage
- Short circuit arc from defective or worn insulation
- Unspecified short circuit arc
- Arc from faulty contact or broken conductor
- Arc or spark from operating equipment
- Fluorescent light ballast
- Other (unclassified or unknown type) electrical failure or malfunction

The **nature of the electrical failure** can be inferred to some degree from entries under Heat Source. The following are the eight most frequently reported Heat Source entries for fires reported under Electrical Failure or Malfunction as electrical-failure fires, in U.S. homes:

- Electrical arcing
- Unclassified heat from powered equipment
- Unclassified heat source
- Radiated or conducted heat from operating equipment
- Spark, ember or flame from operating equipment
- Unclassified hot or smoldering object
- Heat or spark from friction
- Molten or hot material

Yes, **electrical distribution or lighting equipment fires** can be reported with any of 40 choices under Equipment Involved in Ignition:

- Electrical power (utility) line
- Electrical service supply wires, from utility pole to meter box
- Electrical meter or meter box
- Electrical wiring from meter box to circuit breaker or fuse box or panel board
- Panel board or switchboard
- Electrical branch circuit wiring or cable
- Outlet or receptacle
- Wall switch
- Ground fault interrupter, portable or plug-in
- Other (unclassified or unknown type) electrical wiring
- Distribution-type transformer
- Overcurrent disconnect equipment
- Low-voltage transformer
- Generator
- Inverter
- Uninterrupted power supply
- Surge protector
- Battery charger or rectifier
- Battery
- Table, floor or desk lamp
- Lantern or flashlight
- Incandescent light fixture
- Fluorescent light fixture or ballast
- Halogen light fixture or lamp
- Sodium or mercury vapor light fixture or lamp
- Portable work or trouble light
- Light bulb

- Other (unclassified or unknown type) lamp or lighting
- Night light
- Decorative light on line voltage
- Decorative or landscape lighting on low voltage
- Sign
- Electric fence
- Traffic control device
- Lightning rod
- Detachable power cord or plug
- Permanently attached appliance power cord or plug
- Extension cord
- Other (unclassified or unknown type) cord or plug
- Other (unclassified or unknown type) electrical distribution, lighting or power transfer Equipment

**Reporting of other appliance and equipment fires (ISO 17755-1, pages 87-91)**

Yes, can be reported with many choices under Equipment Involved in Ignition, including the following choices that have not been listed under prior entries in this report:

- Power saw
- Power lathe
- Power shaper, router, joiner, planer
- Power cutting tool
- Power drill or screwdriver
- Power sander, grinder, buffer, polisher
- Power hammer
- Power nail gun or stapler
- Other (unclassified or unknown type) power tool
- Paint dipper
- Paint flow coating machine
- Paint mixing machine
- Paint sprayer
- Coating machine
- Other (unclassified or unknown type) painting tool
- Air compressor
- Gas compressor
- Atomizing equipment
- Pump
- Wet/dry vacuum
- Hoist, lift or crane
- Powered jacking equipment
- Drilling machinery or equipment
- Other (unclassified or unknown type) hydraulic equipment
- Heat-treating equipment
- Incinerator (also can be reported separately as a type of confined fire)
- Industrial furnace, oven or kiln
- Tar pot or tar kettle
- Casting, molding or forging equipment
- Distilling equipment
- Digester or reactor
- Extractor or waste recovery machine
- Conveyor
- Power transfer equipment
- Power takeoff
- Powered valves
- Bearing or brake
- Picking, carding, or weaving machine
- Testing equipment
- Gas regulator
- Separate motor
- Internal combustion engine

- Printing press
- Car washing equipment
- Other (unclassified or unknown type) shop tool or industrial equipment
- Dental, medical or other powered bed or chair
- Other dental equipment
- Dialysis equipment
- Medical imaging equipment
- Medical monitoring equipment
- Oxygen administration equipment
- Radiological equipment
- Medical sterilizer
- Therapeutic equipment
- Other (unclassified or unknown type) medical equipment
- Transmitter
- Telephone switching gear
- Television monitor array
- Studio-type television camera
- Studio-type sound recording or modulating equipment
- Radar equipment
- Amusement ride equipment
- Ski lift
- Elevator or lift
- Escalator
- Microfilm or microfiche viewing equipment
- Photo processing equipment
- Vending machine
- Non-video arcade game
- Water fountain or water cooler
- Telescope
- Electron microscope
- Other laboratory equipment
- Other (unclassified or unknown type) commercial or medical equipment
- Combine or threshing machine
- Hay processing equipment
- Farm elevator or conveyor
- Silo loader, unloader, screw/sweep auger
- Feed grinder, mixer, blender
- Milking machine
- Pasteurizer
- Cream separator
- Farm or garden sprayer
- Chain saw
- Weed burner
- Lawn mower
- Lawn or landscape trimmer or edger
- Lawn vacuum
- Leaf blower
- Mulcher, grinder or chipper
- Snow blower or thrower
- Log splitter
- Post hole auger
- Post driver or pile driver
- Tiller or cultivator
- Other (unclassified or unknown type) garden tool or agricultural equipment
- Trash compactor (also can be reported separately as a type of confined fire)
- Hot tub or whirlpool
- Swimming pool equipment
- Other (unclassified or unknown type) floor care equipment
- Electric broom

- Carpet cleaning equipment
- Floor buffer, waxer or cleaner
- Vacuum cleaner
- Comb or hair brush
- Curling iron
- Electrolysis equipment
- Hair curler warmer
- Hair dryer
- Lighted makeup mirror
- Electric razor or shaver
- Sunlamp or suntan equipment
- Electric toothbrush
- Other (unclassified or unknown type) portable appliance designed to produce heat
- Baby bottle warmer
- Electric blanket
- Heating pad
- Clothes steamer
- Clothes iron
- Automatic door opener
- Burglar alarm
- Garage door opener
- Gas detector
- Intercom
- Smoke or heat detector or fire alarm
- Thermostat
- Ashtray
- Fire extinguishing equipment
- Insect trap
- Timer
- Model vehicle
- Powered toy
- Woodburning kit
- Clock
- Gun
- Jewelry-cleaning machine
- Scissors
- Sewing machine
- Shoe polisher
- Non-medical sterilizer
- Other (unclassified or unknown type) personal or household equipment
- Other (unclassified or unknown) equipment
- No equipment
- Undetermined

Other data elements record fuel or power source and portability.

Fires can be reported as any of six specific types of confined fires – for which much less detailed reporting is permitted – and two of the six refer to these other types of equipment (incinerator, commercial compactor).

**Reporting of item first ignited in terms of form and function** (ISO 17755-1, pages 99-101)

Yes, can be reported with many choices under Item First Ignited:

- Exterior roof covering
- Exterior sidewall covering
- Exterior trim or appurtenance including door or porch
- Floor covering
- Interior wall covering
- Interior ceiling covering
- Structural member or framing
- Thermal or acoustical insulation
- Other (unclassified or unknown type) structural component or finish
- Upholstered furniture

- Non-upholstered chair or bench
- Cabinetry
- Ironing board
- Appliance housing or casing
- Household utensil
- Other (unclassified or unknown type) furniture or utensil
- Mattress or pillow
- Bedding
- Linen other than bedding
- Clothing not on a person
- Clothing on a person
- Curtain, blind, drapery or tapestry
- Fabrics and yard goods
- Luggage
- Other (unclassified or unknown type) soft goods or clothing
- Christmas tree
- Decoration
- Sign
- Chips
- Toy or game
- Awning or canopy
- Tarpaulin or tent
- Other (unclassified or unknown type) adornment or recreational material
- Box or bag
- Raw materials being used to make a product
- Empty pallet or skid
- Cord, rope, twine or yarn
- Packing or wrapping material
- Baled goods or material
- Bulk storage
- Palletized material
- Rolled or wound material
- Other (unclassified or unknown type) storage supplies
- Atomized or vaporized liquid
- Flammable liquid or gas in or escaping from combustion engines
- Flammable liquid or gas in or escaping from final container or pipe before engine or burner
- Flammable liquid or gas in or escaping from container or pipe
- Uncontained flammable liquid or gas
- Pipe, duct, conduit or hose
- Pipe, duct, conduit or hose covering
- Filter
- Other (unclassified or unknown type) liquid, piping or filter
- Agricultural crop
- Light vegetation excluding crop
- Heavy vegetation excluding crop
- Animal, living or dead
- Human, living or dead
- Cooking materials
- Feathers or fur not on a bird or animal but not processed into a product
- Other (unclassified or unknown type) organic material
- Electrical wire or cable insulation
- Transformer or transformer fluid
- Conveyor, drive or V-belt
- Tire
- Railroad tie
- Fence or pole
- Fertilizer
- Pyrotechnics or explosives
- Book

- Magazine, newspaper, writing paper
- Adhesive
- Dust, fiber or lint
- Film or residue
- Rubbish, trash or waste
- Oily rags
- Multiple items first ignited
- Other (unclassified or unknown type) item first ignited
- Undetermined

**Reporting of item first ignited in terms of material composition** (ISO 17755-1, pages 102-103)

Yes, can be reported with any of many choices under Type of Material First Ignited (reporting not required for organic or general materials):

- Natural gas
- Liquefied petroleum (LP) gas
- Anaesthetic gas
- Acetylene gas
- Hydrogen
- Other (unclassified or unknown type) flammable gas
- Class 1A flammable liquid
- Class 1B flammable liquid excluding gasoline
- Class II combustible liquid
- Gasoline
- Class 1C flammable liquid
- Class IIIA combustible liquid
- Class IIIB combustible liquid
- Other (unclassified or unknown type) flammable or combustible liquid
- Fat or grease
- Non-food grease
- Polish, paraffin or wax
- Adhesive, resin, tar or glue
- Applied paint or varnish
- Combustible metal
- Solid chemical
- Radioactive material
- Other (unclassified or unknown type) volatile solid or chemical
- Wood chips, sawdust or wood shavings
- Round timber
- Sawn wood
- Plastic
- Rubber excluding synthetic rubber
- Cork
- Leather
- Hay or straw
- Grain or natural fiber
- Coal or coke
- Food or starch
- Tobacco
- Other (unclassified or unknown type) natural product
- Plywood
- Fiberboard or particleboard
- Wood pulp
- Paper
- Cardboard
- Other (unclassified or unknown type) wood or paper
- Fabric or fiber excluding fur and silk
- Fur or silk
- Wig
- Human hair

- Plastic-coated fabric
- Other (unclassified or unknown type) fabric, textile or fur
- Linoleum
- Oil cloth
- Asphalt-treated material
- Other (unclassified or unknown type) material compounded with oil
- Multiple types of material
- Other (unclassified or unknown type) type of material
- Undetermined

**Reporting of factors in ignition** (ISO 17755-1, page 107)

Yes, these are the choices under Factor Contributing to Ignition, excluding those cited earlier:

- Abandoned or discarded material or product
- Heat source too close to combustibles
- Cutting or welding too close to combustibles
- Flammable liquid or gas spilled
- Improper fuelling technique
- Flammable liquid used to kindle fire
- Washing or painting part or material with flammable liquid
- Improper container
- Other (unclassified or unknown type) misuse of product or material (also linked to “playing with fire”)
- Automatic control failure
- Manual control failure
- Leak or break
- Worn out
- Backfire
- Improper fuel used
- Other (unclassified or unknown type) mechanical failure or malfunction
- Design deficiency
- Construction deficiency
- Installation deficiency
- Manufacturing deficiency
- Other (unclassified or unknown type) design, manufacturing or installation deficiency
- Collision, knock down, run over, turn over.
- Accidentally turned on or not turned off
- Equipment unattended
- Equipment overloaded
- Failure to clean
- Improper start-up or shutdown procedure
- Equipment not used for intended purpose
- Equipment not operated properly
- Other (unclassified or unknown type) operational deficiency
- Rekindle
- Outside or open fire for debris or waste disposal
- Outside or open fire for warming or cooking
- Agriculture or land management burn
- Other (unclassified or unknown type) fire spread or control (also linked to exposure fire)
- Other (unclassified or unknown type) factor contributing to ignition

**Reporting of factors in fire growth** (ISO 17755-1, pages 108-111)

Yes, a data element on Primary Item Contributing to Fire Spread is available with the same choices shown for Item First Ignited.

Also can be reported with any of the many choices under Fire Suppression Factors, shown below.

- Roof collapse
- Roof assembly combustible
- Ceiling collapse
- Holes or openings in walls or ceilings
- Wall collapse
- Difficult to ventilate



- Combustible interior finish
- Balloon construction
- Internal arrangement of partitions
- Internal arrangement of stock or contents
- Floor collapse
- Lack of fire barrier walls or doors
- Transoms
- Attic undivided
- Insulation combustible
- Stairwell not enclosed
- Elevator shaft
- Dumbwaiter
- Vertical duct
- Rubbish or laundry chute
- Supports unprotected
- Composite plywood I-beam construction
- Composite roof/floor sheathing construction
- Wood truss construction
- Metal truss construction
- Bars on windows or other fixed burglar protection assemblies
- Quick release failure of bars on windows or doors
- Previously damaged by fire
- Other (unclassified or unknown type) building construction or design
- Door left open or outside door unsecured
- Fire door blocked or did not close properly
- Violation of applicable or locally adopted fire, building or life safety code
- Illegal or clandestine drug operation
- Intoxication by alcohol or other drugs
- Riot or civil disturbance
- Person interfered with operation
- Accelerant used
- Other (unclassified or unknown type) act or omission
- Aisle blocked or improper width
- Significant and unusual fuel load from structure components
- Significant and unusual fuel load from contents of structure
- Significant and unusual fuel load outside from natural environment conditions
- Significant and unusual fuel load from man-made condition
- Improper storage
- Radiological hazard on-site
- Biological hazard on-site
- Cryogenic hazard on-site
- Hazardous chemical, corrosive material or oxidizer
- Flammable or combustible liquid hazard
- Explosives hazard present
- Decorations
- Natural or other lighter-than-air gas present
- Liquefied petroleum (LP) or other heavier-than-air gas present
- Combustible storage extending more than 12 feet above ground
- High rack storage
- Other (unclassified or unknown type) on-site materials
- Delayed detection of fire
- Delayed reporting of fire
- Alarm system malfunction
- Alarm system shut off for valid reason
- Alarm system inappropriately shut off
- Unable to contact fire department
- Information incomplete or incorrect
- Communications problem
- Blocked or obstructed roadway

- Poor or no access for fire department apparatus
- Traffic delay
- Trouble finding location
- Size, height or other building characteristic delayed access to fire
- Power lines down or arcing
- Poor access for firefighters
- Secured area
- Guard dog
- Aggressive animal excluding guard dog
- Suppression delayed due to evaluation of hazardous or unknown materials at incident scene
- Locked or jammed door
- Apparatus failure before arrival at incident
- Hydrant inoperative
- Air space restriction
- Military activity
- Closest apparatus unavailable
- Other (unclassified or unknown cause) delay
- Automatic fire suppression system problem
- Automatic sprinkler or standpipe connection problem
- Water supply (private) inadequate
- Water supply (public) inadequate
- Electrical power outage
- Delayed reporting of fire
- Alarm system malfunction
- Alarm system shut off for valid reason
- Alarm system inappropriately shut off
- Unable to contact fire department
- Information incomplete or incorrect
- Communications problem
- Blocked or obstructed roadway
- Poor or no access for fire department apparatus
- Traffic delay
- Trouble finding location
- Size, height or other building characteristic delayed access to fire
- Power lines down or arcing
- Poor access for firefighters
- Secured area
- Guard dog
- Aggressive animal excluding guard dog
- Suppression delayed due to evaluation of hazardous or unknown materials at incident scene
- Locked or jammed door
- Apparatus failure before arrival at incident
- Hydrant inoperative
- Air space restriction
- Military activity
- Closest apparatus unavailable
- Other (unclassified or unknown cause) delay
- Automatic fire suppression system problem
- Automatic sprinkler or standpipe connection problem
- Water supply (private) inadequate
- Water supply (public) inadequate
- Electrical power outage

**Presence and type of sprinkler or other extinguishing equipment (ISO 17755-1, page 114)**

**Presence; only one system can be reported.**

- Present
- Partial
- None present
- Undetermined

**Type of system; choose the system present in the area of fire origin, and if there are multiple systems in the area, choose the system designed to protect the hazard where the fire started:**

- Wet-pipe sprinkler system
- Dry-pipe sprinkler system
- Other sprinkler system (including deluge or pre-action sprinkler system)
- Dry chemical system
- Foam system
- Halogen-type system (including nonhalogenated systems that operate on same principle)
- Carbon dioxide system
- Other special hazard system
- Undetermined

**Performance of sprinkler or other extinguishing equipment (ISO 17755-1, page 116)**

**Operation of system**

- Operated and was effective
- Operated and was not effective
- Fire too small to activate system
- System did not operate
- Other operation
- Undetermined

**Number of sprinkler heads operating.**

**Reason for system failure [or ineffectiveness]**

- System shut off
- Not enough agent discharged to control the fire
- Agent discharged, but did not reach the fire
- Inappropriate system for the type of fire
- Fire not in area protected by the system
- System components damaged
- Lack of maintenance, including corrosion or heads painted
- Manual intervention defeated the system
- Other reason system not effective
- Undetermined

**Presence and type of detection or alarm equipment (ISO 17755-1, page 120)**

Yes, included in reporting.

**Presence within designed range of fire; only one system can be reported.**

- Present
- None present
- Undetermined

**Type of detector; choose the system present in the area of fire origin:**

- Smoke detector
- Heat detector
- Combination smoke and heat detector in a single unit
- Sprinkler, water flow detection
- More than one type present
- Other detector type
- Undetermined

**Detector power supply:**

- Battery only
- Hardwire only
- Plug-in
- Hardwire with battery backup
- Plug-in with battery backup
- Mechanical, including spring-wound, stored pressure source
- Multiple detectors and power supplies
- Other detector power supply
- Undetermined

**Performance of detection or alarm equipment (ISO 17755-1, page 124)**

**Operation**

- Fire too small to activate detector
- Detector operated
- Detector failed to operate
- Undetermined

**Effectiveness.**

- Detector alerted occupants, occupants responded
- Detector alerted occupants, occupants failed to respond
- There were no occupants
- Detector failed to alert occupants
- Undetermined

*For confined fires, where reduced reporting is permitted, there is a mandatory question that covers some of this information*

- Detector alerted occupants
- Detector failed to alert occupants
- Unknown

**Reason for system failure [or ineffectiveness]**

- Power failure or hardwired detector shut off or disconnected
- Improper installation or placement of detector
- Defective detector
- Lack of maintenance, including not cleaning
- Battery missing or disconnected
- Battery discharged or dead
- Other detector failure reason
- Undetermined

**Presence of extinguishers or other manual extinguishing equipment (ISO 17755-1, page 126)**

No, not included in reporting.

**Presence of smoke management or control equipment by country (ISO 17755-1, page 127)**

No, not included in reporting.

**Reporting on fire doors, fire walls and other compartmentation (ISO 17755-1, page 129)**

No, not included in reporting since 1999. During 1980-1983, the USA used codes similar to those still used in Canada. Some of those codes were used until 1998.

References of existing database/studies

“Conquering the Unknowns” (2014). Report by the [National Association of State Fire Marshals Fire Research and Education Foundation](#).

Butry, DT, Thomas, DS. (2012). Evaluating Potential Bias in Non-Randomly Reported Fire Incident Data. National Institute for Standards and Technology. Technical Note 1770. [https://tsapps.nist.gov/publication/get\\_pdf.cfm?pub\\_id=912210](https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=912210)

Anderson, A, Ezekoye O. (2017). Exploration of NFIRS Protected Populations Using Geocoded Fire Incidents. *Fire Technology*. <https://i-psdi.org/assets/research/exploration-of-nfirs-protected-populations-using-geocoded-fire-incidents.pdf>

United States Fire Administration. (2017). Review and Assessment of Data Quality in the National Fire Incident Reporting System. [https://www.usfa.fema.gov/downloads/pdf/publications/nfirs\\_data\\_quality\\_report.pdf](https://www.usfa.fema.gov/downloads/pdf/publications/nfirs_data_quality_report.pdf)

NFPA 901, Standard Classifications for Incident Reporting and Fire Protection Data [www.nfpa.org/901](http://www.nfpa.org/901)

### Summaries of existing database

The National Fire Incident Reporting System (NFIRS) relies upon local fire departments to collect and submit data to state fire protection agencies or through their server partitions. Data is then processed by the state agencies and submitted or released to the National Fire Data Center. NFIRS was created following the publication of *America Burning* in 1973 by the National Commission on Fire Prevention and Control. This report culminated in the passage of the Federal Fire Prevention and Control Act of 1974, which authorized the USFA to gather and analyze information on the magnitude of the nation's fire problem, as well as its detailed characteristics and trends. NFIRS has been through several iterations since its initial release. USFA has developed a standard data collection package that includes separate forms for incidents and casualties (fatal and non-fatal, firefighters and civilians), a coding structure for data processing purposes, reference guides, computer software and procedures, documentation and a [National Fire Academy](#) training course for utilizing the system. While reporting is voluntary at the federal level, different states have different reporting requirements, ranging from mandatory for all incidents to completely voluntary.

### Existing definitions

A data dictionary with a list of definitions is available [here](#).

### Are there differences within the same country?

Incident reports and data elements are standardized. Completeness of data entered into incident reports may vary by locality.

There are differences in interpretation. "Burnt food" may be considered a fire, excessive heat, a smoke scare, or a false alarm. The data dictionary is used in software but lacks detail found in the is used in software but lacks detail found in the *NFIRS 5.0 Complete Reference Guide* See

- <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Emergency-responders/osNFIRSIncidentType.ashx?la=en>
- [https://www.usfa.fema.gov/downloads/xls/NFIRS\\_Spec\\_Tables\\_2013.xls](https://www.usfa.fema.gov/downloads/xls/NFIRS_Spec_Tables_2013.xls)
- [https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS\\_Complete\\_Reference\\_Guide\\_2015.pdf](https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS_Complete_Reference_Guide_2015.pdf)

It appears that career firefighters are more likely to document firefighter injuries.

Many non-fatal civilian injuries are not captured by the fire service. See CSPC's 2005 analysis, *Estimates of Fire Injuries Treated in Hospital Emergency Departments* by David Miller at:

<https://www.cpsc.gov/s3fs-public/pdfs/neissfire.pdf> . He found that an estimated 21,174 of 48,202 civilian non-arson fire injuries resulted from residential or consumer-product fires attended by fire departments from July 1, 2002 to June 30, 2003. NFPA estimated totals of 18,425 civilian injuries in 2002, and 18,125 in 2003, including injuries caused by arson. Some of the injured may have left the scene before the fire department arrived or been transported by a non-fire department organization.

### Are there differences and contradictions with other domains?

There are no differences within NFIRS domains. However, there are some differences with the ICD-10 coding of death certificates. For instance, NFPA counted the fatalities in the World Trade Center and Pentagon attacks as fire deaths, The death certificates called them terrorism. It can also be unclear to determine when vehicle fire deaths should be counted as transportation events rather than fires in the ICD-10 codes.

Small fires that did not require suppression but result in death – such as fatal burns caused by smoking while on oxygen -- may be considered EMS and not fire deaths based on the responder. , who may be emergency medical crews not affiliated with the fire department.

NFPA's estimates of fire deaths derived from our fire department experience survey seem close to fire death data. See pages 7-8 of NFPA's 2019 report, *US Fire Death Rates by State* at: <http://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/osstate.pdf>

### Identification of missing information

Missing data is a long-established problem with NFIRS. Undetermined or missing information on fire cause is a particular concern and is seen to be especially prevalent in the case of more serious fires, as indicated in a 2014 report by the [National Association of State Fire Marshals Fire Research and Education Foundation](#).

Some jurisdictions refuse to report dollar loss. Some have policies that require causal information to be reported as undetermined when fires are referred for investigation.

To make it easier for firefighters, information about causal factors and details on fire protection are not required for six types of structure fires, collectively called confined fires. These include: confined cooking fires, confined chimney or flue fires, confined fuel burner or boiler fires (mostly oil burner blowbacks), confined compactor fires, confined incinerator fires, and rubbish trash fires in or on a structure that did not extend to the structure or other contents. The type of material first ignited is not required for certain types of items first ignited, such as cooking materials, including food, dust, electrical wire, etc.

Some data elements were left optional. "None" is a choice in some data elements such as factor contributing to ignition and equipment involved in ignition that can seem like an easy out.

NFPA's [Fire Experience Survey](#) uses population and survey data to get big picture estimates that include fires reported to local fire departments but not in NFIRS.

USFA has been exploring the possibility of using more in-depth analysis of NFIRS to identify and compensate for unreported fires. See the 2017 white paper, National Fire Estimation Using NFIRS Data at <https://www.hsdl.org/?view&did=828558>.

## **X2. STATISTICS COLLECTION ISSUES**

### Fire department responsibilities

Fire departments are responsible for entering data with key details from the incidents for which they are dispatched, which include not only fires, but also emergency medical services, severe weather and natural disasters, and other incidents. Separate reports are filed for incidents and, if applicable, casualties (fatal and non-fatal). Firefighter casualties and civilian casualties utilize separate reports.

### Fire response organisation

Municipal fire departments (volunteer, career, and mix) participate. Department of Defense also participates, but their data is not publicly released. NFIRS and NFPA estimated generally do not include data from federal or state firefighting organizations or industrial fire brigades.

### Who collects data?

Fire departments are responsible for collecting data on calls that they respond to. In addition to fires, they include reports for emergency medical services, vehicle accidents, weather or natural disasters, and hazardous conditions. Incident reports of firefighter injuries include injuries during incident responses as well as non-incident events.

Police provide some data on arson and arson arrests to Federal Bureau of Investigation's (FBI's) Uniform Crime Reporting System. <https://www.fbi.gov/services/cjis/ucr>

Fire investigators can provide data to the Alcohol, Tobacco and Fire Arms' (ATF's) Bomb Arson Tracking System and use its case management features. See <https://www.atf.gov/explosives/bomb-arson-tracking-system-bats>. ATF also participates in some investigations.

The Chemical Safety Board investigates incidents involving chemicals. See <https://www.csb.gov/about-the-csb/>

The US Consumer Product Safety Commission's (CPSC's) National Electronic Injury Surveillance System (NEISS) collects data from a sample of hospital emergency departments about injuries caused by consumer products, and records if fire was involved and if the fire department attended. See <https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data>

NEISS collects less information is collected when a consumer product was *not* involved. Fires or burns are grouped together are grouped together in a database of non-fatal injuries. See: <https://www.cdc.gov/injury/wisqars/nonfatal.html>

The National Center for Health Statistics collects vital statistics, including death certificates. These may be accessed at <https://www.cdc.gov/injury/wisqars/fatal.html>.

NFPA collects summary data from a subset of local fire departments to estimate fires, civilian deaths and injuries, firefighter injuries and direct property damage from fire by broad incident type and property class through its fire experience survey (FES). Surveys are sent to all departments protecting at least 5,000 and a random sample of departments from less populated areas.

#### Who issues the data?

State programs at the state level. The United States Fire Administration provides the national database to interested parties. Narratives are not included in the public data release.

NFPA, USFA, and CPSC all release some type of national estimates of the fire problem with CPSC focusing on residential fire losses.

#### Are there different levels of collection?

Data at the state level includes data submitted by local fire departments. National data includes data on all incidents submitted by state agencies. Local fire departments may analyse their own data. NFPA, CPSC, USFA, consulting firms, students, etc. analyse the data

#### Identify disparities in data feedback

Since data is collected at local levels -- which vary by resources, staffing, and leadership -- there are substantial opportunities for disparities between jurisdictions related to the completeness and accuracy of data. Different fire departments and states provide different levels of quality control.

#### Where is the data stored?

State agencies house information submitted by local fire departments on their systems or in partitions on the federal server, or some combination of the two. The National Fire Data Center is the custodian of data at the national level.

### **X3. STATISTICS INTERPRETATION ISSUES**

#### **Who is interpreting the statistics?**

Each organization determines their approach to handling unknowns (and deciding what should be classified as unknown) and deciding how to group things.

#### Purpose for which data is collected

NFIRS data may be used by fire prevention and public education programs to target at-risk groups or to address critical problems, fire officials use the data in decision making that affects the allocation of firefighting resources, and consumer groups and litigators may use the data to assess product fire incidence. The NFIRS report may stand as the public record of an event. Engineers use it for modeling. Policymakers and administrators may use data to justify budgets and or support legislation related to fire issues. Regulators may use it in the evaluation of performance-based designs. Media uses it for context,

#### What are the methods used to fill the gaps where information is missing?

USFA seeks to accommodate missing information by including an “undetermined” option for many data elements and encouraging fire departments to update reports if and when a determination is made. In practice, however, information appears to be rarely updated once the undetermined selection is made. USFA does not make post-hoc statistical adjustments to its data in order to account for data gaps. The National Fire Protection Association, which uses NFIRS data in its own analyses, does apply a “scaling factor” in order to compensate for fires reported to fire departments but not to NFIRS, and allocate unknown values proportionally among known values. USFA uses a cause hierarchy of multiple data elements. If a fire does not “fit” anywhere, it is considered unknown. While NFPA allocates unknowns separately for each data element, USFA allocates only those that make it through the hierarchy. NFPA also allocates unknowns when sufficient data are provided for optional data elements.

#### Is there follow up to data collected ?

State program managers are responsible for cleaning data and reconciling inconsistencies prior to submission to the national level. Although causal information for incidents under investigation can be updated once an investigation is complete, this is frequently not done. While local records can be updated at any time, once the federal database is released, updates will not be incorporated

#### Analyse potential cause and consequences in trends

Data indicate that fires and losses in the U.S. have dropped dramatically since the early 1970s. Undoubtedly a number of factors play a role in this decline, but education, the adoption of more stringent fire codes, and increased use of fire detection are key factors. The recognition of fires as a serious problem in need of intervention and the introduction of NFIRS in the 1970s as a way to document where problems lay and solutions might be targeted must certainly be recognized as a vehicle for reducing the threat of fire.



#### X4. ANALYSE EXISTING DATA

##### Determining the level of confidence

USFA reports that approximately 75 percent of fires reported in the U.S. are included in the NFIRS database. More than 24,000 fire departments participated in NFIRS in 2018. In addition, 38 fire departments representing protected populations of more than 500,000 residents participate in NFIRS. Because NFIRS was not designed as a statistical sample, it is hard to determine levels of confidence. In addition, tensions exist between fire authority needs and NFIRS guidelines. For example, NFIRS has advised fire departments not to use NFIRS to report fatal fires if the fire department did not respond to them. See: [usfa.fema.gov/data/nfirs/support/nfirsgrams/nfirsgram\\_reporting\\_deaths\\_no\\_response.html](https://usfa.fema.gov/data/nfirs/support/nfirsgrams/nfirsgram_reporting_deaths_no_response.html).

However, a state may wish to have all of the fire deaths in their NFIRS database for analysis.

Little attention has been paid to the reliability of the data. It is clear that many firefighters who are doing their best to complete the reports disagree about how the reports should be coded.

A study of representativeness relating NFIRS to NFPA's FES was published in 2011, See: [reginfo.gov/public/do/DownloadDocument?objectID=53926600](https://reginfo.gov/public/do/DownloadDocument?objectID=53926600)

##### Pinpointing issues and limitations

- The United States Fire Administration places a heavy reliance upon states as cooperative partners in administering the NFIRS program. USFA shoulders significant developmental costs and responsibilities, but much of the cost burden for NFIRS is carried by the states. No federal funding is provided to states for personnel, and USFA provides no guidelines for the staffing of state NFIRS programs. Consequently, the levels and form of staffing and the resources available to NFIRS programs varies from state to state. Staffing for better-resourced state NFIRS programs may include multiple administrative, research, and support staff. Other states with fewer resources may rely upon a single person. Some state programs include full-time research analysts, while others rely upon administrators, information technology staff, or investigators to run their programs, often on a part-time basis.

Resource disparities also influence the level and sophistication of the technology utilized by state NFIRS programs. USFA provides basic – but not particularly sophisticated – software to states at no cost, but individual fire departments or states can choose their own software. Some state programs provide licenses to a specific software vendor, and large fire departments may have software integrated with computer assisted dispatch in custom systems. The variety of systems within and between states makes it difficult to introduce changes in the NFIRS system. In addition, because USFA is within the U.S. Department of Homeland Security, security requirements also complicate the introduction of changes and makes them more expensive.

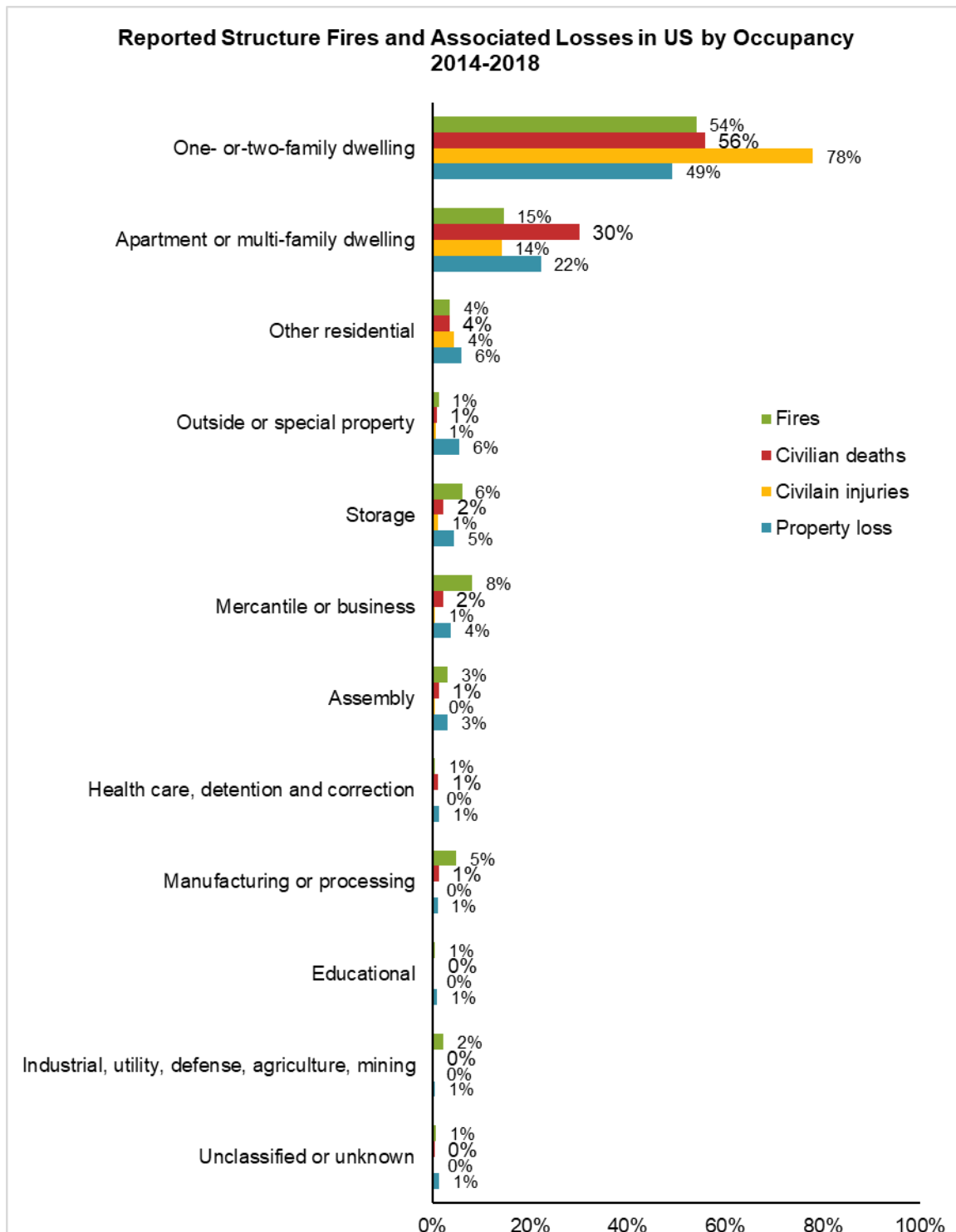
It is also important to recognize that funding at both federal and state levels is subject to the vicissitudes of both the policy environment and economic conditions, making the sustainability and consistency of support for NFIRS a potential ongoing challenge.

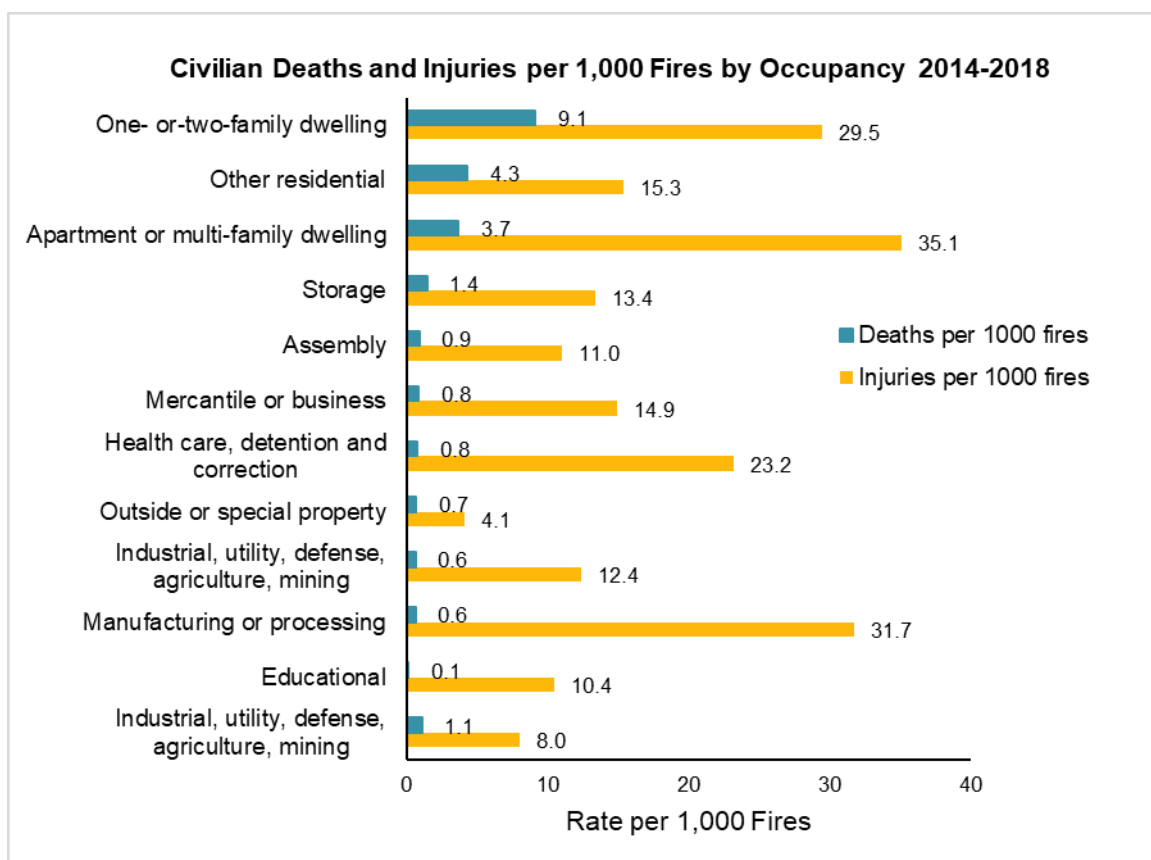
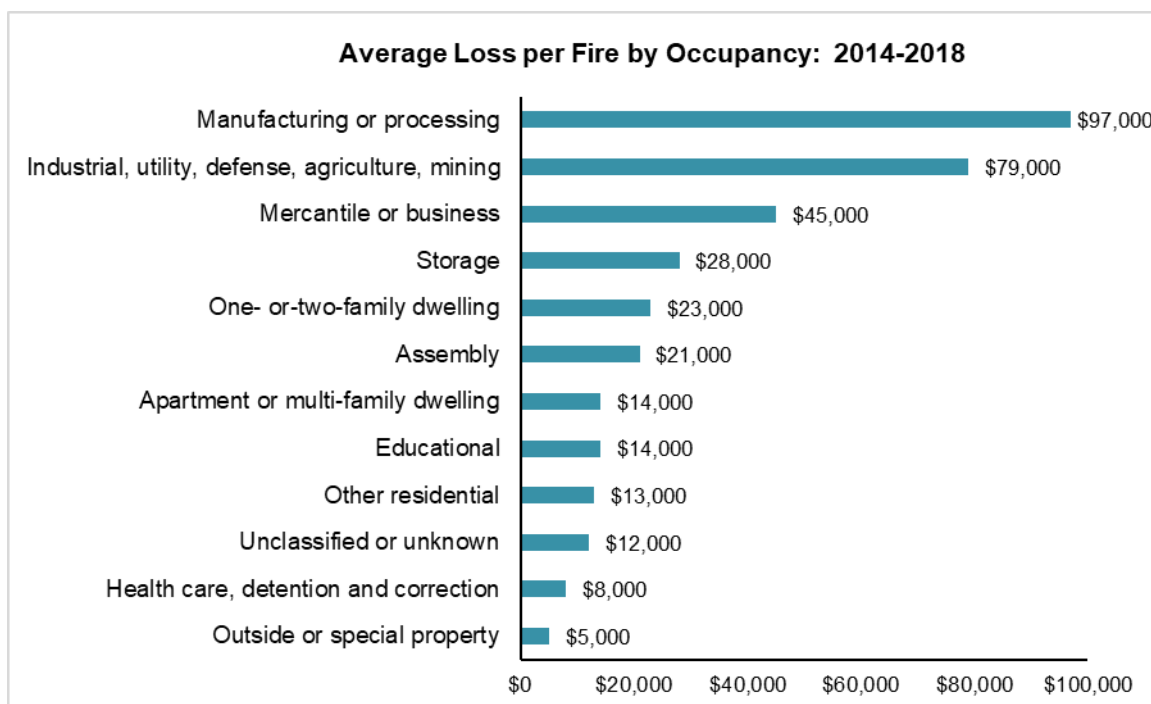
- As indicated, missing data is a serious issue which compromises data quality. The reliance on firefighters as primary data collectors is a recognized barrier inasmuch as firefighters are not trained researchers and have substantial responsibilities that can diminish attention to data collection and reporting. Liability concerns can also discourage complete reporting of information. Funding and resource limitations can undermine support for data collection, including participation in training and access to computer and software support. Another issue with respect to the completeness and accuracy of reporting is that NFIRS codes are seen to be overly complex, resulting in frustration that can deter reporting.

Efforts to improve quality of data with new relational edits have at times had unintended consequences. For example, requiring a valid equipment involved in ignition when heat source or factor contributing to ignition resulted in more unknowns in those fields. This edit was later removed.

Because the list of code choices is so long for many data elements, many fire departments use cheat sheets with the most commonly used code choices. More rarely used codes may be completely forgotten.

Examples





**Key Findings from NFPA’s Fire Experience Survey** (<https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/osFireLoss.pdf>):

In 2019, local fire departments responded to an estimated 1.3 million fires. These fires caused roughly 3,700 civilian fire deaths and 16,600 reported civilian fire injuries. Property damage was estimated at \$14.8 billion.

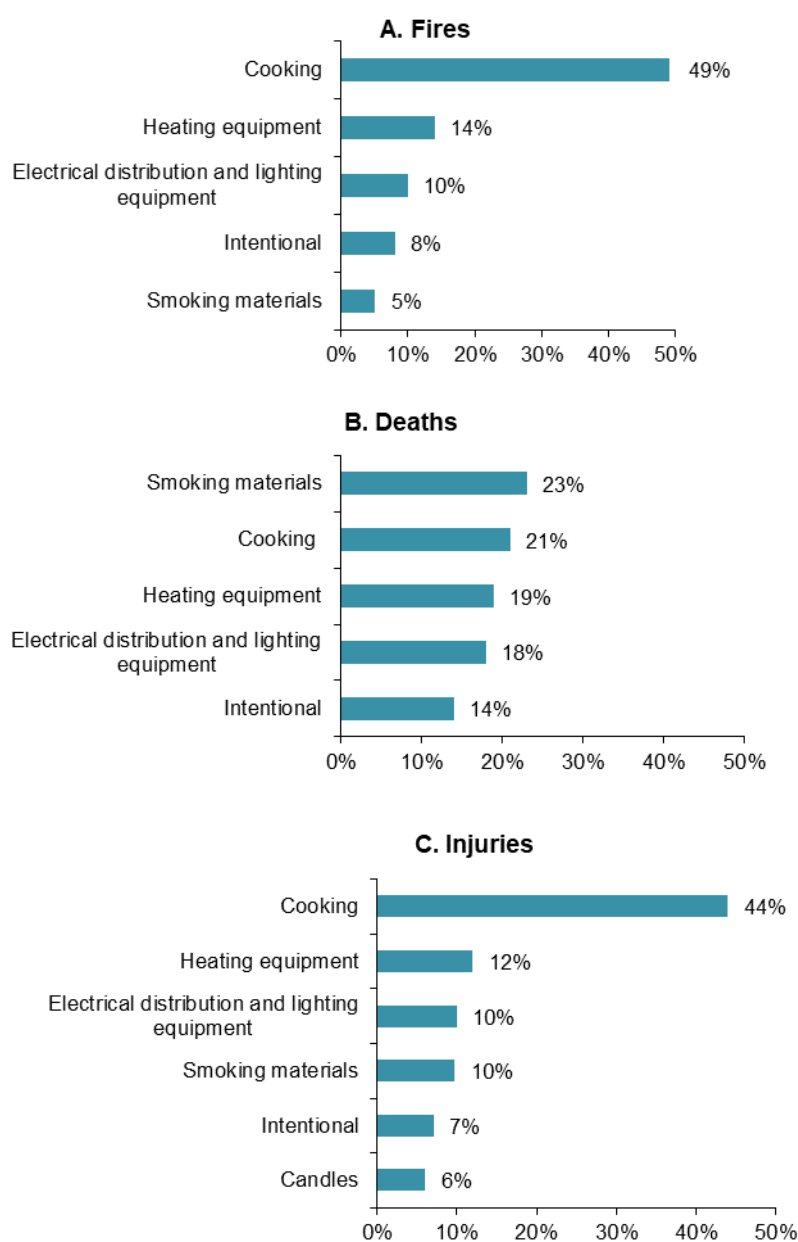
**Key Findings from NFPA Home Structure Fire Report:**

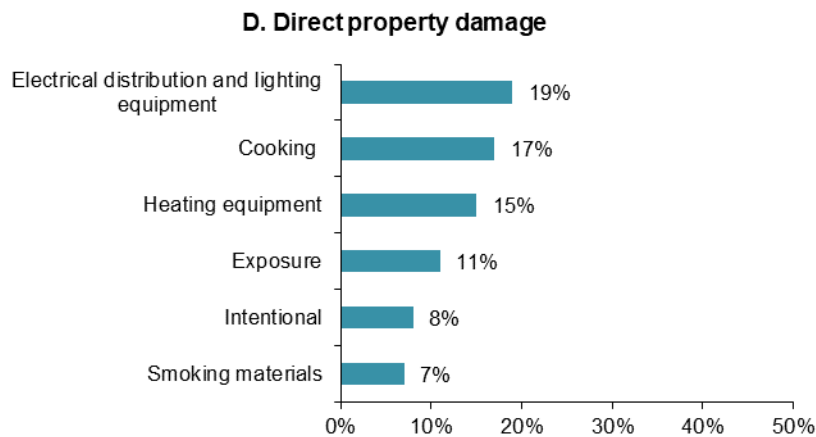
During 2014 - 2018, US fire departments responded to an estimated average of 353,100 home structure fires per year. These fires caused an annual average of 2,620 civilian deaths, 11,030 civilian fire injuries, and \$7.2 billion in direct property damage.

Sixty-nine percent of reported home fires in 2014–2018 were in one- or two-family homes, including manufactured homes. These fires caused 85 percent of home fire deaths, 65 percent of home fire injuries, and 79 percent of the direct property damage from home fires.

Most home fires and fire casualties result from five causes: cooking, heating equipment, electrical distribution and lighting equipment, intentional fire setting, and smoking materials. Over the five-year period of 2014–2018 as a whole, cooking was the leading cause of home fires and home fire injuries, while smoking was the leading cause of home fire deaths.

**Leading causes of home structure fires: 2014–2018**





**Key Findings from NFPA Fires in Structures under Construction or undergoing Major Renovation report** (<https://www.nfpa.org/News-and-Research/Data-research-and-tools/Building-and-Life-Safety/Fires-in-Structures-Under-Construction-or-Renovation>):

Local fire departments responded to an estimated average of 3,840 fires in structures under construction and 2,580 fires in structures under major renovation per year in 2013-2017. The fires in structures under construction caused an average of four civilian deaths, 49 civilian injuries, and \$304 million in direct property damage annually, while those in structures under major renovation caused averages of eight civilian deaths, 52 civilian injuries, and \$104 million in direct property damage annually.

## 1<sup>ST</sup> PROGRESS REPORT

### TASK 1: TERMINOLOGY AND DATA COLLECTION METHODOLOGY

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EU FireStat - Closing data gaps and paving the way for pan-European Fire Safety Efforts

**Contractor** European Commission  
Directorate General For Internal Market, Industry, Entrepreneurship  
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**LIST OF ABBREVIATIONS**

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BAM	Bundesanstalt für Materialforschung und –prüfung
CFS-CTIF	Centre for Fire Statistics of CTIF
DBI	Danish Institute of Fire and Security Technology
EC	European Commission
EU	European Union
EuroFSA	European Fire Safety Alliance
LU	Lund University
MS	Member State
NFPA	National Fire Protection Association
PT	Project Team
UoE	The University of Edinburgh
VFDB	Vereinigung zur Förderung des Deutschen Brandschutzes

## **EXECUTIVE SUMMARY**

---

Task 1 of the EU FireStat project is focused on understanding the terminology and data collection methodology used by the 27 EU Member States and 8 Other European and Non-European countries (Australia, Canada, New Zealand, Norway, Russia, Switzerland, UK and USA); a total of 35 countries were examined. The 8 Other European and Non-European countries have been chosen based on their structured and detailed fire statistics.

The aims of Task 1 are mainly focused on increasing the awareness of the data fields collected in the various countries fire statistics and understanding the definitions provided for the terminologies adopted in those statistics. It is important to evaluate the variables collected related to the pre- and post-fire conditions of fire incidents that affect buildings.

In Task 1 summary tables were created for each country examined and these tables focused on major areas of investigation, such as: fire incident, building description, fire causes, fire consequences, fatalities, casualties, fire safety measures, fire response, fire costs, and fire prevention. The differences that may appear in the fields recorded in the summary tables of the countries investigated are due to the differences in the fire statistics and collection methodologies available in each of them. The summary tables are subdivided into two parts: Part 1 relates to the definitions adopted in the fire statistics and Part 2 relates to the data collection methodology and available fields recorded in the fire statistics. One aspect to consider is that not all the fire statistics of the countries examined were structured in a way that enabled the completion of Part 1 and Part 2 and thus there is a difference in the number of countries investigated for the definitions and fields recorded in the fire statistics.

Abstracts of the summary tables are described in Section 2 for 24 EU and 8 Other European and Non-European countries, and a general description of the current practice of fire statistics in each country is provided. This description highlights the responsible authorities and challenges faced by the consortium groups in gathering the information. In addition, it gives a short description of Parts 1 and 2 of the summary table and examines key aspects and limitations encountered in the process.

Part 1 is focused on the definitions and the related tables for 15 EU and 8 Other European and Non-European countries are available in Appendix I and Appendix II, respectively. The references for each fire statistics have been specified in the tables provided in Appendix I and Appendix II where each definition is related to the specific recording system with the appropriate links, where possible. In Section 3, the evaluation of the analogies and differences in the definitions provided in the fire statistics has been developed considering the major areas of investigation and comparing the terminologies used with those provided by ISO/TS 17755-2:2020(E). The fields recorded in the fire statistics for 21 EU and 8 Other European and Non-European countries are investigated in Part 2 of the summary table, which is considering the major areas of investigation, as discussed in Section 4.

It is suggested to link the considerations presented in the abstract of Section 2 with the definitions provided in Section 3 and the fields covered by the various fire statistics in Section 4.

Overall, the research developed in Task 1 will contribute to subsequent tasks in the EU FireStat project as well as towards a better understanding of current practices, thus identifying optimization measures and providing insights towards harmonised fire statistics.

## 1. INTRODUCTION

---

### 1.1. TASK 1 PROJECT OVERVIEW

The data collected in the aftermath of real fire incidents in various building types can vary significantly according to the country considered, who collects the data, the specific data fields recorded, how each field is defined, and the collection methodology adopted. In Europe, a single unique fire statistics terminology and methodology system is not yet available and each Member State has its own recording system, fire statistics fields, and data elaboration. Moreover, within a country, several databases of fire statistics, not always publicly available, could be present and managed by various organizations.

Data are usually collected by the fire brigades attending the fire scene in the aftermath of an event and inserted into an online database. However, in some circumstances, data collection is voluntary and/or uses a paper-based collection system, and fire incident information could also be provided by police, private and state fire investigators, fire engineers and insurance companies. Even though similar terminology and factors of the fire statistics may be encountered in various recording systems, their meanings and definitions can vary also based on the relevance that these fields assume in the various fire statistics. Such inconsistencies often lead to challenges and have the potential for errors particularly when the data are compared between countries.

Based on the above, the aim of Task 1 of the EU FireStat project is to increase the awareness of the fire statistics available, deeply investigate the semantic differences used in the fire safety fields and the recording approaches for the information gathered. Task 1 is focused on the terminologies and data collection methodologies of the **27 EU Member States** and **8 Other European and Non-European countries** (Australia, Canada, New Zealand, Norway, Russia, Switzerland, UK and USA) for a total of 35 countries examined. The two objectives of Task 1 mainly cover the:

1. Terminology
  - to create a complete inventory of the terminology adopted regarding pre and post-fire incident conditions in various building types.
2. Data collection methodology
  - to create an overview of which fire data are collected;
  - to create an overview of when they are collected;
  - to record who collects the information; and
  - to establish the quality assurance process adopted.

Task 1 started on 22<sup>nd</sup> September 2020 and ended on 22<sup>nd</sup> February 2021. The following report presents the progress developed, main findings and specific conclusions obtained from the research.

In Task 1, the research is focused on the analysis of the definitions and fields recorded in the fire statistics of EU, Other European and Non-European countries. For each of them, in the abstracts provided, it is specified who collects the fire statistics, the recording system adopted, and the origin of the information gathered. Instead of providing a unique list of reference at the end of the report, the references have been specifically addressed for each country investigated in the tables provided in Appendix I and Appendix II where each definition is related to the specific recording system. Moreover, in the references, where available, links to this information have been provided. Furthermore, analysing the forms in and by themselves is somewhat beyond the scope of this task, particularly given the large number of languages involved.

Our project has the goal to provide a clear understanding of the fire statistics related to buildings subjected to fire incidents and does not include the evaluation of “near misses” which are usually not collected in the recording systems examined. For instance, in Scandinavia, reports can be created for fire spread in criminal cases, to judge how dangerous it could have been for human beings/property, if accidental circumstances had not prevented fire spread. These evaluations represent a useful field of investigation to identify physical and societal hazards and support the creation of preventive measures. The collection of “near misses” implies, in some cases, a detailed and challenging assessment able to determine benefits for user input. However, such reporting could also result in uncertainty in the data. Furthermore, it would also require a new system able to describe such investigation and could lead to a much higher need for resources to check the correctness and treat the data once a reporting system is in place.

The outputs generated in Task 1 intend to inform the European Commission and Parliament, National and Local authorities, regulators, policymakers, Fire and Rescue Services, International Fire Safety Community and the General Public. Furthermore, the analyses will hopefully contribute to a thorough evaluation of current practices, including identification of missing fields that are relevant to fire safety.

## 1.2. METHODOLOGY

The methodology of Task 1 is based on the collection of fire statistics through publicly available information and by contacting the responsible organizations in Europe and the other international countries. Direct contacts in each of the countries investigated have been established and considered at the base of the outputs generated. Elaborations are determined through an analysis of the summary tables.

In detail, Task 1 is subdivided into 5 subtasks:

1. Creation of summary tables.
2. Terminology and data collection in EU, Other European and Non-European countries.
3. Contact with countries where fire statistics are not publicly available.
4. Contact respondents for follow-up questions.
5. Elaboration of the information.

The goal is the creation of **summary tables** for the **27 EU Member States** and **8 Other European and Non-European countries** to evaluate analogies and differences and increase the understandings of fire statistics. The summary table has been created considering and improving the information presented in Task 0 and is considered as a guide to follow where the differences that may appear in the structure of the countries examined are due to the differences in the fire statistics and collection methodology available in each of them. The summary table is adapted to the information gathered and is always structured in two parts: Part 1 definitions adopted and Part 2 data collection methodologies and available fields recorded in the fire statistics.

**Table 1: Fields covered in the major areas of investigations**

<b>FIRE INCIDENT</b>	Accidental fire Deliberate fire False alarm
<b>BUILDING DESCRIPTION</b>	Building fire Residential buildings Non-residential buildings
<b>FIRE CAUSES</b>	Fire causes Source of ignition Area of fire origin
<b>FIRE CONSEQUENCES</b>	Fire spread Fire horizontal spread Fire vertical spread Damage Fire Flame Smoke Water Total
<b>FATALITIES</b>	Victims Type of fatality
<b>CASUALTIES</b>	Injured people Type of injury
<b>FIRE SAFETY MEASURES</b>	Alarm Type of alarms Automatic extinguishing systems Type of automatic extinguishing systems Compartmentation Fire barriers Safe areas Smoke extractors Fire brigades on site Escape routes Evacuation
<b>FIRE RESPONSE</b>	Fire service time of response Occupant fire response
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs Indirect financial costs
<b>FIRE PREVENTION</b>	Fire regulations and prevention

Along with language barriers, confidentiality policies, private databases and lack of responses represent the most challenging aspects encountered while developing Task 1. The aforementioned risks have been overcome by establishing direct contact with the relevant authorities for the fire statistics of the countries, and by asking for their kind contribution to our project. The countries covered have been assigned to the consortium groups based on their location and existing interaction with relevant countries. It is really important to acknowledge the precious collaboration and cooperation of the relevant authorities and fire brigades who kindly provided the information necessary to fill in the summary tables and allow the comparisons between countries.

The aspects of the fire statistics examined in each summary tables developed in Task 1 cover pre- and post-fire conditions of fire incidents in buildings, and they have been classified according to 10 major areas of investigation: fire incident, building description, fire causes, fire consequences, fatalities, casualties, fire safety measures, fire response, fire costs, and fire prevention. As shown in Table 1, many of the 10 major areas of investigation have various subcategories and the relevant authorities have been asked to indicate the fields covered in their fire statistics. Considering the major areas of investigation, the summary tables could partially bias the information received from the various countries. However, defining generic groups was necessary to have a method of comparison.

From the analysis developed, it appears difficult to evaluate the mandatory and optional fields collected by the various fire statistics. Within a specific country, fire statistics could be a voluntary system, differently managed at a local level or, considering a unique recording system (e.g., UK), only a number of fields are mandatory while others could be filled in only if specific fire conditions appear. In the description provided by the abstracts, such differences have been highlighted to provide a clear overview of current practice in various countries.

The consortium has created summary tables for a total of 35 countries. Unfortunately, no information has been received for Luxembourg, Malta and Portugal, and limited information for Lithuania and Spain. Therefore, the fire statistics of 24 EU countries and 8 Other European and Non-European countries have been investigated, thus 32 countries covered (Table 2).

For all the summary tables developed in Task 1, a short abstract is provided in Section 2. The information collected has been summarised in Section 2 for EU, Other European and Non-European countries, based on the relevant information and the methodology adopted to provide descriptions about:

- who collects the fire statistics;
- if fire statistics are national or local;
- the number of datasets available;
- if definitions for each field of the fire statistics are provided, given by classification or not available; and
- the various fields recorded in the fire statistics.

Part 1 of the summary tables related to the definitions is provided in Appendix I for the EU and Appendix II for the Other European and Non-European countries. Where no definition is available and the specific fields are included in dropdown menu, this is clearly stated. The possible responses in Appendix I and Appendix II have to be considered as follows:

- "a": fields available,
- "b": definitions not available, and
- "c": fields not clear to the relevant authority of the fire statistics.

A deep analysis of the definitions determining analogies and differences is described in Section 3 with a comparison with the terminology provided by the ISO/TS 17755-2:2020(E) (named ISO TS 17755-2 in this document). A semantic evaluation of the definitions is fundamental to understand what is covered by each term and allows correct comparisons amongst variables. Unfortunately, not all the countries considered in Task 1 have an available glossary or list of definitions for the fire statistics. Therefore, the analysis is focused on the definitions available for fire incidents, fatalities and casualties, damage, safety measures, response time and the financial costs of fire for 23 countries (15 EU and 8 Other European countries).

Part 2 of the summary table, focused on the fields recorded in the various fire statistics, is summarized in Section 4 based on the major areas of investigation highlighted in Table 1 for a total of 29 countries (21 EU and 8 Other European and Non-European countries).

**Table 2: Summary tables completed for the EU, Other European and Non-EU countries specifying where definitions and fields recorded in the statistics are available.**

EU-27	DEFINITIONS	STATISTICS FIELD	STATUS	COMMENT
Austria	YES	YES	Completed	
Belgium	NO	YES	Completed	
Bulgaria	NO	YES	Completed	
Croatia	NO	YES	Completed	
Cyprus	NO	YES	Completed	
Czech Republic	YES	YES	Completed	Part 1 - definitions given by law and government but not specified
Denmark	YES	YES	Completed	
Estonia	YES	YES	Completed	
Finland	YES	YES	Completed	
France	YES	YES	Completed	
Germany	YES	YES	Completed	
Greece	NO	NO	Completed	
Hungary	YES	YES	Completed	
Ireland	YES	YES	Completed	
Italy	YES	YES	Completed	
Latvia	NO	YES	Completed	
Lithuania	NO	NO	Limited information	
Luxembourg	NO	NO	No information received	
Malta	NO	NO	No information received	
Netherlands	YES	YES	Completed	
Poland	NO	YES	Completed	
Portugal	NO	NO	No information received	
Romania	YES	YES	Completed	
Slovakia	YES	YES	Completed	
Slovenia	YES	YES	Completed	
Spain	NO	NO	Limited information	
Sweden	YES	YES	Completed	
OTHER EUROPEAN AND NON-EUROPEAN COUNTRIES	DEFINITIONS	STATISTICS	STATUS	COMMENT
Australia	YES	YES	Completed	
Norway	YES	YES	Completed	
Canada	YES	YES	Completed	
USA	YES	YES	Completed	
New Zealand	YES	YES	Completed	
UK - England				
UK - Scotland	YES	YES	Completed	
UK - Wales				
UK – Northern Ireland	NO	NO		
Russia	YES	YES	Completed	
Switzerland	YES	YES	Completed	

The outputs of Task 1 of the EU FireStat project will be considered as inputs in Task 2, where data needed for decision making are evaluated, Task 3, focused on data collection methodologies, Task 4 where a unified terminology will be proposed. Finally, the results generated by Task 1 will increase awareness of the fire statistics collected in the countries examined. The research developed will highlight not only the differences and similarities of the terms, data recorded and methodology adopted in the fire statistics of various countries, but also the missing aspects necessary for the prevention of fire frequency and limitation of fire consequences that could be improved in short- and long-term. The outputs of Task 1 have to be considered as an extended map of fire statistics applied worldwide able to support future horizons of research and introduce a holistic approach based on the collaborations and cooperation amongst various nations in Europe and internationally.

## 2. ABSTRACT SUMMARY TABLES

---

Abstracts of the summary tables completed for 24 EU (Luxembourg, Malta and Portugal are not described) and 8 Other European and Non-European countries are presented in the following sections to provide an overview of the information gathered in Part 1 related to the definitions and Part 2 related to the fire safety fields recorded. In the abstracts, the fire statistics of each country is described considering the national or local recording system, the authorities responsible for the data collection and management with a description of the recording system and the datasets available. Challenges faced by the consortium groups for the collection of the relevant information, if any, are also introduced. A short description of Parts 1 and 2 of the summary table related to definitions and fields of the fire statistics available are present and key aspects and limitations encountered are examined. The information provided in the abstract of each country needs to be related to the available definitions provided in the tables of Appendix I and Appendix II.

### 2.1. EU COUNTRIES

#### 2.1.1. Austria

##### Fire statistics description

##### 1. On a national level:

In general, the Austrian Fire Prevention Associations collect data from the police stations and insurers for each federal state (excepting Vienna) and publish them yearly. Several fire statistics are gathered by the Upper Austrian Fire Prevention Association for creating and publishing an Austrian Fire Statistic, which is also published once a year. These statistics provide data in a superficial way only (number and loss by ignition source and federal state, number and loss by risk group and federal state, trend of lethal fire injuries, long-term statistic over 10 years).

Data Management-System in Fire Investigation:

In the years 2014 to 2017 a group of experts in fire investigation created a database-system to collect fire data in a structured way (Datenmanagement in der Brandursachenermittlung – DMBUE). Six of nine Austrian federal states participate in this data management-system up to now.

Since 2017, the participating Austrian Fire Prevention Associations collect information about fires including information of police stations and fire investigations conducted by the fire prevention associations.

##### 2. On a local level:

SIZ (Sicherheitsinformationszentrum)

<http://www.siz.cc/bund/sicherheit/show/231>

BVS - Brandverhütungsstelle für Oberösterreich

Property loss: <https://www.bvs-ooe.at/services-und-leistungen/brandschadenstatistiken/>

Landesstelle Steiermark, <http://www.bv-stmk.at/index.php/statistik>

Fires, property losses, fatalities and injuries (uploaded documents)

##### Collection of the information

Several different entities who collect fire data. Some of them are focused on property losses and fire causes, others seem to collect data about fatalities and injuries as well.

No national system but various local systems seem to be in place.

The DMBUE is a web-based tool to collect information about fire incidents. Primarily, the surveyors of the Austrian Fire Prevention Associations, that conduct fire investigation, feed data into the system. System-members connect to [www.brandursache.or.at](http://www.brandursache.or.at)

The gathered data are available typically to create statistics or requests.

##### Summary table – Part 1: Definitions

In the reporting systems, various fields are recorded such as fire incident date, time and location, building description, fire cause, fire loss, damage to person, alarm and several others.

##### Summary table – Part 2: Fields recorded in the fire statistics

Fire incident, building description, fire causes, fire losses, fatalities and casualties

##### Further comments

- Very fractured collection system as several institutions are collecting with different methods and terms.
- Limitations regarding the link between the different collections of data.
- Fatalities due to smoke inhalation, smoke is hazardous for inhabitants and firefighters (smoke layer ignition, backdraft etc.) (Brandschutzforum Austria- Heisse Zahlen).



- High property loss in a few numbers of industrial fires, these are not the fires with the most fatalities.
- Property loss is increasing over recent years.

### 2.1.2. Belgium

#### **Fire statistics description**

The fire statistics cover the entire country of Belgium and it is unknown the recorded number of fire incidents per year. The intervention report which represents the only form of data collection known to the consortium partner, does not cover many fields in the summary table. The intervention report is filled in by the first responders that were at the scene of the incident and the report is not solely used for fire incidents. It focusses on the interventions made by the fire brigades. Almost all fields of the intervention report consist of a dropdown menu.

#### **Collection of the information**

The summary table has been completed by the Dutch Fire Service Academy. An example of an intervention report was provided by the Belgium Ministry of Internal Affairs. There was a delay in the response and very limited information is available.

#### **Summary table – Part 1: Definitions**

In the intervention report, no definitions are described.

#### **Summary table – Part 2: Fields recorded in the fire statistics**

Remarkably, not much information is being collected about fatalities. Only the number of victims, their age (estimation) with a distinction is made between occupants and firefighters. No information on the causes is being collected and this makes Belgium one of the few countries that does not collect data on fire causes. Most data collection occur in the field of building description and the fire incident. Since an intervention report was received, many fields that are collected in that report are related to intervention of the fire brigade and does not only relate to fire incidents. Moreover, the field of fire response is covered by the intervention report. The presence of (automatic) smoke alarms is collected, but not the presence of (automatic) extinguishing systems, nor the presence of other fire safety measures.

### 2.1.3. Bulgaria

#### **Fire statistics description**

The fire statistics in Bulgaria is managed by Fire Safety and Civil Protection Chief Directorate, Ministry of Interior. The data is usually collected by the fire brigades in the aftermath of an event. The dimension of the dataset (number of incidents recorded per year) is 42,141 fire records in 2019. Therefore, one fire statistics dataset is available.

#### **Collection of the information**

No public access to the database. Inquiries through the responsible ministry are possible.

#### **Summary table – Part 1: Definitions**

In Bulgaria, the sources of fire statistics seem to have no link to definitions.

#### **Summary table – Part 2: Fields recorded in the fire statistics**

A written description of the national database is not available for the public. It is an internal document of the related ministry. The annual reports contain the following chapters and describe all the activities of fire services in Bulgaria: number of accidents and exits of fire and rescue equipment; fires with material losses distributed by reasons of occurrence; fires with material losses, broken down by industry; statistics on fire deaths and injuries; information on the performed activity; information on the performed activity in the field of preventive control; and training and preparation.

#### **Further comments**

A unique fire statistics dataset is present. No evaluation of the economic impact of fire is available.

#### 2.1.4. Croatia

##### **Fire statistics description**

The basis for the data collection on fires by the Croatian Fire Brigade Association was data collected by the Ministry of Interior and others compiled through analysis on about 50 data collection systems currently in existence in Croatia.

##### **Collection of the information**

The summary table has been completed based on the reports prepared by the Croatian Fire Brigade Association.

##### **Summary table – Part 1: Definitions**

Data collected in Croatia are number of fires by size by Croatian Firefighting Association, number of victims (deaths, injured, rescued persons, missing persons) by Ministry of the Interior, fire causes by Ministry of Interior, fires by fire objects (buildings types, sectors of industry, etc.) by Croatian Firefighting Association, and fire damage by Ministry of Interior. A unique database with nationwide definitions is not present.

##### **Summary table – Part 2: Fields recorded in the fire statistics**

There is no regular document with a description of fire recording rules available.

##### **Further comments**

A national fire statistics is not present.

No evaluation of the economic impact of fire is available.

The purpose of national fire statistics is: reducing the number of fires, reduction in the number of fire victims, reducing fire damage, elimination of the main causes of fire, increasing fire safety in the most important fire objects, reducing the environmental damage caused by fires, creation of stable fire-resistant infrastructure, increasing fire safety for children and the elderly, incident preparation, incident management, post analysing, financing of fire-fighting units, public relations.

#### 2.1.5. Cyprus

##### **Fire statistics description**

Data is collected by each fire station and then centralised in the headquarters of Cyprus fire service.

##### **Collection of the information**

All data are collected at the time of the incident by the Fire Operations Control Center.

##### **Summary table – Part 1: Definitions**

There is no information at present about definitions.

##### **Summary table – Part 2: Fields recorded in the fire statistics**

The statistics are calculated daily and cover the total number of fires, special services, and false calls, ambulances - by province, by the station and nationwide. They also contain the damage in euros if any, the number of injured, the number of dead, the total comparison with the previous year (increase or decrease in number). Fires are divided into urban and rural. The burned area in hectares is also calculated.

#### 2.1.6. Czech Republic

##### **Fire statistics description**

The Czech Republic collects the fire statistics according to the ISO 17755-1/2. Each region is responsible for collecting the fire statistics and the republic data are concentrated in Ministry of the Interior- Directorate General of the Fire Rescue Service of the Czech Republic

##### **Collection of the information**

The name of the national Fire Statistics Database is “Statistical monitoring of emergencies” (Statistické sledování událostí). In this programme, not only fire statistics are recorded but also all details of all emergencies in which the fire units intervened. This database is not public. The statistics can be found in the Statistical Yearbooks.

### **Summary table – Part 1: Definitions**

In the national database, detailed definitions are provided for almost all of the major areas of investigations with specific fields recorded. Evaluation of direct or indirect costs of fire is present.

### **Summary table – Part 2: Fields recorded in the fire statistics**

The typical contents of the statistical fire statistics yearbook are the following: individual types of events with fire service interventions, evacuated and rescued persons, number of interventions in natural disasters, summary information on events in the regions, interventions (including multiple) for individual types of events according to the type of intervention, basic information about intervention, death and injury of firefighters during interventions, events with the intervention of the chemical laboratory of the Fire and Rescue Service of the Czech Republic and aeronautics of other services, events involving military fire brigades, events in the territory under the administration of municipalities with extended powers, negative effects of interventions, events with fire service interventions by time of day, fires with damage of CZK 10 million and more, events in the 3<sup>rd</sup> and special alarm level, number of persons killed in fires, number of persons injured in fires, number of rescued persons, number of persons killed in traffic accidents, number of evacuees, and extraordinary events in the 3<sup>rd</sup>, and special alarm level.

### **Further comments**

A national fire statistics is present. Fire statistics is very detailed with clear definitions and the fields available cover the major areas of investigations. The Fire Rescue Service is responsible for collecting fire data, some information is collected also by insurance companies and Police of the Czech Republic. The Czech Republic collects all relevant data which are necessary for analysing the emergencies.

#### 2.1.7. Denmark

### **Fire statistics description**

The fire statistics in Denmark is national statistics. The data is usually collected by the fire brigades in the aftermath of an event in the ODIN database (online dataregistrering og indberetning). The inputs to the fire statistics are managed by the public body Beredskabsstyrelsen (DEMA). Other bodies, such as police, health authorities and insurances are also gathering data, which are not public.

### **Collection of the information**

The summary table has been completed based on DEMA, which is publicly available, and ODIN, which is not publicly available. However, the fire statistics of Denmark are published annually with a limited number of fields recorded.

### **Summary table – Part 1: Definitions**

DEMA provides some definitions for almost all of the 10 major areas of investigations with specific fields recorded. In particular, there is no definition for accidental and deliberate fires, but there are definitions for false alarms. Fatalities, fire safety measures, fire response and fire prevention are provided/specified. There are no clear definitions for causalities and the building description, fire causes and fire spread are described by a dropdown menu with clear classes. No evaluation of direct or indirect costs of fire is present.

### **Summary table – Part 2: Fields recorded in the fire statistics**

In Part 2, the majority of the fields are covered in ODIN, except for the evaluation of casualties and fire costs, which are evaluated by police, health authorities and insurances, but are not made public. Fire incidents, building description, fire causes and consequences are present, as well as fatalities, fire safety measures, fire response and fire prevention.

### **Further comments**

- A national fire statistics is present.
- Fire statistics in DEMA are present with some definitions and the fields available cover the major areas of investigations.
- No evaluation of the economic impact of fire is available

### 2.1.8. Estonia

#### **Fire statistics description**

The fire statistics cover the entire country of Estonia with approximately 5,000 fires per year. The dataset is a combination of different automatic logs and report forms and is collected by the Emergency Response Centre (log), the incident commander (report) and the fire investigator (report). The inputs to the fire statistics are mostly manual quality controlled and sometimes an automatic check for omissions is done. Potential errors in the database are removed if discovered in single reports or queries. All ERB staff members (brigades, planners, management) can access the database. This includes detailed incident reports on a need-to-know basis. Datasets issued for research projects are upon consideration.

#### **Collection of the information**

The summary table has been completed by the Estonian Rescue Board. There was no delay in the response and the summary table is complete, so there was no need for an update or a check.

#### **Summary table – Part 1: Definitions**

In the Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms), many detailed definitions are provided for almost all of the 10 major areas of investigations. Relevant, is the definition for Fire consequences: damage, namely "Property damage = [(building square metre value) \* (burnt area square metre)] \* [(100% - depreciation percentage) + sanitary repairs + renovation + capital repairs + warranty repair] / 100". This is quite detailed and seems well thought-out. Also, having a formal definition of what are false alarms differentiate Estonia from many countries. No definitions are available of type of automatic extinguishing systems, water, fire horizontal and vertical spread and (non-)residential building.

#### **Summary table – Part 2: Fields recorded in the fire statistics**

In Part 2, the majority of the fields are covered, except for fire costs, fire response of occupants. Themes covered are fire cause, source of ignition and room where the fire started. Also, descriptions of the building are provided by the building registry. Fatalities, casualties, responses of the fire brigades and many aspects of fire safety measures are covered by data collection in Estonia as well. The information recorded comes from automated registries, like the building registry query and the Emergency Response Centre. An exception is that age, gender, language, social status and disabilities of a fatality victim are added by a fire investigator and is therefore not added automatically.

#### **Further comments**

- Several definitions explained in details are available.
- Official data about injuries come from Estonian Forensic Science Institute (mainly CO poisoning or burns)
- Despite a large number of definitions, not many data are collected, as seen in part 2. The fire statistics are mostly automatically registered.
- The dataset is a combination of different automatic logs and report forms and collected by three parties.

### 2.1.9. Finland

#### **Fire statistics description**

Finland has approximately 15,000 incidents recorded per year. Fire statistics (in Finnish language only) cover the whole country of Finland (excluding Åland island). The data originate from the 22 regional fire departments and they guarantee a quality assurance process. Rescue services authorities, other authorities, researchers, students have access to the database.

#### **Collection of the information**

In the website (prontonet Finland), the documentation system can be found that shows the database. In order to remove potential errors in the database, (22 regional) fire departments monitor its quality. Also errors detected by other users are corrected.

#### **Summary table – Part 1: Definitions**

Many definitions in fire statistics exists in Finland. Indirect costs, safe areas and fire prevention are the only groups that do not have a definition available. Having a formal definition of what are false alarms differentiate Finland from many countries. Also, having most of the fire safety measures defined is remarkable.

### Summary table – Part 2: Fields recorded in the fire statistics

In Part 2, almost all the fields are covered. All types of damage (water, fire, smoke) are collected, as well as details on the fire response of occupants and fire brigades. Data of direct costs are collected, but not the indirect costs (loss of business, transportation etc.). Also, no distinction is made between insured and uninsured losses and the cost incurred to insurance companies. Ethnicity and profession of the victims are not collected.

### Further comments

Finland has very elaborate system of collecting fire statistics, called PRONTO. Almost all aspects of fire statistics are collected by the regional fire departments. The data is checked for its quality and therefore increases its reliability.

#### 2.1.10. France

### Fire statistics description

Data is collected in each fire service and is then sent to General Direction of Civil Security and Crises Management (DGSCGC) of the French Home Ministry. At the end of each year, the latter publishes the French national fire statistics only in French.

### Collection of the information

The annual reports contain information about the personnel (professional civil or military), the organisation, the equipment and national fire departments indicators.

Fields recorded are mostly covering the number of interventions for all type of activities: fire-related, traffic accidents, personal assistance, the number of interventions by day, the number of interventions for 100,000 inhabitants, number of interventions by types of buildings and the type of intervention missions (fire-related, traffic accidents, personal assistance...), the duration of intervention, the average number of intervention by day, by activity and type of building, number of aggression by 100,000 hours of interventions, number of victims by type of intervention (deaths, severe injuries, relative injuries), number of victims by type of buildings (deaths, severe injuries, relative injuries) and number of enrolled firefighters (civil, professional, military, etc.)

### Summary table – Part 1: Definitions

There are no definitions available; however, a working group related to the Ministry on Interior is currently working on the development of definitions with the main objective to adopt definitions that are in agreement with those defined in ISO TR 17755-2.

### Summary table – Part 2: Fields recorded in the fire statistics

Only the number of fire interventions, fatalities and casualties are reported by the building types.

### Further comments

Very basic fire statistics are reported in France. However, due to the lack of definitions, it is very difficult to rely on this data. Moreover, since fire deaths are registered for fatalities occurring only on the fire scene, the numbers of fire deaths are underestimating the real number of fire deaths.

#### 2.1.11. Germany

### Fire statistics description

1. On a national level:

National cause of death statistics, ICD-10 and gender, e.g. exposition to flames, fire and smoke, official website (public available):

[https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Todesursachen/\\_inhalt.html](https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Todesursachen/_inhalt.html)

Operations of fire brigades, fire deaths and injuries, Deutscher Feuerwehrverband (DFV), only as a paper book "Feuerwehrjahrbuch" (only in German, website including some data.

<https://www.feuerwehrverband.de/presse/statistik/>)

Injuries and fatalities from accidents (DGUV), <https://www.dguv.de/de/zahlen-fakten/au-wu-geschehen/index.jsp>

Property loss: data collected by insurer Gesamtverband der Versicherer (GDV), website (with data: <https://www.gdv.de/de/zahlen-und-fakten/versicherungsgebiete/hausrat-24100#Schaeden> )

Fire causes (insured fire incidents), collected by the institute for fire cause investigation (for insurers), Institut für Schadenverhütung (IFV) website with data: <https://www.ifs-ev.org/schadenverhuetung/ursachstatistiken/brandursachenstatistik/>

2. On a local level:

Data collected by fire services, different data and formats; several fire services collect via an electronic system but not all. Often there is a fire service operation statistics (electronic) and a fire incident report (form to fill in). Example for such a form for fire incident report is given in uploaded documents, one form is to be submitted to DFV, it is called FEU 905 and it summarizes data for one year and is collected on a national level by DFV (see above)

Some "Länder" (states) and some larger fire brigades collect data about fire incidents with a survey about prevention measures and effect of these measures on the fire development (form to fill in uploaded documents) For example, Munich fire service collects data about fire incidents with a survey about prevention measures and effect of these measures on the fire development (form to fill in uploaded documents): <https://www.lfv-bayern.de/informationen/statistiken/>

Data collected by German police, such as criminal statistics and fire causes, is not publicly available.

### Collection of the information

The information for the summary table was collected through the investigation in the statistics group in VFDB. Challenges faced in Germany while gathering the information are due to the extremely fragmented approach for the collection of data related to fire incidents.

### Summary table – Part 1: Definitions

Relevant definitions: three words in the German language: Falschalarm (false alarm - fire detected but not real) is divided into Fehlalarm (false alarm - alarm due to technical failure in the detection systems) and Täuschungsalarm (deception alarm - detection is working but detected something different, i.e. water vapour). Fire: Kleinbrand (small fire) a and b. Small fire a: use of one small extinguishment equipment (Einsatz von einem Kleinlöschgerät); small fire b: Use of not more than one C-hose (Einsatz von nicht mehr als einem C-Rohr)/ Mittelbrand (medium fire): use of not more than 3 C hose / Großbrand (large fire): use of more than 3 C hose / fire extinguished before fire service on scene.

Building regulations reflect definitions / what to understand under a compartment/fire barrier.

### Summary table – Part 2: Fields recorded in the fire statistics

Fire incident, building description, fire causes, fire losses, fatalities and causalities are recorded.

### Further comments

- Very fractured system as several institutions are collecting data with different methods and terms.
- Limitations regarding the link between the different collections of data.
- Most fires and fatalities occur in residential building fires.
- Fires and fatalities occur also often in nursing homes and hospitals.
- Observation after bigger fires: the measures against fire spread work in general, the smoke spreads further than the fire and leads to damage/injuries (Munich fire service statistics), escape routes are blocked by smoke in several numbers of fires (40 %) (TB – VFDB).
- High number of false alarms with automatic fire alarm systems.
- Highest property loss in a few numbers of very big fire incidents.

#### 2.1.12. Greece

### Fire statistics description

The fire statistics in Greece present a unique national statistics database. Main data collected by Hellenic Fire Corps. Some other data collected by General Secretariat for Civil Protection, Forest Offices per region, and National Observatory of Athens. The data is usually collected by the fire brigades in the aftermath of an event. Therefore, one unique fire statistics dataset is available for the whole country.

### Collection of the information

The Hellenic Fire Corps collects all the needed statistical information. Besides, General Secretariat for Civil Protection and Forest Offices per region collect specific information, which is required by their sections. The following information is part of data collection: number of fires by size, number of victims (deaths, injured, rescued persons, missing persons), fire causes, fires by fire objects (buildings types, sectors of industry, etc.), and fire damage.

### **Summary table – Part 1: Definitions**

In the national fire dataset, the following information is available: name of the responsible administrative unit, event type, date event start, start time, date extinguishing, extinguishing time, municipality, village (it is important because of a high number of settlements on small islands), space description, event characterization, total fire, vehicles, total fire forces (in men and women), total firefighters shipping, accident type, number of people involved by type, injured, deaths, disasters, and burns. However, definitions have not been provided.

### **Summary table – Part 2: Fields recorded in the fire statistics**

In Part 2, the majority of the fields are covered in the national data collection system. It is difficult to study the available materials because of language barriers.

### **Further comments**

Information on the structure of the database is available for Greece. Then information on the number of fires is given and information about fire victims is displayed. For every fire, there is specific information about the time and place. Moreover, forest fires play a particularly important role for Greece and information on this topic, both on the Internet and in specialist literature, is available. Studying information about the fires in Greece is particularly difficult due to the language barrier.

#### 2.1.13. Hungary

### **Fire statistics description**

There is one unique Fire Damage Statistics Database that is compiled and used within the professional disaster management organization and ministry. It is not open for public.

### **Collection of the information**

Information for the summary table has been provided by the University of Public Service - Institute of Disaster Management, and National Directorate General for Disaster Management, which works with the Hungarian National Directorate General for Disaster Management, who collects, analyses, and summarizes fire data of fire brigades.

### **Summary table – Part 1: Definitions**

Filling instructions to fire and technical rescue reports are available on the online Disaster Management Data Service Program (DMDSP), which contains definitions such as false alarm, fire causes, fatalities, casualties, fire safety measures, fire response.

### **Summary table – Part 2: Fields recorded in the fire statistics**

Fire incident, building description, fatalities casualties, fire safety measures are recorded.

### **Further comments**

Information on fire incidents is well organised to collect useful fires statistics; however since it is not publicly available, it is difficult to assess and compare with other statistics.

#### 2.1.14. Ireland

### **Fire statistics description**

In Ireland, the fire statistics is provided by the fire authorities attending the fire scene. Once all the data inputs are completed, the National Directorate for Fire and Emergency Management (NDFEM) contact each authority to confirm that the information is correct. The NDFEM is currently developing a new command and control system for the Irish Fire Service, and when this will be operational, statistical information will be downloaded directly from a validated computer system. Currently, there are two collection forms: the Fire Statistics – Operational and the Fire fatalities report.

### **Collection of the information**

Information for Ireland was based on the fire statistics publicly available in the website of the Department of Housing, Local Government and Heritage where data about fire service, fire prevention, fire brigade activities, location of fires, causes of fires and fatalities from fires are available for a time range which in general vary from 2000 or early to 2019. Moreover, direct contact has been established with the National Directorate for Fire and Emergency Management who kindly provided the two reporting forms.

### **Summary table – Part 1: Definitions**

In Ireland, a glossary for the fields adopted in the fire statistics is not available. However, for each field, specific classes are present. For example, there are various classifications with several options for residential and non-residential buildings, fire causes and area of fire origin.

### **Summary table – Part 2: Fields recorded in the fire statistics**

The fields recorded in the “Fire Statistics –Operational” form are focused on the residential and non-residential buildings, fire causes and fire prevention with details of prevention work such as inspections, fire safety notices, High Court orders, summary offences and licenses. In the “Fire Fatalities report”, the time, date of the incident and the location and type of the premises is recorded. Furthermore, the number of fatalities, age of the victims and if the death occurred at the scene or afterwards are indicated. Finally, the presence of smoke alarm and the smoke alarm working conditions are asked in the “Fire Fatalities report”.

### **Further comments**

- Data about fire consequences, fire response and fire costs are now listed in the fire statistics.
- The presence of smoke alarms and their working condition are indicated in the “Fire Fatalities report” and not in the “Fire Statistics – Operational”. No other fire safety measures are listed.
- It would be possible that in the new command and control system for the Irish Fire Service developed by the NDFEM other fields will be recorded.

#### 2.1.15. Italy

### **Fire statistics description**

In Italy, the collection of data is conducted by the STA-RI (Statistics and Report of Intervention) web-based software, used by the crew commander while compiling the intervention report on digital support on a standardized frame called “VF-41”. The intervention report is not only for fires and explosions but also for the opening of windows and doors, the safety of buildings and stability of constructions, rescue of people, recoveries, road accidents, water accidents, intervention no longer required, clean up from insects, gas leakages, lift malfunction, the rescue of animals, false alarms and aircraft. The data are subdivided into provincial, regional and central levels only for administrative and statistical reasons.

The Central Statistical Service has been editing the Statistic Annual Report of the Corpo Nazionale Vigili del Fuoco (C.N.VV.F) for several years, with the aim to standardize and spread out the information, in a fully available way also for users outside the Administration, as well as to acknowledge of the work for the CNVVF STAT-RI application that allows the electronic compilation of the same data included in the VF-41 form, such as time and place, type of accident, cause, substance involved, injured/dead, etc.

STAT-RI is integrated with SO115 software, - the software used in the operating rooms - allowing the person compiling the form to import, thanks to the card code, all information already inserted by the operator in the control room. At the same time, this mechanism ensures the integrity of all data treated by SO115 and STAT-RI system.

The statistics are used by Fire departments, governments, industries, public and private use, as per law for access act right (L.241/90), FOIA regulation apply to more general data with the statistical annual report, without privacy issues.

### **Collection of the information**

The information about the Italian fire statistics has been collected considering the Annual Report called Annuario Statistico Corpo Nazionale Vigili del Fuoco and kindly provided establishing direct contact with the Corpo Nazionale Vigili del Fuoco.

### **Summary table – Part 1: Definitions**

For the Italian fire statistics, a glossary with the definitions of each field collected is not available. However, for each field recorded, a detail classification is provided. Various classes are listed for residential and non-residential buildings, fire causes, item and material first ignited.

### **Summary table – Part 2: Fields recorded in the fire statistics**

For intervention related to fires and explosions, the Italian fire statistics report fire incidents and false alarms, time, date and location of the incident, property types, fire causes, item and material first ignited, fire response of the fire brigades and duration of the intervention. The number of victims and people injured, cause, age and gender of the people affected are fields recorded. Moreover, the rescue of persons is classified according to various causes amongst which one class is given by fire ignition. Fire prevention and surveillance data are recorded related to fire prevention activities of fire brigades. The activity of investigation and judicial/criminal police in charge of Fire Brigade and/or to other Police Corp.



#### Further comments

- Fire statistics are collected by the fire brigades and it is subdivided into national, regional and provincial levels.
- Fields are determined by various detailed classifications. However, no specific definition is provided.
- There is no information about the damage caused by the fire incident, the fire safety measures present at the scene and the evaluation of financial costs.

#### 2.1.16. Latvia

##### Fire statistics description

There is a national database, but it can be used to a limited extent by external users.

##### Collection of the information

The summary table has been completed based on the available reports and information taken from related websites.

##### Summary table – Part 1: Definitions

In the national database system for fire statistics of Latvia, detailed definitions exist. The information is available only for internal use of the Ministry of Interior.

##### Summary table – Part 2: Fields recorded in the fire statistics

In Part 2, the majority of the fields are covered in the national database. Attention is focused on: fires in objects (in the residential sector, agricultural production facilities, in public buildings, production buildings, in vehicles, transportation means, industry, in warehouses, construction sites, landfills, waste, and unmanaged buildings), and victims (people died, including children, injured people, and rescued people).

##### Further comments

A national fire statistics is present.

#### 2.1.17. Lithuania

##### Fire statistics description

The fire statistics in Lithuania is national statistics and it is subdivided into 10 counties and the Capital region of Lithuania (Vilnius county). The data is usually collected by the fire brigades in the aftermath of an event. The inputs to the fire statistics are managed by National Fire and Rescue Department of Lithuania. Therefore, one unique national fire statistics dataset is available.

##### Collection of the information

The summary table has been completed based on the available national reports on fire statistics. Publications about the fire situation in the country are published annually.

##### Summary table – Part 1: Definitions

There is a national fire dataset based on definitions. The definitions are part of internal documents of a relevant national ministry. The dimension of the dataset (number of incidents recorded per year) in the year 2019 is of 9,848 fires, 60 fire deaths, 112 injured by fires, and 82 persons rescued from fires.

##### Summary table – Part 2: Fields recorded in the fire statistics

In Part 2, the majority of the fields are covered by the national dataset can be specified as follows: human loses (children under the age of 18 among them, injured people, rescued people, and children among them), factual number of fire (residences, hotel buildings, manufacture and industrial buildings, home farm buildings, vehicles, open territories, forest, meadow, peatbog, crop, stubble, other open territory, and other objects), losses from fires (rescued people, animals (units), vehicles (units), buildings (units), living-space (m<sup>2</sup>), uninhabitable space (m<sup>2</sup>), and fodder (t)), fire causes (22 types of causes).

##### Further comments

A national fire statistics is present. The definitions for the various fields of fire statistics are not publicly available.

#### 2.1.18. Luxembourg

For Luxembourg, the level of information received is not enough to provide a complete summary table.

#### 2.1.19. Malta

For Malta, the level of information received is not enough to provide a complete summary table

#### 2.1.20. Netherlands

##### **Fire statistics description**

The fire statistics cover the entire country of the Netherlands. The country is subdivided into 25 safety regions, (e.g., Drenthe and Amsterdam-Amstelland). The safety regions collect data on their own incidents and report their data. Another collector of fire statistics is the Institute for Fire Safety (IFV and Fire Service Academy). IFV and the fire brigades from the 25 safety regions collaborate together and compute one database. This database is accessible for IFV for research and educational purposes. It is also available for the fire brigades to do their own research or to learn from fire incidents. Every year carefully selected (national) fire statistics are shown to the public by means of an online dashboard. Media and reporters can have access to most of the data, when requested officially and when the data are made anonymous.

##### **Collection of the information**

The summary table has been completed based on the questionnaires that are used throughout the Netherlands to collect fire statistics. These are available to IFV and the fire brigades of the 25 regions.

##### **Summary table – Part 1: Definitions**

For the majority of the fields in Part 1, definitions are not available. Definitions regarding fatalities, rescues, response times, fire causes and building characteristics are covered but safety measures, fire costs and fire prevention are lacking in the list of definitions.

##### **Summary table – Part 2: Fields recorded in the fire statistics**

Data on fire incident, building descriptions, causes, fatalities and casualties are collected in detail. For consequences, damage is not collected by the Netherlands. For fire safety measures, detailed data are collected on smoke alarms but not on other types of fire safety measures (e.g. automatic extinguishing systems and escape routes). Data on the time before finding the occupant (fatal or rescue), the fire response time and the time between incident and fatality are collected.

##### **Further comments**

- No evaluation of the direct and/or indirect fire costs are available.
- The Netherlands data are focused mainly on fatal residential fires and rescuing civilians from buildings and possesses a detailed database regarding these issues.

#### 2.1.21. Poland

##### **Fire statistics description**

The State Fire Service (SFS) of Poland, supervised by the Minister of the Interior and Administration, is a leading rescue organization in Poland, comprises variety of activities and constitutes main part of the National Firefighting and Rescue System (KSRG). Centralized structure of the KSRG enables to swiftly relocate rescue resources. In order to safeguard good response time of professional and voluntary firefighters, various models and methodologies are adopted.

##### **Collection of the information**

All data are collected, processed and analysed in the State Fire Service Decision Support System (DSS). The functional and informative scope of the software covers all areas of the SFS activity, with particular emphasis on the tasks performed by the rescue units. The main task of the DSS is to support the duty service in handling reports and events, coordinating rescue operations, and preparing documentation of the actions carried out. All statistical data collected by SFS, you can find at:

<https://www.gov.pl/web/kgqsp/interwencje-pszp-lata-2010-2019-zestawienia>

<https://dane.gov.pl/institution/22,komenda-glowna-panstwowej-strazy-pozarnej>

### **Summary table – Part 1: Definitions**

No list of definitions has been provided.

### **Summary table – Part 2: Fields recorded in the fire statistics**

Detailed scope of data collected by the SFS from the intervention of fire protection units is specified in Annex 6 to the Regulation of the Minister of Interior and Administration of July 3, 2017 on the detailed organization of the National Firefighting and Rescue System (Journal of Laws 2017, item 1319). The main areas which are covered by the information from the intervention are: type of the incident (fire, local threats, false alarm), location of the incident, facility and owner (closed catalog), operational times of the incident, forces and resources used during the incident, types of rescue operations (closed catalog), equipment used in rescue operations (closed catalog), place of activities (inside the facility, floor, etc.), consumption of water, extinguishing agents, medical rescue operations, fatalities and casualties, the size of the event, the size of the facility, estimated losses, estimated property rescued, preventive data about the facility (presence and operation of fire prevention measures), access to the facility, personal data of persons managing rescue operations and medical rescue operations descriptive data of the event (description of the course of rescue operations, threats and difficulties, used and damaged equipment, etc).

### **Further comments**

Various fire statistics fields are collected in Poland; however, it is not clear if definitions are available.

#### 2.1.22. Portugal

For Portugal, the level of information received is not enough to provide a complete summary table.

#### 2.1.23. Romania

### **Fire statistics description**

The fire statistics in Romania is national statistics. The information is collected during the interventions through a letter form and subsequently entered in the electronic databases set up at county level and transmitted at a national level. The database is manually checked to identify potential errors which are subsequently corrected at county/nation level. The inputs to the fire statistics are managed by the public body IGSU.

### **Collection of the information**

The summary table was completed based on the internal procedure (Order of the General Inspector of IGSU) and Databases on emergency interventions - set up and managed at the level of the General Inspectorate for Emergency Situations.

### **Summary table – Part 1: Definitions**

There are some definitions for the major area of investigations. All the definitions provided in the summary table were extracted from the internal procedure (Order of the General Inspector of IGSU). In particular, there are no clear definitions for fire safety measures, fire financial cost and fire prevention. For the building characteristics, there are no definition but classifications. The fire fatalities and casualties are divided into three categories (burns, asphyxiated and other causes) and six age groups (0-6, 7-14, 15-25, 26-55, 55-70, >70). The estimation of damage is done in m<sup>2</sup> and the extent of flame damage at the end of the fire is assessed.

### **Summary table – Part 2: Fields recorded in the fire statistics**

In Part 2, the majority of the fields are covered in the database. The value estimation of the properties is assessed by the firefighters. All the other categories are presented in some context.

### **Further comments**

- Fire statistics are present with some definitions and the fields available cover the major areas of investigations.
- No evaluation of the economic impact of fire is available, nevertheless, the estimation of damage is assessed by the fire brigade.

#### 2.1.24. Slovakia

##### **Fire statistics description**

The fire statistics in Slovakia are national. The data are collected by fire investigators in the fire departments and issued by the Fire & Rescue Corps. An English version of their annual fire statistics was published until 2011. The number of fires and fire deaths are also reported in the annual statistics yearbook for Slovakia. In 2016 (last year we got information from) there were 8,407 fire incidents in Slovakia.

##### **Collection of the information**

The information about fire statistics in Slovakia was obtained from the English version of the Fire Statistics from 2011. This book contains very detailed information about the data collected. Additionally, the annual statistics yearbook provided some of the key definitions. Other definitions were obtained with help from the Slovakian ministry. However, it was found that several of these definitions were more of generic nature found in testing standards and similar and not the definitions used by the fire investigators in their collection of data.

##### **Summary table – Part 1: Definitions**

As mentioned above, definitions are available for some of the terms, often more generic than what was needed for the actual fire data collection. The definition for fire fatalities was provided in the statistical yearbook as: “killed persons are persons who died in the place of the accident (or in the place of fire), or when being transported to the hospital, or within 24 hours after the accident.”

##### **Summary table – Part 2: Fields recorded in the fire statistics**

The data recorded are focused on the type of building, Fire cause, room of origin, item first ignited as well as information about fire victims.

##### **Further comments**

It is not clear if the data are a full census, but it is assumed that it is. There was no information about how missing or incomplete data are handled.

#### 2.1.25. Slovenia

##### **Fire statistics description**

The fire statistic in Slovenia covers the entire country and is available within a national database defined as Intervention and Accident Reporting System (SPIN). The data is usually collected by the fire brigades in the aftermath of an event. Some of the information such as the cause of the fire is only an approximate estimation conducted by the firefighters. However, the experts usually evaluate the fire events, but they are not obliged to write it in the system.

##### **Collection of the information**

The summary table was completed based on the information provided in SPIN. The definitions were given based on the Building law and the Fire Protection Act.

##### **Summary table – Part 1: Definitions**

Most of the time, there are no clear definitions for the major area of investigations. All the definitions provided in the summary table were extracted from the Building law or the Fire Protection Act. Both of the documents are official laws in Slovenia, which specify general definitions which can act more like guidelines of how to reach a certain group of definitions. In particular, no clear definition of fire incidents exists. Building characteristics are provided and casualties are specified. For the fire safety measures, there are no definitions, except recommendations on how to ensure fire safety measures. Evaluation of damage and fire financial cost (direct and indirect cost) are present.

##### **Summary table – Part 2: Fields recorded in the fire statistics**

In Part 2, the majority of the fields are covered in the SPIN, except for cause, fire safety measures, fire cost and fire interventions. The property damage and cost of the property damage are not assessed by the firefighters. Fire incident, building description, consequence, fatalities, casualties and the fire response are presented in some context.

### **Further comments**

- Fire statistics in the SPIN is present but not very detailed with no clear definitions and the available fields cover most of the major areas of investigations.
- All the provided definitions in the summary table are extracted from the building code and the Slovenian fire protection act.
- No evaluation of the economic impact of fire is available.

#### 2.1.26. Spain

### **Fire statistics description**

A Spanish Royal Decree establishes the need of collecting fire statistics. The Royal Decree also indicates the convenience of centralizing the statistics elaboration, incorporating them into the General Statistic Plan of the Ministry of Interior Affairs. However, since 1994, official statistics have not been published due to lack of funding. Currently in Spain, the only (recent) existent documents about fire victims are those annually published by Mapfre Foundation in collaboration with APTB (professional association of firefighters) and Fundación Mapfre publish every year a report on fatal fires. UNESPA (association of insurers) also publishes an annual report based on data from insurers. It is generated with information from 22 insurers, which can be estimated to have just over 75% of the Spanish market by turnover.

### **Collection of the information**

Data published by APTB and MAPFRE are developed from data detailed by fire departments on fires with fatalities and crossed with the Legal Medicine Institutes of the different autonomous communities and provinces. There is a basic standardized document to collect data «Parte Unificado de Actuación», but most of the Fire Services don't use it, and they have their own way to collect data, depending on their resources. It is variable between different regions.

### **Summary table – Part 1: Definitions**

There is a clear definition for fire deaths in the annual report; however, for other aspects of fire incidents, no information is available at the present time.

### **Summary table – Part 2: Fields recorded in the fire statistics**

Example of published data:

- Estimated distribution of the cost of insured fires by type of buildings.
- Insured assets from fire, according to the size of the municipality where they are located and cities.
- Distribution of the severity (derived from cost) of fires, by type of insurance.
- Average severity of fires, according to the type of insurance.
- The 50 municipalities with the most insured assets from fires.
- Provincial distribution of fires, insured assets and population.
- Ratio of the average severity of the fire to the average disposable income of the municipality.
- Fire intensity ratios, according to the type of insurance
- Fire intensity ratios, by province.
- Fire intensity ratios, by cities.

### **Further comments**

Fire investigations are not included in the Fire Service reports, which means that in many of the accidents there are not enough data to establish the cause of the fire or the reason for the fire deaths. These data would be useful to complete the “unknown” sections in the existing database.

#### 2.1.27. Sweden

### **Fire statistics description**

National fire statistics are published by the Swedish Civil Contingencies Agency (MSB) on the IDA web site. Data is collected from incident reports from all fires that the municipal fire and rescue services respond to. MSB also has a database covering fatal fires which occur in Sweden and people who died in the fires. Data is collected from all relevant authorities and cover all fire deaths regardless of a victim's nationality. Data from forensic pathologists have been available up to 2015. At present, the MSB do not have access to this data, and until the legal situation is clarified, there will be some under-reporting of fatal fires not attended by the fire service. The statistics are available at the IDA website. The number varies over time, from 80 to 130 per year. In addition, the National Board of Health and Welfare (Socialstyrelsen) publishes cause of death statistics, covering all people dying in Sweden as well as residents of Sweden who die in foreign countries. The statistics

use the international classification of diseases, so fire deaths can be identified. The numbers vary over time. In 2019, there were 47 fire deaths. The highest figure in recent years was 138 in 1998. Finally, the Swedish insurance companies collect data on insurance claims due to fires. The latest figures are 27,794 in 2018 and 34,217 in 2019.

#### **Collection of the information**

All the information reported here is publicly available. However, not all data fields are searchable through the online tools. The MSB update preliminary statistics on fire fatalities on a daily basis. All other statistics are published annually.

No special challenges have been encountered during the project except that it was sometimes difficult to translate specific terms and present them in the project's predefined table structure.

#### **Summary table – Part 1: Definitions**

The definitions are not available online but have been obtained through direct contact with the corresponding data collector (except for the cause of death register, which has the same definitions as in other countries (ICD-10)).

#### **Summary table – Part 2: Fields recorded in the fire statistics**

Different data collectors gather different types of data.

The incident report database contains data on emergency responses by the fire and rescue service. It also includes the number of presumed deaths and injuries (the number of people taken off by ambulance and the number of people treated on the scene). Concerning the fire itself, data recorded includes item first ignited, ignition source and room of origin, as well as the fire spread expressed as contained in the item of origin, room of origin, fire compartmentation, initial building or spread to another building.

The fatal fire database contains data on the fire and its victims.

The cause of death register only contains the number of deaths per cause.

The insurance companies have data on claims and the costs reimbursed for the fire.

#### **Further comments**

- The different databases focus on different aspects and the contents of the datasets vary.
- Quality assured data is difficult to get and recently the secrecy legislation has been an obstacle.

## 2.2. OTHER EUROPEAN AND NON-EUROPEAN COUNTRIES

### 2.2.1. Australia

#### Fire statistics description

The fire statistics in Australia is collected at the state level by the Queensland Fire and Emergency Service; Fire and Rescue New South Wales; South Australia Metropolitan Fire Service; Tasmania Fire Service; Fire Rescue Victoria; Fire & Emergency Service Western Australia. The data are yearly published; however, only specific fields are publicly available. The fire statistics are collected by the fire brigade after attending an incident and the data are reviewed by the fire service which monthly amends the datasets. Despite the review, data would still include anomalies and missing information and the fire statistics is used by the fire service to evaluate and optimize performance, by insurance investigations and court cases. The collection of the information is based on the Australian Incident Reporting System (AIRS). The AIRS includes definitions, and it is composed of 10 parts as follows:

- A. Incident report header
- B. False alarm
- C. Hazardous materials
- D. Casualties, rescue and evacuation
- E. Ignition (all fires)
- F. Firefighting
- G. Bush, Forest, Grass fires
- H. Dollar loss fires
- I. Mobile property
- J. Structure fires.

#### Collection of the information

The information has been collected based on the public website of the Fire and Emergency Service in the six states of Australia and thanks to the support of the South Australian Metropolitan Service.

#### Summary table – Part 1: Definitions

The definitions provided by the AIRS covers the fire incidents with time, date, location and property type, fire causes, material contributing most to fire and smoke, area of origin and fire consequences such as factors contributing to flame spread, fire spread, flame, smoke and water damage. For the fire safety measures, the definitions of alarms, automatic extinguishing systems and compartmentation are provided as well as descriptions of fatalities and casualties. The fire response is determined as the time of the incident, the time that the officer in charge declares the incident to be under control and no further response of emergency units are required. Finally, fire financial costs are estimated based on dollar loss, property, contents with specifications if they were insured.

#### Summary table – Part 2: Fields recorded in the fire statistics

The fields included in the fire statistics are very detailed and cover the majority of the fields related to pre and post-fire conditions. There is no information about the descriptions of the person affected by the fire and the damage is subdivided into flame, smoke and water damage.

#### Further comments

- The fire statistics are based on the AIRS and collected at the state level.
- Definitions are available and provided with a high degree of detail.
- Not all the fields collected by the fire statistics are publicly available.

### 2.2.2. Canada

#### Fire statistics description

Canada's fire incident reporting at the national level has been inactive since at least 2007 and efforts to renew fire data collection appear to currently be in a state of flux. Fire incident data are collected at the level of provinces and territories by local fire departments. However, fire data collection in Canada is highly decentralized, with some variation within and between provinces. A pilot project seeking to revive a centralized fire data collection system in Canada released a report in 2017 introducing a National Fire Information Database. This effort relied upon data from six of Canada's thirteen provinces and territories, provides the backbone for a new National Fire Information Database. Canada's most populous provinces collect substantially more detailed information on fire incidents that include information on data and time, fire

department response, property details, presence and type of fire protection features, factors relating to ignition, and details of fire loss.

### **Collection of the information**

The information relies upon several reports from the Canadian Centre for Justice Statistics which described the National Fire Information Database, the current state of fire incident data collection in Canada, and results on Canada's fire experience from 2005 to 2014. Our description of Canada's fire data collection system has been shared with one of the principal participants in the country's data collection efforts and received confirmation that the information was accurate.

### **Summary table – Part 1: Definitions**

Canada has a data dictionary.

### **Summary table – Part 2: Fields recorded in the fire statistics**

Incident Information: Year, Month, Date, Day of Week, Time, Location, Response Time, Mutual Aid, Crew Size, Number of Vehicles, Distance from Department to Incident, Status on Arrival, Number of Persons Rescued, Number of Casualties, Type of Weather, Temperature, Wind Direction, Wind Speed.

Property Classification

Property Details: General Construction, Method of Construction, Year of Construction, Building Height, Ground Floor Area, Number of Occupants, Value at Risk.

Fire Protection Features: Manual Fire Protection Facilities, Sprinkler Protection, Fixed System Other than Sprinklers, Automatic Fire Detection System, Fire Detection Devices, Outside Fire Protection, Fire Service in Area.

Incident Variables: Igniting Object, Fuel or Energy Associated with Ignition, Energy Causing Ignition, Material First Ignited, Act or Omission.

Factors Relating to Origin and Spread of Fire: Area of Origin, Level of Origin, Flame Spread – Interior, Flame Spread – Vertical Openings, Flame Spread – Horizontal Openings, Smoke Spread Avenues

Fire Loss Details: Extent of Fire, Extent of Damage, Dollar Loss.

Discovery of Fire and Action Taken: Initial Detection, Transmission of Alarm to Fire Department, Action Taken, Performance of Automatic Extinguishment Equipment, Method of Fire Control and Extinguishment, Performance of Smoke Alarm Device, Impact of Smoke Alarm Activation on Occupant, Occupants in Dwelling Unit at Time of Fire.

Fire Casualties: Age of Victim, Sex of Victim, Status of Victim (Firefighter, Civilian), Nature of Casualty, Probable/Possible Cause, Class of Victim (Adult, Senior), Condition of Victim (Asleep, Too Young to Act, Physical Disability, etc.), Action of Casualty, Condition of Casualty, Cause of Failure to Escape, Ignition of Clothing or Other Fabrics, Type of Material Ignited.

### **Further comments**

Key aspects: Fire data collection in Canada is highly decentralized, with some variation within and between provinces. Local fire departments are asked to collect information on incendiary incidents and submit them to their respective provincial or territorial authorities. It appears that Canada's most populous provinces collect substantially more detailed information on fire incidents that include information on data and time, fire department response, property details, presence and type of fire protection features, factors relating to ignition, and details of fire loss. Commonality of the data reported across jurisdictions is facilitated by the Canadian Code Structure on Fire Loss Statistics, a document produced by the Council of Canadian Fire Marshals and Fire Commissioners.

Limitations: Canada's fire incident reporting at the national level has been inactive since at least 2007 and efforts to renew fire data collection appear to currently be in a state of flux. A pilot project seeking to revive a centralized fire data collection system in Canada released a report in 2017 on fire statistics in Canada from 2005 to 2014. This effort, which relied upon data from six of Canada's thirteen provinces and territories, provides the backbone for a new National Fire Information Database. A critical challenge in assessing national fire data collection in Canada is a lack of publicly-available information regarding discussions about harmonizing localized data collection into a uniform and sustainable national database.



### 2.2.3. New Zealand

#### **Fire statistics description**

The fire statistics of New Zealand is collected by the fire crew filling an online form in the aftermath of an emergency. The data cover the whole of New Zealand from 1998 to current and publications are annually released. Some incident types are quality assurance completed and final dataset reviewed by the national office before publishing. The data are used by Fire and Emergency, government agencies, industries, public and private users. The data related to the general incident description are published for public access while private/sensitive data are restricted. Moreover, National HQ staff manage the data and correct identified errors.

#### **Collection of the information**

The information for the fire statistics of New Zealand has been kindly provided by the Fire and Emergency New Zealand.

#### **Summary table – Part 1: Definitions**

Definitions for the fields collected by the fire statistics are available in the Fire and Emergency New Zealand SMS Incident Report for what concerns fire incident, building description, fire causes, fire consequences, fatalities and casualties. The definition for the type of injury is provided by the Fire Investigation technical manual while those for fire safety measures by the NZ Building Code. Fire and Emergency Fire Safety, Evacuation Procedures and Evacuation Schemes Regulations 2018 describe terminology for the evacuation and the Statement of Performance 2020/21 defines an agreement between Fire and Emergency New Zealand and the Government about the fire service time of response. There isn't a definition for the direct financial costs; however, an activity-based costing model is adopted. Finally, the Fire and Emergency Act 2017 provides fire regulations and a National Risk Reduction Strategy 2019-2029 contain fire prevention.

#### **Summary table – Part 2: Fields recorded in the fire statistics**

The fields recorded in the incident recording system adopted in New Zealand cover fire incident, false alarms, date, time and location, building types and dimensions. For the fire consequences, fire spread is collected considering confinement and quantified in m<sup>2</sup> for flame, smoke and water damage. Fatalities and Casualties are listed in the same classification and age, gender and ethnicity of the person affected are reported. The field for alarms includes also automatic extinguishing systems and type, operation, effectiveness and failure are present. Fire response is recorded, and direct financial costs caused by fire are estimated considering average m<sup>2</sup> rebuild cost multiplied by the total damage without considering content loss and business interruption.

#### **Further comments**

- The New Zealand fire statistics are nationally collected by the fire brigades after an emergency.
- Definitions are provided in detail and cover all the aspects related to pre- and post-fire conditions.
- Several fields are recorded in the fire statistics and in particular, damage is subdivided into flame, smoke and water damage and direct financial costs are evaluated.

### 2.2.4. Norway

#### **Fire statistics description**

The fire statistics in Norway is a national statistics. The data is usually collected by the fire brigades in the aftermath of an event in the collection form BRIS (brann- og redningstjenestens rapporteringssystem). The inputs to the fire statistics are managed by the public body, the Norwegian Directorate for Civil Protection (DSB). Other bodies, such as police, health authorities and insurances are also gathering data, which are not public.

#### **Collection of the information**

The summary table has been completed based on DSB, which is publicly available, and BRIS, which is not publicly available. However, the fire statistics of Norway are published annually with a limited number of fields recorded.

#### **Summary table – Part 1: Definitions**

DSB provides some definitions for almost all of the 10 major areas of investigations with specific fields recorded. In particular, there is no definition for accidental and deliberate fires, but there are definitions for false alarms. Fatalities, fire safety measures, fire response and fire prevention are provided/specified. There are no clear definitions for causalities and the building description, fire causes and fire spread are described by a dropdown menu with clear classes. However, in Norway, the incident commander (Fire) must make an

assessment of the cost of fire. This must be registered in BRIS. The insurance companies make their own collection of data which one can apply for the access.

#### **Summary table – Part 2: Fields recorded in the fire statistics**

In Part 2, the majority of the fields are covered in BRIS, except for the evaluation of casualties and fire costs, which are evaluated by police, health authorities and insurances, but are not made public. Fire incidents, building description, fire causes and consequences are present, as well as fatalities, fire safety measures, fire response and fire prevention.

#### **Further comments**

- A national fire statistics is available.
- Fire statistics in DSB are present with some definitions and the fields available cover the major areas of investigations.
- The assessment of the cost of the fire is done by the incident commander and is registered in the collection form.
- The data collected by the insurance companies can be access with permission.

#### 2.2.5. Russia

##### **Fire statistics description**

The fire statistics in the Russian Federation is a national statistics and it is subdivided into 86 regional subjects taking into account 11 time zones and 17 vegetation zones and several climate zones. The data is collected by the fire brigades according to national law. The inputs to the fire statistics are managed by the Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM of Russia). Therefore, one unique national fire statistics dataset is available.

##### **Collection of the information**

The summary table has been completed based on "Order of the EMERCOM of Russia N 625" dated 12.24.2018. The documents name is "On the formation of electronic databases for accounting for fires and their consequences" (together with the "Procedure for filling out and submitting a fire accounting card"), which is publicly available.

##### **Summary table – Part 1: Definitions**

In the Order N 625, detailed definitions are provided for almost all of the major areas of investigations with specific fields recorded.

Data is collected for every fire that occurred in the country for one year. Each fire is characterized by approximately 100 parameters. The database consists of the following parts: general information, object of fire, consequences of fire, saved (evacuated) by fire, development and extinguishing the fire, firefighting forces and means, information about the dead and injured, and others. Information about costs and damage are available. For all the parameters examined definitions are available.

##### **Summary table – Part 2: Fields recorded in the fire statistics**

The structure and scope of the data fields enable a diverse analysis of all important aspects of the fire situation: fire development, course of fire, the extinguishing of fires, fire objects, causes of fire, fire victims, specific conditions of the persons concerned, and fire damage. Where necessary, the data are collected in specific standardized units of measurement. Methods were introduced to minimize or, if necessary, correct data entry errors.

##### **Further comments**

A national fire statistics is present. A qualified team of experts works on fire statistics and produces analyses and reports. Fire statistics in the Russian Federation is very detailed with clear definitions and the fields available cover the major areas of investigations.

## 2.2.6. Switzerland

### Fire statistics description

1. On a national level:

Bundesamt für Statistik, cause of deaths (fire deaths are not a category)

<https://www.bfs.admin.ch/bfs/de/home/statistiken/gesundheit/gesundheitszustand/sterblichkeit-todesursachen.html>

2. On a local level:

Fire service: <https://www.swissfire.ch/der-sfv/fakten-zur-feuerwehr/> (documents uploaded)

Vereinigung kantonaler Feuerversicherungen VKF, <https://www.bsvonline.ch/de/> (no direct link to data – data not publicly available) und Vereinigung kantonaler Gebäudeversicherungen (VKG)

<https://www.vkg.ch/de/versicherung/rueckversicherung?banner=1>

Interkantonaler Rückversicherungsverband (IRV), data not public available

Wildfire statistics: <https://de.statista.com/statistik/daten/studie/369841/umfrage/waldbraende-in-der-schweiz/> (paywall)

### Collection of the information

The information for the summary table was collected through web-based searched and contact persons in Switzerland. Challenges faced in gathering the information are due to the very fractured approach in Switzerland for the collection of data related to fires.

### Summary table – Part 1: Definitions

Various definitions are available such as:

Bestimmungsgemässes Feuer

Raucherwaren

Elektrizität

Explosionen

Brandstiftungen

Feuerungsanlagen

Küchenbrände

### Summary table – Part 2: Fields recorded in the fire statistics

Some fields collected in the fire statistics are:

Residential buildings: Building whose major part of the horizontal area is used for residential purpose.

Fire deaths: Persons who lost their lives in or close to a burning building (called "Brandtote" or "morts à la suite d'incendie")

### Further comments

- Very fractured recording system as several institutions are collecting data with different methods and terms.
- Limitations regarding the link between the different collections of data.

Trends in data:

- A single person dies in more than 90% of the fatal fires. Fires with more than 2-3 fatalities are very rare.
- Most of the fatalities occur in dwellings (CH: more than 80% of the fatalities); however, this building category constitutes also the majority of the building stock
- The following categories of use have the highest fatality rate when considered relative to their proportion in the building stock (descending order):
  - Hospitals and residential cares
  - Dwellings with a part of the building devoted to another usage.
- Fires with fatalities are caused most frequently (descending order) by:
  - Smoking materials or candles, matches etc.
  - Cooking or electrical equipment, electrical installations (Most of the fatal fires are “man-made“ for example careless, sometimes intentional)
  - The risk of injuries (non-lethal) is especially large in cooking fires.

### 2.2.7. USA

#### Statistics Description

The National Fire Incident Reporting System (NFIRS) is a voluntary data collection system which relies upon local fire departments to collect detailed data on fires (as well as other incidents) as they occur, using standardized and uniform reporting forms. Data are transferred from participating fire departments to (or through) their respective state offices before consolidation by the United States Fire Administration into a single national database. The data set includes separate modules for fire incidents and casualties (deaths and injuries for civilians and firefighters).

#### Collection of the information

Information was collected through the NFIRS Complete Reference Guide and additional documents from the USFA and NFPA.

#### Summary table – Part 1: Definitions

Definitions are available in a data dictionary.

#### Summary table – Part 2: Fields recorded in the fire statistics

Note that NFIRS includes a category of “confined fires” for common types of a fire occurring in non-combustible containers that result in little damage, such as confined cooking fires, chimney or flue fires, fuel burner fires, and compactor or incinerator trash fires. NFIRS requires very little causal information or information about fire detection and suppression systems for these fires.

Basic module: State, incident data, location (street, city, etc.), type of incident (structure, vehicle, rubbish, etc.), alarm time, arrival time, controlled time, last unit cleared time, actions taken (extinguishment, overhaul, search and rescue, etc.), estimated dollar losses of property and contents, original value of property and contents, casualties, detectors, hazardous materials release, property use (assembly, educational, health care, residential, etc.), person or entity involved (name, phone, address, city, etc.) owner (name, phone address, city, etc.).

Fire module: State, date, property details (number of buildings, residential living units), on-site materials or products, area of fire origin, heat source, item first ignited, type of material first ignited, cause of ignition, factors contributing to ignition, human factors contributing to ignition, equipment involved in ignition, equipment type, equipment power source, equipment portability, mobile property involved.

Structure fire module: structure type (enclosed building, portable or mobile structure, air-supported structure, etc.), building status, building height, main floor size, story of fire origin, fire spread, number of stories damaged by fire, item contributing most to flame spread, type of material contributing most to flame spread, presence of detectors, detector type, detector power supply, detector operation, detector effectiveness, detector failure reason, presence of automatic extinguishing equipment, type of automatic extinguishing equipment, operation of automatic extinguishing equipment, number of sprinkler heads operating, reason for automatic extinguishing system failure.

Civilian fire casualty module (injury and fatality): state, date, fire department ID, injured person, number of casualties, age or date of birth, race, ethnicity, affiliation (civilian, non-fire department emergency medical services, police, other), date and time of injury, severity, cause, human factors contributing to injury, factors contributing to injury, activity when injured, specific location when injured, general location when injured, story at the start of the incident, story when injury occurred, primary apparent symptom, primary area of body injured, disposition (transferred to hospital, etc.).

Fire service casualty module (injury and fatality): state, date, fire department ID, victim name and ID, gender, affiliation, number of casualties, age, date of birth, date and time of injury, usual assignment, physical condition just prior to injury, severity, taken to, activity at time of injury, primary apparent symptom, primary body part, cause of injury, factor contributing to injury, object involved in injury, where injury occurred, story where injury occurred, specific location where injury occurred, equipment sequence number, protective equipment item, protective equipment problem, equipment manufacture, model, and serial number.

#### Further comments

Key aspects: NFIRS is the world’s largest and most detailed collection of fire incident data. Data is collected and published on an annual basis. NFIRS includes incident and casualty forms, a coding structure for data processing, comprehensive manuals for users, and computer software and procedures. A basic web-based data entry program is available and used mostly by smaller fire departments. The National Fire Academy also sponsors a training program that details how to use the system. Local fire departments may use vendor software with state permission. Some states have purchased software licenses for all fire departments in the state. Some fire departments have custom software that is integrated with other public safety functions.

Limitations: As the primary collectors of data, fire departments and firefighters have different levels of time commitment and motivation in how well they provide complete and accurate information in NFIRS reports.

Those who are tasked with entering data may not have enough time to complete all the modules or spend time identifying the best coding option, so they do the best they can with the time they have. This may be particularly true for volunteer fire departments. Consequently, data quality may vary. NFIRS coding options can be confusing and lead to inconsistent coding responses, even between experienced NFIRS researchers. Many data elements had too many coding options or had options that were not clear, which can lead to no decision or poor data reliability. The authors also pointed out that memory is limited and that long lists of codes can frustrate those who are responsible for entering data. Some states have dedicated program managers to perform quality control and provide feedback to fire departments, but many states lack the resources to perform this function. States do not receive federal funding to support personnel engaged in NFIRS. NFIRS also records a high share of “unknown” responses to a number of data elements, possibly a result of being such a detailed reporting system. It is difficult to make changes to NFIRS because of the many different software packages in use.

#### 2.2.8. UK

##### **Fire statistics description**

The fire statistics in the UK is not a national statistics and it is subdivided into England (Home Office), Northern Ireland (Northern Ireland Fire and Emergency Service), Scotland (Scottish Fire and Rescue Service) and Wales (Welsh Government). The data is usually collected by the fire brigades in the aftermath of an event. The inputs to the fire statistics are managed by the relevant organizations without having a national database. While England, Scotland and Wales have adopted the Incident Recording System (IRS) for the collection of the fire incident data, Northern Ireland has its own system. Therefore, four different fire statistics datasets are available with three of them based on the IRS.

##### **Collection of the information**

The summary table has been completed based on the Incident Recording System, which is publicly available. However, the fire statistics of England, Scotland and Wales are published annually with a limited number of fields recorded. Information for Northern Ireland has been requested and its fire statistics description has not been inserted in the summary table due to delay in the response.

##### **Summary table – Part 1: Definitions**

In the IRS, detailed definitions are provided for almost all of the major areas of investigations with specific fields recorded. In particular, fire incidents are subdivided into primary, secondary, and chimney fires. It also has an appropriate separation between accidental and deliberate fires. Building characteristics are provided and fatalities and non-fatal casualties are specified. For the fire safety measures, definitions for alarms, automatic extinguishing systems, compartmentations and escape routes are described by a dropdown menu with clear classes. No evaluation of direct or indirect costs of fire is present.

##### **Summary table – Part 2: Fields recorded in the fire statistics**

In Part 2, the majority of the fields are covered in the IRS, except for the evaluation of direct and indirect financial/monetary costs. Fire incidents, fire causes and consequences are present, as well as fatalities and casualties. In particular, for the fire consequences, fire damage (flame and/or heat damage) and total damage (flame and/or heat and/or smoke and/or water damage) are recorded in m<sup>2</sup>.

##### **Further comments**

- A national fire statistics is not present. In England, Scotland and Wales the statistics are based on the IRS while Northern Ireland has its own system.
- Fire statistics in the IRS is very detailed with clear definitions and the fields available cover the major areas of investigations.
- No evaluation of the economic impact of fire and economic impact are available.

### 3. ANALYSIS OF THE DEFINITIONS

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Part 1 of the summary table involves the analysis of the definitions available in the fire statistics. For a total of 23 countries (15 EU and 8 Other European and Non-European countries), information has been received and reclassified according to the major areas of investigation highlighted in Table 1. The tables with the definitions present in the fire statistics of the countries examined are available in Appendix I for EU countries and Appendix II for Other European and Non-European countries. In the following sections, the evaluation of the analogies and differences in the definitions provided has been developed and the terminology obtained compared with the one provided by the ISO TS 17755-2.

#### 3.1. FIRE INCIDENTS

The analysis of fire incidents is subdivided into three main parts which are accidental fire, deliberate fire and false alarm. Then ISO TS 17755-2 presents the following definitions:

- "3.2 Accidental fire: fire for which the cause does not involve an intentional human act to ignite or spread the fire into an area where the fire should not be.
- 3.6 Arson: act of intentionally and maliciously starting a fire or causing an explosion
- 3.7 Arsonist: person who commits arson
- 3.24 Deliberate fire, incendiary fire, intentional fire, voluntary fire: fire intentionally ignited under circumstances in which the person knows that the fire should not be ignited.
- 3.35 False fire alarm: alarm for which no fire occurred or for which fire department response was unnecessary".

The investigation of the definitions adopted in the various fire statistics is explained below according to EU, Other European and Non-European countries.

#### I. EU Countries

##### Fire incidents

- No definition is available for the description of the fire incident in Austria, Bulgaria, Denmark, France, and Germany while in the Netherland definitions are available but not provided.
- In Croatia and the Czech Republic, the number of fire incidents is collected; however, no definition is available.
- A unique definition for fire incident is present in the following countries:
  - Romania: Fire - self-sustaining combustion, which takes place without control in time and space, which causes loss of life and/or material damage and requires an organized intervention in order to interrupt the burning process.
  - Slovakia: A fire is any unwanted burning in which the lives or health of individuals or animals, property or the environment are immediately endangered, which results in damage to property, the environment or which results in the injury or death of a natural person or animal.
  - Slovenia: An incident is an event or a group of events that are caused by uncontrolled natural or other forces, which can endanger the life or health of people and animals. It can also cause damage of property, cultural heritage and the environment in such extend, that it is required to use special measures, forces and resources to control the incident, since regular activities, forces and resources are not sufficient. Fire is a process of rapid burning that is spreading uncontrollably in time and space. The fire characteristics are energy release together with smoke, toxic gases and flames. The consequence of rapid burning is an explosion.
  - Sweden: Fire or fire incident: In Swedish fire is to some extent defined by language, there are separate words for unwanted and wanted fires (like a fire for heating your house). In addition, a definition like "uncontrolled flame, glow or smoke that caused damage" for Brand (fire). Fire incident is defined as danger that a flame, glow, smoke or heating of flammable material might cause damage.

From these definitions is clear how fire incident is usually referred to an uncontrolled burning able to endanger the health of individuals and damage property as well as the environment.

Accidental fires, referred to an unintended event causing the fire incident:

- Estonia: Unexpected and unintended event, which causes damage to the person's life, property or environment. Crucial elements of accident are suddenness, involuntary and damage.
- Finland: Accidental fires include those where the motive for the fire was presumed to be either accidental, negligent, or not known (or unspecified).
- In the Netherlands, definitions exist but are not specified.

Deliberate fire, the fire incident is caused by an intentional cause defined as deliberate:

- Estonia: Intentional activity, which purpose is to make harm to another person, using fire for it.
- Finland: Deliberate fires include those where the motive for the fire was 'thought to be' or 'suspected to be' deliberate. This includes fires to an individual's own property, others' property, or property of an unknown owner.

False alarm could involve the notification of a false alarm by an individual or automatic fire alarm system as presented in the following fire statistics:

- Estonia: A false alarm of an automatic fire alarm system is an alarm caused by other factors than a fire.
- Finland: No fire at the scene.
- Romania: False alarm - Upon arrival of the crews at the scene it is found that it does not exist.
- Moreover, in Hungary, only the definition for a false alarm is provided: There is no incident at the indicated location, no event requiring the intervention of firefighters, only an event deemed to be by a caller or fire alarm device (the notifier misjudged the event). The use of detection and surveillance tools does not mean intervention, e.g. lamp, thermal imager, gas sensor. But here counted chimney fires that do not require the intervention of firefighters and the fire does not spread from the chimney to its surroundings.
- Finally, fire incidents can be classified as false alarms in Italy and as fire false alarm, malicious and good intent in Ireland. However, no definition is provided.

## **II. Other European and Non-European countries**

Fire incident is provided where accidental, deliberate fires and false alarms are recorded:

- Canada: Any instance of destructive or uncontrolled burning, including explosion of combustible solids, liquids, or gases. Accidental, deliberate and false alarms are recorded.
- USA: Incident Types: Structure fire, Fire in Mobile Property Used as Fixed Structure; Building fire; Confined fire (Cooking fire without extension beyond cooking vessel, Chimney or Flue Fire confined to chimney or flue, Incinerator overload but no flame damage outside incinerator, Fuel burner; boiler without flame damage outside firebox, Commercial compactor confined to contents, Trash or rubbish fire in structure but no damage to structure of contents). Accidental, deliberate fire included under causes and false alarm included under type of incident.
- In the UK, there are definitions for primary, secondary fires and chimney fires where primary fires are generally more serious fires that harm people or cause damage to property while secondary fires are generally small outdoor fires, not involving people or property. Moreover, a late fire is defined as are fires attended by a Fire and Rescue Service which were known to be extinguished when the call was made.

Accidental fire is available in:

- New Zealand: Fires where the proven cause does not involve an intentional human act to ignite or spread a fire into an area where the fire should not be.
- Russia: Uncontrolled burning, causing material damage, harm to the life and health of citizens, the interests of society and the state.
- UK: Accidental fires include those where the motive for the fire was presumed to be either accidental or not known (or unspecified).

Deliberate fire:

- New Zealand: Incendiary - An unlawful, deliberately-lit fire where, given the known information the fire is likely to be a result of malicious intent or reckless disregard of others and property, to cause unlawful damage.
- Russia: Deliberately or inadvertently setting fire to objects in such a way that the fire is able to spread further spontaneously after removing the ignition means.
- UK: Deliberate fires include those where the motive for the fire was 'thought to be' or 'suspected to be' deliberate. This includes fires to an individual's own property, others' property or property of an unknown owner. Despite deliberate fire records including arson, deliberate fires are not the same as arson. Arson is defined under the Criminal Damage Act of 1971 as 'an act of attempting to destroy or damage property, and/or in doing so, to endanger life'.
- In Switzerland, there is a classification for accidental and deliberate fires, but no definition is provided.

False alarms could be found:

- Norway: There are two types of false alarm.  
"ABA Feil i Bruk" og "ABA teknisk/ukjent" alarm: An alarm which is given accidental or in good faith without fire or risk of a fire or any damage which require or could require the fire brigade.  
A False alarm "Falsk ABA": An Alarm which is given intentionally and in bad faith without fire or risk of a fire or any damage which requires or could require the fire brigade or where there is no other damage.
- Furthermore, in Australia, Russia and the UK, false alarms are recorded in the fire statistics, but a proper definition is not available.

### **3.2. BUILDING DESCRIPTION**

In the building description there are generally two philosophies which are followed:

- Buildings are distinguished between residential and non-residential buildings, and
- Buildings are described with regard to the national building code, often with regard to height and use of the building.

In several countries a drop-down list or a list of typical buildings is given from which the property type can be chosen.

The ISO TS 17755-2:2020 presents several definitions regarding buildings:

- 3.10 building: permanent or semi-permanent walled and roofed structure that stands alone and separately from other structures, including those under construction, or any comparable structure
  - Note 1 to entry: See also built environment, ISO 13943:2017, 3.32.
  - Note 2 to entry: When buildings are used for automatic operations, this shall be specified.
- 3.11 building fire: fire involving any kind of building (3.10) such as residential, commercial, public building
- 3.52 height of a building: distance between the floor of the ground floor used by firefighters and fire engines and the floor of the highest level used by people of the building (3.10)
  - Note 1 to entry: This is at least the number of floors above the ground level of the building.
- 3.26 dwelling fire, home fire, residential fire: fire which occurs in a property that is also a place of residence, excluding hotels, hostels, and residential institutions.

#### **I. EU Countries**

Residential and Non-residential buildings:

- In Switzerland, residential buildings are: Building whose major part of the horizontal area is used for residential purpose.
- In Croatia, Fires by fire objects (buildings types, sectors of industry, etc.) are collected.
- In Denmark, the building description is defined in a "pick list" which specifies which type of building is on fire.
- In Estonia, it is referred to the Building Code: A building is a construction work that has an interior space that is separated from the external environment by the roof and other parts of the building envelope, Residential buildings/House, block of flats, dormitory, auxiliary buildings, Non-residential buildings, Public buildings, industrial buildings.
- In Finland, several building characteristics are reported on separated Building form which are:
  - Residential buildings: Detached house, attached house or block of flats, free-time residents.
  - Non-residential buildings: Commercial building, office building, office building, transport and communication building, institutional and healthcare building, assembly building, educational building, industrial building, warehouse, building for fire services, agricultural building or other building.
- In France, for residential buildings, there are definitions for different types of buildings in French regulations for dwellings (by type and height). These are also used in Fire statistics from firefighters. For non-residential buildings, there are definitions for different types of public buildings (by type and height). These are also used in Fire statistics from firefighters.
- In Ireland, fires are recorded in Domestic buildings, Institutions, Industrial, Commercial, Service and Other. The definitions are the following:
  - Residential buildings: Domestic buildings: Chimney Fires in Houses; Other House Fires; Apartments, flats and bedsitters; Caravans/Mobile Homes.
  - Non-residential buildings: Institutions: Hospitals; Schools; Other institutions, Industrial: Factories, Chemical Plants; Storage Buildings/Warehouses, Commercial: Shops/Supermarkets; Offices; Hotels/Guesthouses/Boarding Houses, etc. Service: Places of



Public Entertainment (Dance Halls, Discos, Cinemas, Theatres, Bingo Halls); Public Houses; Restaurants.

- In Italy, residential buildings are Residential Places and Homes: Private flats and homes; Generic building; Others; Private parking; Gypsy camps; Temporary buildings. Non-residential buildings are Places for specific uses; Storages of solid combustibles; Commercial and sales stores; Agricultural and farming places; Traffic and parking areas; Mountain areas; Other places, waste storage rooms; Switchboard room.
- In the Netherlands, residential buildings are buildings where people live for at least 6 months a year (houseboat and holiday home can be included) and non-residential buildings, all building types that are not residential.
- In Slovakia, the residential part of a building is the part of the building that contains flats or a flat intended for long-term housing; the residential part of the building should have a separate entrance from the public space.
- In Slovenia, specific requirements for buildings are stated: Article 17 (fire safety) says: (1) In order to reduce the risk to people in or near them and the environment, facilities must ensure fire safety and enable effective and safe action by firefighters and rescuers. A sufficient amount of water for extinguishing must be provided. (2) The load-bearing structure of a building must maintain the required load-bearing capacity for a certain period of time in the event of a fire. To limit the rapid spread of fire throughout the building, building elements must be used that are difficult to ignite, emit small amounts of heat and smoke when ignited, and limit the rapid spread of fire over the surface. (3) In order to limit the spread of fire throughout the building, the building must be divided into fire sectors. (4) Facilities must provide a sufficient number of properly carried out evacuation routes and exits at appropriate locations so that people can leave them quickly and safely. To ensure the rapid and safe evacuation of people and the rapid intervention of firefighters and rescuers in the facility, fire alarm and alarm systems must be installed. (5) Unobstructed and safe access for firefighting and rescue must be provided in and around facilities. (6) Appropriate fire-fighting systems and devices and equipment must be installed or installed in the facilities. (7) The external walls and roofs of buildings, partition walls, together with doors, windows and other penetrations, must reduce the risk of the fire spreading to neighbouring buildings. Residential buildings are defined as buildings of which at least half of the usable floor area is used for residential purposes. In case less than half of the usable floor area is used for residential purposes, the building is categorised as non-residential, depending on the purpose of the building.
- In Sweden, a building is a permanent construction with a roof or roof and walls placed on ground or partly below ground or placed for a long period at a certain place in water constructed so that people can be in it. Residential and non-residential buildings are not defined.

## **II. Other European and Non-European countries**

Residential and Non-residential buildings:

- In Australia a code for buildings exists. Determining which major division, the fixed property falls within will assist in finding the correct subdivision. Three digits must be recorded for this code. For each of them property subtypes are available:
  - Public Assembly Property Division 1
  - Educational Property Division 2
  - Institutional Property Division 3
  - Residential Property Division 4
  - Shop/Store, Office Property Division 5
  - Primary Industry, Utility, Defence Property Division 6
  - Manufacturing Property Division 7
  - Storage Property Division 8
  - Special Property Division 9
  - Unclassified Division 0
- In New Zealand, a building fire is referred to as a 'structure fire', either with or without damage. Residential building is a building where a person or persons normally live. Does not include hotels, temporary accommodation or hostels. Non-residential buildings: Nil - field breaks down into general property use. 'General Property Use' is defined as 'the board use of the location where the emergency has occurred.
- In Russia, a building fire is a fire in aboveground construction with premises for living and (or) activities of people, location of production facilities, storage of products or keeping animals. Residential buildings are apartment buildings for permanent residence of people and dormitories for living during the period of work or study. Non-residential buildings are buildings which are not apartment buildings for permanent residence of people and dormitories for living during the period of work or study.

- In the UK, building characteristics are reported: number of floors below and above the ground level. Residential buildings are Dwellings (residential homes and HMOs) and Other residential (hostel, B&Bs, Nursing homes, Students halls of residence, etc.) and Non-residential buildings are Offices, shops, factories, warehouses, restaurants, cinemas, public buildings, religious buildings, agricultural buildings, railway stations, sheds, etc.
- In the US, a building is defined as a Property use, structure. Residential buildings include 9 code choices and non-residential buildings are defined as Assembly; Educational; Health care, detention and correction; Mercantile, business; Industrial, utility, defense, agriculture, mining; Manufacturing, processing; Storage.
- In the other countries, the building is described according to terms used in the building regulations or with the implicit regard to building regulations but without a specific definition written down in the fire statistics.

### **3.3. FIRE CAUSES**

#### Fire causes

- The ISO TS 17755-2 defines the fire cause (3.16) as a predefined categorical class of the primary cause of the fire.
- Most of the countries have no definitions but many of them have a dropdown menu from which it is possible to choose the fire cause.
- The following countries have a definition: Italy, Romania, New Zealand, Russia.
- The existing definitions are similar and can be summarized as the circumstances or conditions that cause the fire.

#### Source of ignition

- The existing definitions are similar to the ISO TS 17755-2 definition, where the source of ignition (3.74) refers to the energy that initiates the combustion.
- Most of the countries have no definitions but many of them have a dropdown menu from which it is possible to choose the source of ignition, such as the heat source, material first ignited, and equipment involved in the ignition.
- The following countries have a definition: Estonia, New Zealand, Russia.
- The existing definitions are similar and can be summarized as the energy or source of energy that initiates ignition or combustion.

#### Area of fire origin

- The existing definitions are similar to the ISO TS 17755-2 definition, where the area of fire origin (3.5) refers to the localized area where the fire started.
- Most of the countries have no definitions but many of them have a dropdown menu from which it is possible to choose the area of origins, such as kitchen, living room, others.
- The following countries have a definition: Australia, New Zealand, Russia
- The existing definitions are similar and can be summarized as the area/place where the fire originated.

From the definitions provided by the fire statistics of the EU, Other European and Non-European countries, the following statements can be affirmed:

- Drop Down menus with the limited amount of possibilities of causes, sources of ignition and areas of origins give a possibility to compare statistical data, once being unified. On the other hand, they limit the editor to given possibilities (a good asset would be to get the full drop-down menus from the countries to compare them with each other).
- In the existent difference of definition/dropdown menus of fire causes and sources of ignition one can see possible different approaches of fire investigation - elimination process versus hypothesis building and verifying, even if the result will be in the most cases the same, the dropdown menu is limiting the number of possibilities (if there is not a free text box, the editor can fill in).
- Differences in interpretation of the terms such as the cause of the fire and sources of ignition can be seen. Some countries report concrete possibilities of a cause of the fire, some also first fuel while others circumstances of the fire (what is also according to ISO) but perhaps difficult to compare statistically. Related to the source of ignition there is also a deviation in reporting. Some countries refer to heat transfer, some to kind of energy that leads to a fire, others also report first ignited material in this category of statistics.

### 3.4. FIRE CONSEQUENCES

Only 5 EU countries and 7 Other European and Non-European countries provide definitions for the different generic groups dealing with fire consequences. Those are Estonia, Finland, Netherlands, Romania, Slovenia, Australia, Canada, New Zealand, Norway, Russia, UK and USA while other countries (e.g. Hungary) record these fields and interpret them, but they do not have specific definitions.

#### Fire spread

- Fire spread or fire propagation (3.46) is defined according to ISO TS 17755-2 as the movement of fire from one place to another.
- Estonia, Finland, Romania, New Zealand, UK and USA define fire spread generally as the evaluation of the extent of flame (and smoke) damage at firefighter arrival and at stop. The possible measurement is to report if the fire was confined to (spread to) room of origin, the floor of origin, building of origin, or beyond the building of origin.
- While in Australia the focus is on determining the reason or the most important factor that allowed flame spread (or char) beyond the room or area of origin.
- In Russia, fire spread is defined as an increase in the combustion zone and/or the likelihood of exposure to hazardous fire factors.

#### Horizontal and vertical fire spread

- According to ISO TS 17755-2, the extent of fire propagation (3.29) is defined as the horizontal and vertical dimension of fire spread.
- Finland, New Zealand, and the UK measure the horizontal area damage in m<sup>2</sup>. New Zealand also measures the vertical area damage in m<sup>2</sup>. In contrast, the Netherlands does not necessarily separate horizontal and vertical fire spread but rather evaluate if and how the fire spread inside/outside the building or to another floor, which can be a combination of fire horizontal and vertical fire spread.

#### Damage

- For the definitions available in the ISO TS 17755-2:
  - "3.23 Damage: total loss caused by fire, including direct property damages (3.25) and indirect losses (3.54) such as business interruption, loss of future production and including loss of wildlife or watershed values in wildland fires.
  - 3.25 Property damage: property damages: estimated monetary value of the damage to property and contents caused by fire and firefighting operations, including costs for demolition and decontamination as well as indirect losses (3.54) due to business interruption"
- Slovenia, Canada, Russia, and ISO TS 17755-2 introduce different definitions for damage that are not specifically contradictory, but with different level of precisions.
- Slovenia: Damage that is caused by natural or other accident.
- Canada: Extent of Damage is the total extent of damage caused by actual burning or charring and includes damage caused by heat (browning, blistering, etc.), smoke, water and other extinguishing agents.
- Russia: Direct material damage from a fire is understood as material values estimated in monetary terms, destroyed and (or) damaged as a result of exposure to hazardous fire factors and their associated manifestations.
- Finally, Estonia has a mathematical equation to calculate the property damage as a function of different parameters such as building square metre value, burnt area, depreciation percentage, sanitary repairs, renovation, capital repairs and warranty repair.
- Finland, New Zealand, and Romania estimate the damage caused by fire depending on the area affected by fire in m<sup>2</sup>.

#### Fire

- The definition in ISO TS 17755-2 is specific for reported fire (3.39):
  - "<fire statistics> fire that receives a fire department response regardless of loss, without any exception.
  - Note 1 to entry: In some countries, a fire can be reported to a fire station. In this case, it is specifically noted as such.
  - Note 2 to entry: Reported fire does not include the following, except where they cause fire or occur as a consequence of fire: explosion, lightning and electrical discharge.
  - Note 3 to entry: This definition differs from general definitions of fire given in ISO 13943:2017, 3.114, 3.115 and 3.116."
- Estonia defines fire as "Combustion process, which is characterized by heat release, smoke and/or flames".

- In Russia it is “Uncontrolled burning, causing material damage, harm to the life and health of citizens, the interests of society and the state”.
- In the UK, the definition is “The total horizontal area damaged by the flame and/or heat (in square metres) at the stop of the fire”.
- While the first two definitions focus on the fire process and are complementary, the latter definition focuses on the fire damage.
- All definitions are technically correct; however, they depend on the context and how they are expected to be used.
- For this term, some fire statistics provide definitions for the fire incident while others for the fire damage caused by the incident.

#### Flame

- Estonia defines flame as a “combustion zone in the vapour phase which emits light” and Russia defines it as “Combustion process accompanied by flame or glow”.
- Australia and New Zealand define flame damage in a similar way (but different wordings) covering “the extent of the area burned or charred by flame impingement”.
- The UK only records if there were any heat and smoke damage, while the USA evaluates the number of stories where there is minor damage, significant damage, heavy damage and extreme damage.
- Finally, Finland records fire damage in square meters and Euros.

#### Smoke

- The ISO TS 17755-2 does not include a definition just for smoke but for the extent of smoke propagation (3.30): horizontal and vertical dimension of smoke spread.
- Estonia and Russia have similar definitions for smoke which covers “a visible suspension of solid and/or liquid particles (or aerosol) in gas formed by combustion or pyrolysis of materials”.
- The definition in Australia is also similar but is worded differently: “The extent of the smoke and heat scorch or browned damage to the structure.” Overall, they don’t seem to contradict.
- New Zealand records the approximate floor area of the structure that was affected by smoke. That is also the practice in Finland, in addition to the estimated cost of damage in Euros.
- The UK only records if there were heat and smoke damage or not.

#### Water

- Finland records the area of damage by water in square meters and its cost in Euros, while New Zealand only records the approximate floor area of the structure that was affected by water. Similarly, Australia evaluates the extent of the damage to the building and contents caused by water or other extinguishing agents. However, there are no specific definitions.

#### Total

- Finland accounts for total damage in square meters and Euros, while New Zealand only considers all damage measured in square metres. In the UK, it is the total horizontal area damaged by the flame, heat, smoke and/or water (in square metres) at the stop of the fire. Finally, in the USA, the Estimated Dollar Losses cover Property and Contents.

### **3.5. FIRE SAFETY MEASURES**

Members of the project team sought to assess whether countries included in the study collected data on a variety of fire safety measures that may have been present in fire incidents involving buildings. Information was sought on eleven safety measures: Alarm, Type of Alarm, Automatic Extinguishing Systems, Type of Automatic Extinguishing Systems, Compartmentation, Fire Barriers, Safe Areas, Smoke Extractors, Fire Brigades on Site, Escape Routes, and Evacuation. The project team sought to identify whether the various national data collection systems provided definitions of these safety measures, the type of information included in the definitions, and how differences and similarities between definitions in the respective data collections systems.

“Alarm” is the only safety measure for which a definition is available in ISO TS 17755-2, limiting comparisons with an external standard:

- “3.4 Alarm: it is the time to notification to fire service or other local service
  - Note 1 to entry: This definition differs from alarm time defined in ISO 13943:2017, 3.16 which corresponds to the time interval between ignition of a fire and activation of an alarm to notify occupants”.

In general, although most of the data collection systems include data on alarms, the focus can significantly differ between systems.

It is also worth noting that there may be some inconsistency in how certain of the fire safety measures were interpreted by individual members of the project team. For instance, it isn't clear whether escape routes, safe areas, evacuation referred to building features that were specifically designed with fire safety in mind or, alternatively, whether occupants were simply able to find passages to safety, to shelter in safe areas, or to evacuate, and whether compartmentation referred to fire spread or to fire safety structural features. There was also likely to be confusion whether fire brigades on site referred to whether or how soon fire departments reached the scene of a fire or to fire departments permanently stationed at the location of a fire, such as industrial fire brigades.

The results of this research task are summarized below for three country categories: member states of the European Union, European nations that are not members of the European Union named Other European, and Non-European countries.

### **I. EU Countries**

Seventeen members of the European Union were included in the assessment of fire safety measures. Our research found that the fire data collection systems in seven of these countries included a definition of at least two of the safety measures: Austria, Denmark, Estonia, Finland, Germany, Hungary, and Slovakia. However, no definitions were provided for Germany or Austria. Definitions were classified as not available for four countries: France, Ireland, Italy, and the Netherlands. Definitions were not specified or unclear in six countries: Bulgaria, Croatia, the Czech Republic, Romania, Slovenia, and Sweden. Consequently, the review of fire safety measures in the European Union is limited to five countries for which at least some of the definitions for fire safety measures are available: Denmark, Estonia, Finland, Hungary, and Slovakia.

Alarm:

- Four countries (Denmark, Finland, Hungary, Slovakia) were found to capture information on "Alarm" in their data collection systems.
- The information in each case referenced the physical presence of a fire alarm in a building, which differs from the ISO TS 17755-2 definition of alarm as "time to notification to fire service or other local service."

Type of Alarm:

- Four countries (Denmark, Estonia, Finland, and Hungary) captured information on the type of alarm, but categories differed between them, such as "ion detector, optimal smoke detector, thermodetector, multifunction detector" vs. "autonomous fire alarm sensor, autonomous fire alarm system, automatic fire alarm."

Automatic Extinguishing System:

- Information on the presence of automatic extinguishing systems is captured in four countries (Estonia, Finland, Hungary, Slovakia).

Type of Automatic Extinguishing System:

- Finland and Hungary capture information on the type of automatic extinguishing system.
- Finland captures "type of sprinkler," while Hungary captures whether the system is "water mist, gaseous, pressurized, drencher, foam, powder, or other."

Compartmentation:

- Three data collection systems (Estonia, Finland, Hungary) capture compartmentation as a structural element of a building.
- Information on compartmentation for a fourth (Denmark) references fire spread from the main space and the reason for the spread, such as open doors.

Fire Barriers:

- Two countries (Estonia and Slovakia) collect data on fire barriers and reference the barrier as a structural feature designed to stop the spread of fire.
- Information on fire barriers in Finland is said to be included in compartmentation, but no additional information is provided.

Safe Areas:

- Safe area in Hungary is identified as a designated room or space in a building that is designed to ensure safety until rescue or escape.
- Estonia identifies the safe area as a room where people are evacuated to but doesn't indicate that this is the room designed as a safe area.

Smoke Extractors:

- Four countries (Estonia, Finland, Hungary, Slovakia) collect information on smoke extractors.
- Finland and Slovakia distinguish between automatic and manual extraction systems.
- Estonia references smoke extractors as a permanently installed building system.

Fire Brigades on Site:

- Two countries (Finland and Hungary) include information on fire brigades on-site, but reference different phenomena: Finland reports arrival time of fire brigades, while Hungary references fire brigades that are maintained by the facility of fire occurrence.

Escape Routes:

- Estonia, Finland, Hungary and Slovakia identify escape routes as a route used to facilitate evacuation. Two indicate or imply that the escape routes are a building design feature.

Evacuation:

- Estonia, Finland, Hungary, and Slovakia identify evacuation as the departure or removal of building occupants to safety.

## **II. Other European and Non-European Countries**

Information was collected on fire safety measures for four European nations that are not member states of the European Union (Norway, Russia, UK, and Switzerland). Although the research indicated that the fire data collection systems for Switzerland included definitions on all of the fire safety measures within the scope of review, no definitions of those measures were identified. Information on fire safety measures is therefore limited to Norway, Russia, and the United Kingdom. Information was also collected on fire safety measures for four non-European countries (Australia, Canada, New Zealand and the United States).

Alarm:

- All Other European and four Non-European countries indicate that information on alarm presence is captured in data collection systems.

Type of Alarm:

- Norway and the UK capture information on the type of alarm but utilize different categories.
- Detector type in Norway is based upon the type of detection (ion detector, optical smoke detector, thermodetector, multifunction detector)
- Categories in the UK are based upon alarm power source (Smoke alarm – 1-year battery; Smoke alarm - long-life battery; Smoke alarm – mains; Smoke alarm - mains and battery; Smoke alarm - Battery type not known; Mains security system including smoke alarm; Other; Not known).
- Canada, New Zealand, and the USA capture information on the type of alarm.
- Canada captures whether the alarm is: Single- or two-stage central alarm, whether the alarm is a voice alarm, and whether the alarm is connected to a remote monitoring agency single-stage central alarm with connection to the remote monitoring agency.
- The USA identifies whether the alarm is a smoke alarm, heat alarm, combination smoke and heat alarm, sprinkler water flow detection alarm, or involves more than one type of alarm.

Automatic Extinguishing System:

- Russia and the UK capture information on the presence of automatic extinguishing systems.
- All four Non-European countries have information on the presence of automatic extinguishing systems.

Type of Automatic Extinguishing System:

- Information is collected only by the UK, based on categories of Water mist; Gaseous system - halon; Gaseous system - other; Pressurization; Smoke ventilation; Drencher; Foam; Powder; Other.
- The USA identifies whether the system is wet pipe, dry pipe, dry chemical, foam, halogen-type, carbon dioxide or other.
- New Zealand identifies different types of system, but options are not available.

Compartmentation:

- Information on compartmentation was included for Norway and the UK.
- The information for Norway refers to whether fire spread from the area of origin and whether spread was due to open doors, holes, etc.
- The UK more directly references compartmentation as a building design feature, where the size of compartment is recorded and compartment categories include: Stopped/checked spread; Breached - current building work; Breached - previous building work; Breached - fire doors left open or incorrectly

fitted; Damage to compartmentation; Fire spread through gaps or voids in construction; No compartmentation in the building; Not applicable; Other.

- No information on compartmentation as a building design safety feature in Non-European countries.
- Australia collects information on the smallest compartment within which the fire is contained.
- The USA collects information on the extent of fire spread.

#### Fire Barriers:

- Information on fire barriers for the UK is included in information on compartmentation.
- The data collection system in Russia describes fire barrier as: A building structure with a standardized fire resistance limit and a structural fire hazard class of a structure, a volumetric element of a building or other engineering solution designed to prevent the spread of fire from one part of a building, structure, structure to another or between buildings, structures, structures, green spaces.
- No information on the presence of fire barriers in Non-European countries.

#### Safe Areas:

- The data collection system in Russia is said to include safe areas as "An area where people are protected from the effects of fire hazards or where there are no fire hazards".
- The response for Norway indicates that safe area involves "Fire technical equipment and functionality (smoke alarm, fire blanket, fire technical installations)".
- No information on smoke extractors as a feature of the building in Non-European countries.
- New Zealand defines a "place of safety" as a place in the vicinity of a building from which people may safely disperse after escaping the effects of a fire. It may be a place such as a street, open space, public space or an adjacent building.

#### Smoke Extractors:

- Information on smoke extractors is only included for Russia, with this definition: The smoke exhaust system is a specialized complex of ventilation equipment designed for the prompt removal of combustion products from the premises, for removing smoke from the evacuation routes of people and contributing to the correct organization of measures to eliminate the fire.
- No information on smoke extractors as a feature of the building for Non-European countries.
- New Zealand records equipment adopted by fire brigades for the extraction of smoke.

Fire Brigades on Site: No information.

#### Escape Routes:

- Russia defines an escape route as: An exit leading to the escape route directly outside or into a safe area.
- The UK includes escape route information in several response options: Okay – no visible concerns; Exits locked; Exits blocked (e.g. Materials stored blocking exit); Exit route blocked by smoke/flames; Poor implementation e.g. doors swing the wrong way; Contents contributing to abnormal fire spread/smoke production; Not applicable; Other.
- New Zealand records only if occupants could or could not escape safely.

#### Evacuation:

- Russia defines evacuation as: The process of organized independent movement of people directly outside or into a safe area from premises where there is a possibility of exposure of people to dangerous fire factors.
- The UK includes evacuation information as: Yes (with data on people evacuated with or without assistance) and No Escape Routes.
- New Zealand asks for evacuation status and whether the location of the emergency was fully evacuated during the emergency. Fire Safety, Evacuation Procedures and Evacuation Schemes Regulations 2018 require buildings to have a 'means of escape from fire' either by "The owner of a building must have a procedure in place (evacuation procedure) for the safe, prompt, and efficient evacuation of the building's occupants in the event of a fire emergency requiring evacuation, or an evacuation scheme to enable the safe, prompt and efficient evacuation of the building's occupants in the event of a fire emergency evacuation.

### **3.6. FIRE RESPONSE**

Fire response constitutes of two different entries, “Fire service time of response” and “Occupant fire response”. These terms are part of ISO TS 17755-2 only as “response time (3.68) – time from the time of call to the arrival of the first fire engine”.

Fire service time of response:

- The examined fire statistics show that in many countries only a definition for “Fire service time of response” is provided. The fire service response time is also possible to be calculated in many cases based on different entries.
- In Denmark and Norway, this can be constituted of several time entries like alarm time and date, departure, arrival at scene, leaving scene and back at the station.
- In Hungary, the country has provided the requirements that the country has on the rescue service for response time (time between alert and the first vehicle starts moving) or what affects the response time.  
Estonia, Netherlands, Romania, Slovenia, Australia, Canada, New Zealand, Russia and UK have provided a similar definition as given by ISO TS 17755-2.

Occupant fire response:

- The term “Occupant fire response” is more ambiguous and few countries have provided a definition for this in the tables. In Finland, it is unclear if it, in fact, relates to the Fire service time of response.
- Hungary explains the regulations on who should report a fire.
- The Netherlands defines “Occupant fire response” as if someone tries to put out the fire.
- New Zealand does not provide a definition but have a selection drop list on what equipment had been used to control the fire before the fire brigade arrived.
- The UK has defined it as the time between ignition and discovery and between discovery and the call recorded.

By studying the tables obtained in Part 2 of the summary table in the fire statistics, it is possible to gain further insight into what data different countries collect that can relate to “Occupant fire response”, this is in many cases related to what actions the occupants take to control the fire, but as the term is written now it is unclear what is meant by it.

### **3.7. FIRE FINANCIAL COSTS**

The direct financial costs related to the fire incidents are defined only in 4 EU countries, while the indirect financial costs only in Slovenia. When Other EU and Non-EU countries are considered, 4 countries determined the direct financial costs and only Russia the indirect financial costs.

In the ISO TS 17755-2, there are various definitions related to the direct and indirect fire costs:

- “3.23 Damages: total loss caused by fire, including direct property damages (3.25) and indirect losses (3.54) such as business interruption, loss of future production and including loss of wildlife or watershed values in wildland fires
- 3.25 Direct property damages: damages (3.23) excluding indirect losses (3.54)  
Note 1 to entry: See also, damages (3.23) and indirect losses (3.54).
- 3.66 Property damages: estimated monetary value of the damage to property and contents caused by fire and firefighting operations, including costs for demolition and decontamination as well as indirect losses (3.54) due to business interruption  
Note 1 to entry: Property damages does not include land value. It can include indirect loss due to business interruption.
- 3.54 Indirect losses: amount of loss incurred as a result of being unable to use business property or equipment”.

#### **I. EU Countries**

The direct financial costs are evaluated as the amount of damage to the building caused by the fire in monetary terms:

- In Estonia, damage to furniture or the environment is not taken into account.
- In Finland, they are estimated by fire, smoke and water.
- In Slovakia, the direct material loss is the sum of losses calculated from estimated residual value of tangible fixed assets, materials and other values destroyed by the fire.
- In Slovenia, physical or legal person who intentionally caused an accident or because of negligence, the incident induced costs due to the emergency is required to cover the following: costs of the rescue



intervention, costs of restoration to the previous condition, costs of compensation for physical and legal people. Funds for assessing the damage in the event of a natural or other incident is provided by the government

The indirect financial costs:

- In Slovenia, they are related to the cost of the firefighting operations. In particular, the owner or manager of the facility is obliged to cover the costs of performing firefighting operations. The costs of the intervention that arise due to the tasks performed by the fire brigade are covered by the municipality. Irrespective of the previous two sentences, the costs of the intervention are covered by:
  1. The person responsible for the accident that was caused intentionally or due to negligence
  2. Whoever is not taking precautions when transporting, storing or carrying out other tasks with toxic substances
  3. Whoever is not organising that the firefighters to be present at an event or activity according to the regulations
  4. Whoever is on purpose contacting the fire unit without reason.
- The costs of interventions that arise due to the interventions performed outside of the municipality of the fire unit are covered by the Republic of Slovenia if the intervention was performed on the basis of national protection.

## **II. Other European and Non-European countries**

The direct financial costs in Other European and Non-European countries:

- The fire direct financial costs are subdivided into dollar loss, property, contents and insurance in Australia:
  - Dollar loss: the estimated monetary value of the damage to property and contents caused by fire and firefighting operations. Do not include land value.
  - Property: the reporting officer's estimation of the value of the property. Do not include the value of the contents (property includes buildings, structures and mobile property).
  - Contents: the reporting officer's estimation of the value of the contents (includes crops).
  - Insurance: whether the contents or structure or both were insured.
- In Canada, the direct financial costs are estimated in dollar loss but no methodology is provided.
- In Russia, direct material damage from a fire is understood as material values estimated in monetary terms, destroyed and (or) damaged as a result of exposure to hazardous fire factors and their associated manifestations.
- In USA, estimate of total property and contents dollar loss and pre-incident value of the property and contents are provided.

For the indirect financial costs of fire:

- In Russia, material losses due to violation of economic plans in the economy (e.g. a decline in production, a decline in trade and banking operations, a decrease in income, losses due to delays in the transport of goods).

In the following Section, the analysis of fatalities and casualties, will be provided based on the definitions available in the ISO TS 17755-2 and the description of the current terminology adopted in EU, Other European and Non-European countries.

### 3.8. FATALITIES AND CASUALTIES

#### 3.8.1. Description of the data status of ISO TS 17755-2

With regard to the current EU FireStat project, the ISO TS 17755-2 standard has been examined. Table 3 provides an overview of common terms and definitions.

**Table 3: Common terms and definitions ISO TS 17755-2**

Code	Terms	Definition(s)
3.03	Age group of victims	categorization by age of the victims (3.15) of fire Note 1 to entry: this categorization may differ locally. This document proposes the following categories: - Newborn (child under 28 days of age) - Child (person whose age is between 28 days (included) and 9 years (included)) - Youth (person whose age is between 10 years (included) and 17 years (included)) - Adult (person whose age is between 18 years (included) and 64 years (included)) - Elderly (person who is aged 65 or more)
3.15	Casualty, Victim	person killed or injured
3.18	Cause of casualty	phenomenon causing death of a person in a fire: Smoke inhalation (heat gases and toxic gases including oxygen depletion); Burn; Physical injury; Other
3.21	Condition of casualty	predefined categorical classes of the circumstances of casualty EXAMPLE Asleep at time of fire; bedridden or other physical handicap; defenestration; impairment by alcohol; impairment by drugs; impairment by medication; blinded or partially sighted; deafness; mental impairment; senility (3.72); awake and no physical or mental impairment at the time of fire; under restraint or detention; too young to react to fire emergency; child left unattended; unclassified
3.36	Fatal fire	fire with at least one fire fatality (3.37) Note 1 to entry: See also, multi fatal fire (3.62).
3.37	Fatal fire casualty, Fire fatality, Fatal fire injury, Fire death	person who has died as a result of injuries sustained during a fire incident Note 1 to entry: In this context, there is no limitation of time after the fire. Fire fatalities also include death from natural or accidental causes sustained whilst involved in the activities of fire control, attempting rescue (3.67) or escaping from the dangers of the fire, including blast and defenestration, except when a death occurred in sites with the right of extraterritoriality Note 2 to entry: Fire fatalities are composed of all persons discovered or declared dead on the location of the fire (3.58), during their transportation to the hospital or after their admission at the hospital. Note 3 to entry: A person who dies by fire resulting from vehicle accidents is included in the fire fatalities database if the death can be attributed to fire.
3.40	Fire casualty, Fire victim	person killed or injured as a direct effect of a fire without any limit of time following the date on which the injury was sustained Note 1 to entry: In some countries, limits of time are used. In such cases, this is noted.
3.42	Fire injury	person who is injured (but not fatally injured) as a result of a fire incident, without any limitation of time after the fire, Note 1 to entry: This includes being injured from natural or accidental causes sustained whilst involved in the activities of fire control, attempting rescue (3.67) or escaping from the dangers of the fire, including blast and defenestration and requiring first aid (3.48) at the scene (provided by anyone) or further medical treatment with or without any hospital admission. Note 2 to entry: A person who is injured by fire resulting from a vehicle accident is included in the fire injuries database if the injury can be attributed to fire. Note 3 to entry: In some countries, limits of time are used. In such cases, this is noted. Note 4 to entry: See also, minor injury (3.61), light injury (3.57), serious injury (3.73) and life threatening (3.56)
3.57	Light injury, Moderate injury	person who is hospitalized for 1 day to 3 days or requires 1 day to 3 weeks off work Note 1 to entry: See also, fire injury (3.42), minor injury (3.61), serious injury (3.73) and life threatening (3.56).
3.61	Minor injury	person who is hospitalized or off work for less than 1 day Note 1 to entry: See also, fire injury (3.42), light injury (3.57), serious injury (3.73) and life threatening (3.56)
3.63	Nature of casualty, Severity of casualty	stage of fire victim (3.40) EXAMPLE: Minor injury, light injury, serious injury, life threatening, death. Note 1 to entry: See also, fire injury (3.42), minor injury (3.61), light injury (3.57), serious injury (3.73) and life threatening (3.56).
3.73	Serious injury	person who is hospitalized for 4 days or more or has more than 3 weeks off work Note 1 to entry: See also, fire injury (3.42), minor injury (3.61), light injury (3.57) and life threatening (3.56).

Code	Terms	Definition(s)
3.78	Status of a victim	role of a victim (3.15) during a fire EXAMPLE: Civilian; firefighter (civilian or military, volunteer or professional, on-duty or off-duty or retired); other rescuer (civilian or military, volunteer or professional, on-duty or off-duty or retired); unknown.
3.84	Victim characteristics	information collected about victims (3.15)

The terms and definitions proposed by the ISO TS 17755-2 are inherently more than contradicting:

- Code 3.03: "victims" – the term refer to 3.15 "person killed or injured".
- Code 3.15: using the terms "casualty" and "victim", two situations are spoken of: "person killed or injured", i.e. "fire deaths" and "fire injured" are placed in one group, consequently the generic term is "victim" (see 3.40, person killed or injured).
- Code 3.18: Cause of casualty is associated with the "phenomenon causing death of a person in a fire", thus inconsistently with the term "fire death", because the term "fire fatality" actually stands for "fire deaths" (see 3.37). Thus, "fire casualty" logically means "fire injury" (person rescued from the fire) (see 3.42).
- Code 3.21: "Cause of casualty" - from the context it is not clear what is meant if "fire deaths", "fire injured" or both.
- Code 3.37: "Fatal fire casualty, Fire fatality, Fatal fire injury, Fire death" - through the combination with the word "fatal" one can understand intuitively that it is "fire death". However, the words "casualty" and "injury" are misleading, especially since the definition of "...person who has died... during a fire incident" is used. Some inconsistencies are present and it would be more appropriate to adopt "fatal fire death".
- Code 3.37: "Fatal fire injury" is described as a synonym of fatal fire casualty (3.37), fire fatality (3.37) and fire death (3.37). The term itself and the definition (refer to 3.37) can be misunderstood. If a person is injured (i.e. saved alive, in a fire), this is to be classified as a "fire injury". If the person dies from the injuries, then this person is to be classified as "fire death". The term "fatal fire injury" is misleading because it is difficult to be associate with "non-fatal fire injury". Regardless of this, the term "not fatally injured" (3.42) is used - also unclear.
- Code 3.40: "Fire casualty, Fire victim" defined as "person killed or injured as a direct effect of a fire". No clear separation of the terms is described here: see 3.15. If one speaks of "fire casualty" (3.40) or "casualty" (3.15), and of "fire victim" (3.40) or "victim" (3.15) - nothing changes in terms of content: "victim" remains the generic term for "dead and injured".
- Code 3.42: "Fire injury" is person who is injured (but *not fatally injured*) as a result of a fire incident. Thus, all other people involved are to be categorized either as "fire deaths" or simply as "affected by fire".
- All other codes continue to play a subordinate role.

### 3.8.2. Description of the current definitions in EU, Other European and Non-European countries

The definitions for fatalities and casualties of the EU, Other European and Non-European countries were evaluated, where available.

#### Fatalities/Deaths

- According to ISO TS 17755-2, a fire victim is a person killed or injured as a direct effect of a fire without any limit of time following the date on which the injury was sustained. Hungary has the same definition. In some countries, limits of time are used. For example, Finland, Denmark, Norway and Estonia use a limit of time of 30 days for the death after the fire. In Slovakia, it is 24 hours after the incident and in Sweden within 90 days of the fire. Italy does have a limit of time, namely "the time of the intervention".
- Most of the countries have a definition for victims.
- The following countries do not have a definition: Bulgaria, Czech Republic, France, Ireland, the Netherlands, Slovenia. Although these countries do not have a definition, the number of victims is collected in most of them.
- A very clear definition of victims is provided by Denmark: a person which is dead in a fire or within 30 days because of a fire, typically from smoke poison or burns.
- The existing definitions can be summarized as the number of fatal victims that died due to the consequences resulting from open or closed fire.
- When speaking of "death because of a fire", most countries mean "death from smoke poison or burns".
- Canada and the USA make a difference between civilian and fire service victims. In Canada, the classification of a fire death is: A person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
- Croatia also counts injured, rescued and missing persons as victims.

#### Type of fatality

- Most of the countries do not have a definition for type of fatality or the term is not specified.
- The following countries do have a definition: Romania, the Netherlands and the UK.
- The Netherlands divides types of fatalities into natural cause, suicide or accidental death by fire.
- Romania uses 3 categories: burned, asphyxiated and other causes.
- The UK classifies the cause and nature of fatality in the IRS.

#### Casualties/Injured people

According to the tables provided in Appendix I and Appendix II, information on what an injured person is, and the types of injury could be obtained in Estonia, Finland, France, Hungary, Italy, Romania, Slovenia, Sweden, Australia, Canada, New Zealand, Russia, UK and USA.

- In Estonia, there is a distinction between an evacuated, self-rescued and rescued person.
- The definition of casualty as a person injured in a fire is available in Finland, Hungary, Italy, Slovenia, Canada, New Zealand, Russia, UK and USA.
- In France, no definition for causality is present but types of injury are available
- In Romania, fire-related fatalities include any injury which is the direct result a fire incident.
- Injured people are estimated by the rescue service on site in Sweden.
- In Australia, a casualty is a person who dies or is physically injured as the result of an incident or the action of handling the incident and includes injuries sustained whilst responding to and returning from the incident. To be recorded, the injury must be severe enough to require treatment by a medical practitioner, regardless of whether treatment is actually received, or the injury must result in at least one day of restricted activity immediately following the incident. A death is recorded if it is attributable to the incident or the action of handling the incident.

It can be stated that:

- No uniform definition is used.
- Sometimes very different and sometimes contradicting terms are used:
  - Injured by fire,
  - Fire-related fatalities (e.g. not fire deaths),
  - Injured people and patients,
  - Casualty is a person who dies or is physically injured as the result of an incident,
  - Civilian - a person accidentally injured, member of a fire department accidentally injured,
  - Non-fatal casualties,
  - "casualties," which can either be fatal or non-fatal.

Regardless of this, it has been found that most countries still have definitions for the term "casualties". The terms can be found in the internal service instructions of the responsible ministries but sometimes not publicly available.

**Conclusions and recommendation:**

1. The terms must be standardized and defined as simply as possible in order to do justice to the linguistic diversity within the EU and to avoid misinterpretations during translation.
2. The first recommendation is therefore to use the term “fire death” for people who have died in a fire and the term “fire injury” for people injured in a fire.
3. The criteria for the term “fire death” must be uniformly specified by the specialist knowledge of medical doctors and forensic medicine experts.
4. The criteria for the term “fire injury” must be uniformly specified by the specialist knowledge of medical doctors, WHO experts, etc.
5. Persons who were neither killed nor injured by fire, but who are influenced by the consequences of the fire should be classified as affected persons.

#### 4. ANALYSIS OF THE FIELDS COLLECTED IN THE FIRE STATISTICS

The fields recorded in the fire statistics of the countries examined have been investigated in Part 2 of the summary table, as described in Section 1.2. A total of 21 EU and 8 Other European and Non-European countries have kindly provided information about their fire statistics. Due to the limited or no information received, Greece, Lithuania, Luxembourg, Malta, Portugal and Spain are not covered in this analysis.

The 8 Other European and Non-European countries have been selected based on their high accuracy in the fire statistics. They adopt a solid and complex systems for recording the information of the fire incidents and they have very extensive datasets. These are the reasons why they appear to cover more fields than those recorded by EU Member States. As described in Section 2 for each country, the data are mainly from the fire brigades, but they could belong to other sources such as insurance companies in Switzerland. Finally, as explained for Sweden, in some countries the recording system is composed of different datasets and the fields collected in the fire statistics could be covered by separated databases and not a unique one.

In Part 2 of the summary table, the fire statistics fields recorded by the relevant authorities have been classified according to the major areas of investigation described in Table 1 with a total of 98 subfields. Each authority or organization has inserted the data available in their fire statistics and it is possible to affirm that between 0 and 49% and between 50 and 74% of the total fields examined are usually covered by the fire statistics of the EU countries, and Other European and Non-European countries, respectively (Figure 1). Therefore, despite the difference in the number of datasets evaluated, it appears that in Other European and Non-European countries more detailed fire statistics are available.

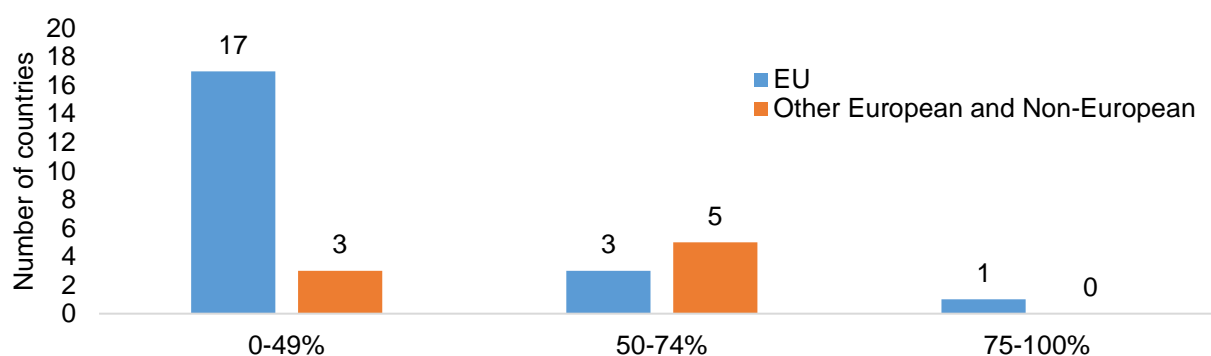


Figure 1: Data recorded in the fire statistics considering the total fields examined in Part 2 of the summary table for EU, Other European and Non-European countries.

In Figure 2, the fields related to the description of the fire incidents are introduced. The incident time, date and location are recorded for almost the total number of countries investigated despite their geographical location. Furthermore, the false alarms are recorded in 14 EU and 4 Other European and Non-European countries while the distinction between deliberate and accidental fires is less frequent (recorded in more than 9 and 5 EU and Other European and Non-European countries, respectively).

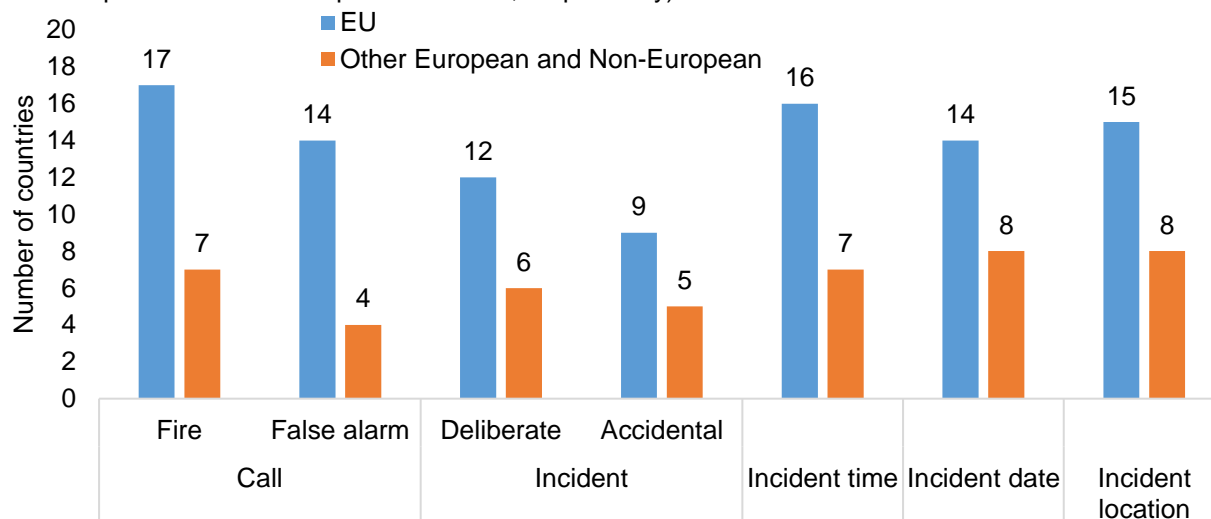
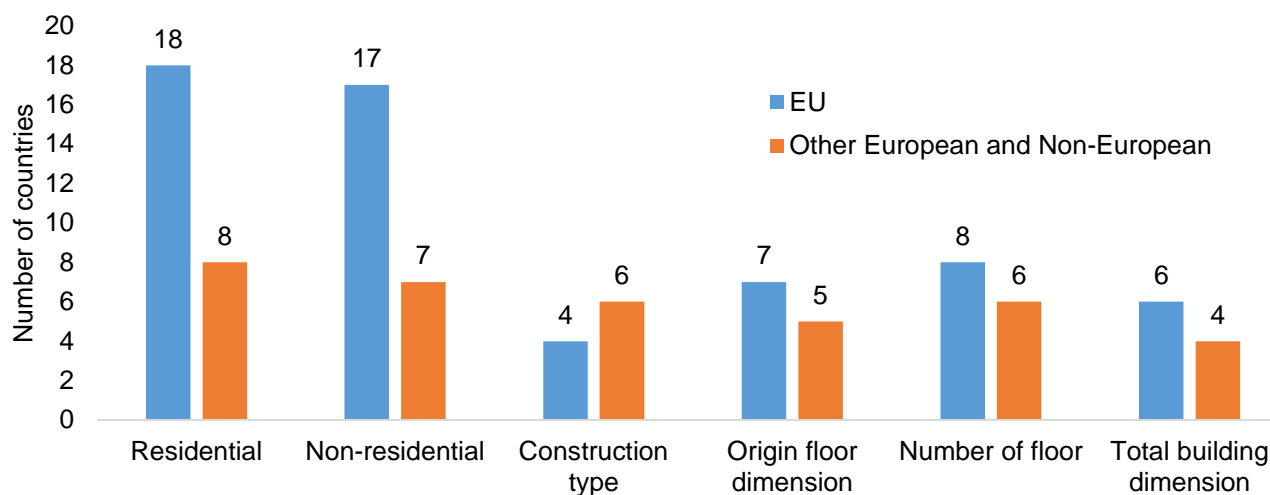


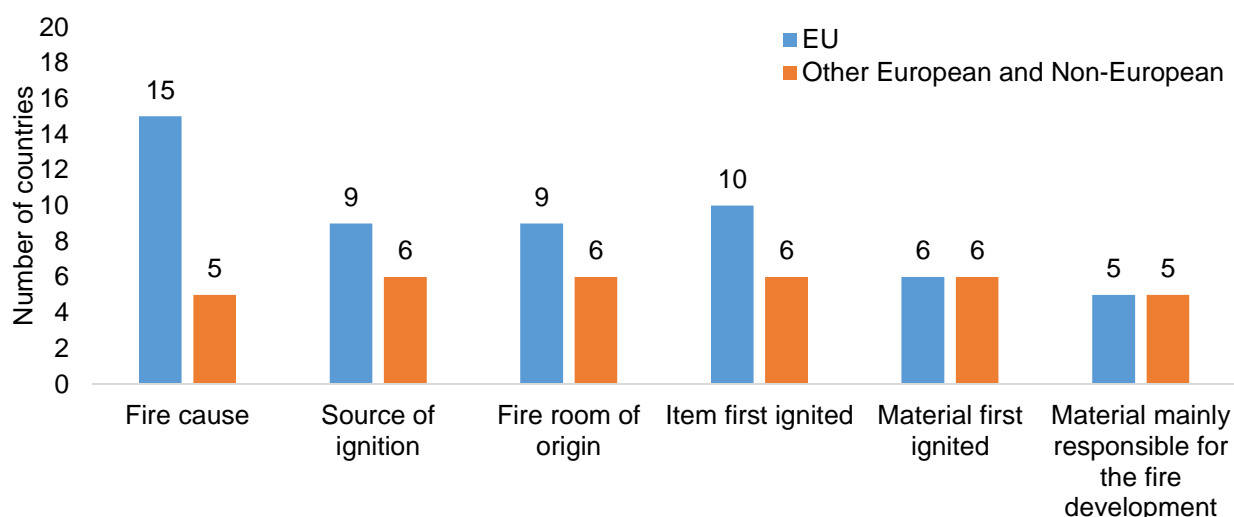
Figure 2: Fields recorded for the description of fire incidents in EU, Other European and Non-European countries.

For the description of the building involved in the fire incident, the classification of the building into residential and non-residential properties is usually available in 17 EU and 7 Other European and Non-European countries. Moreover, in several fire statistics, the building type is usually further classified in various sub-property types. The field related to the construction types is often available in Other European and Non-European countries (6) while it is present in only 4 EU countries. The number of floors, origin floor and total building dimension are recorded for a maximum of 8 EU countries and almost the total Other European and Non-European countries investigated (Figure 3).



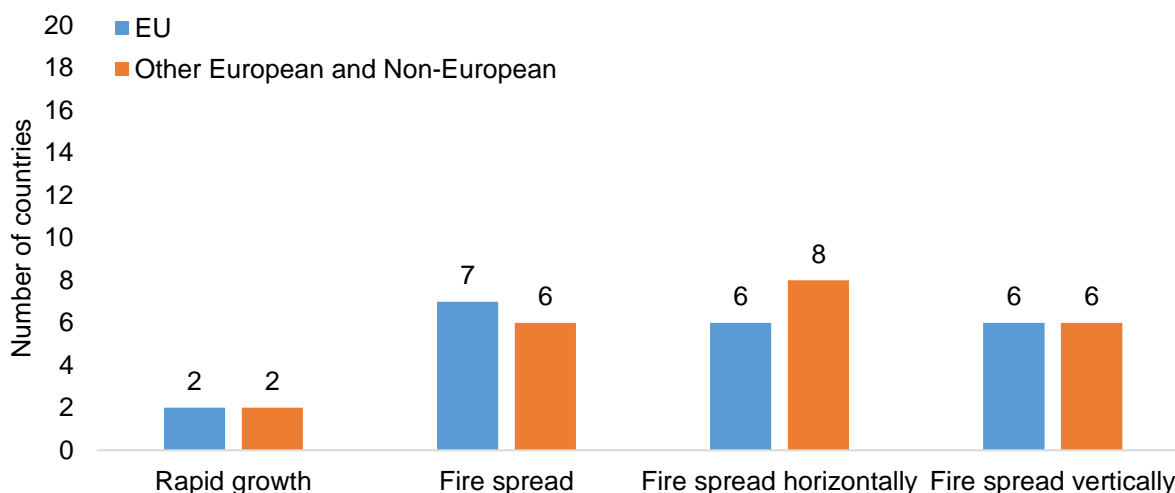
**Figure 3: Fields recorded for the building description in EU, Other European and Non-European countries.**

When the pre-fire conditions are analysed, fire causes are available in the fire statistics of 15 EU and 5 Other European and Non-European countries. For the factors contributing to ignition, source of ignition (9 & 6), fire room of origin (9 & 6), item first ignited (10 & 6), material first ignited (6 & 6) and material mainly responsible for the fire development (5 & 5) are available in the EU and Other European and Non-European countries as shown in Figure 4.



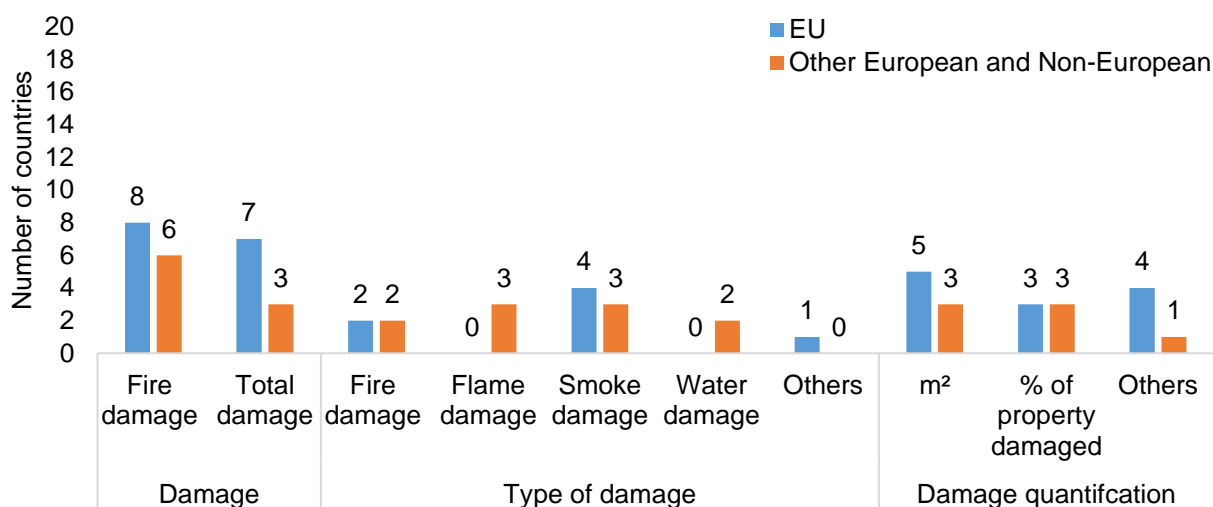
**Figure 4: Fields recorded for the fire causes in EU, Other European and Non-European countries.**

When the post-fire conditions are examined focused on the effects of the fire incident on the building, the analysis has been divided into the evaluation of fire spread, investigation and quantification of damage. According to Figure 5, the field related to the fire spread is usually present in 7 fire statistics of EU countries where 6 of them provide also a distinction between horizontal and vertical fire spread. In Other European and Non-European countries, fire spread is generally referred to as horizontal spread even if the vertical spread is recorded in 6 countries.



**Figure 5: Fields recorded for the fire consequences focused on the fire spread in EU, Other European and Non-European countries.**

The distinction between fire and total damage appears in 7 EU countries and 3 Other European and Non-European countries while damage is usually linked only to fire damage. This is also supported by the damage types recorded which are generally only related to fire damage while in 2 Other European and Non-European countries, the subdivision of damage in fire, flame, smoke and water damage is available. Furthermore, in Figure 6, it appears that fire damage is quantified based on m<sup>2</sup> and the percentage of property damage in 5 & 3 EU countries while both quantifications in 3 Other European and Non-European countries.



**Figure 6: Fields recorded for the fire consequences focused on the evaluation of damage in EU, Other European and Non-European countries.**

The evaluation of the fire safety measures is an essential aspect that should be covered in the fire incident investigation. The analysis developed by this research has subdivided the fire safety measures into alarms, automatic extinguishing systems (Figure 7) and other safety measures such as compartmentation, smoke extractors and others (Figure 8). Usually, the analysis of the presence and operation of alarms are recorded more often (11 & 9) than the type (7), effectiveness and failure (6) in EU countries. For the automatic extinguishing systems, the presence in a building is the field generally recorded (8) followed by operation and effectiveness (6), type (5) and failure (4) in EU countries. If the same analysis is repeated in Other European and Non-European countries, the fields recorded in a decreasing number of countries are operation and failure (8), type (7), presence (6) and effectiveness (5) for alarms while presence and type (7), operation and effectiveness (6), and failure (5) for automatic extinguishing systems. As described in Figure 7, almost the majority of Other European and Non-European countries provide detailed information about the alarms and automatic extinguishing systems.



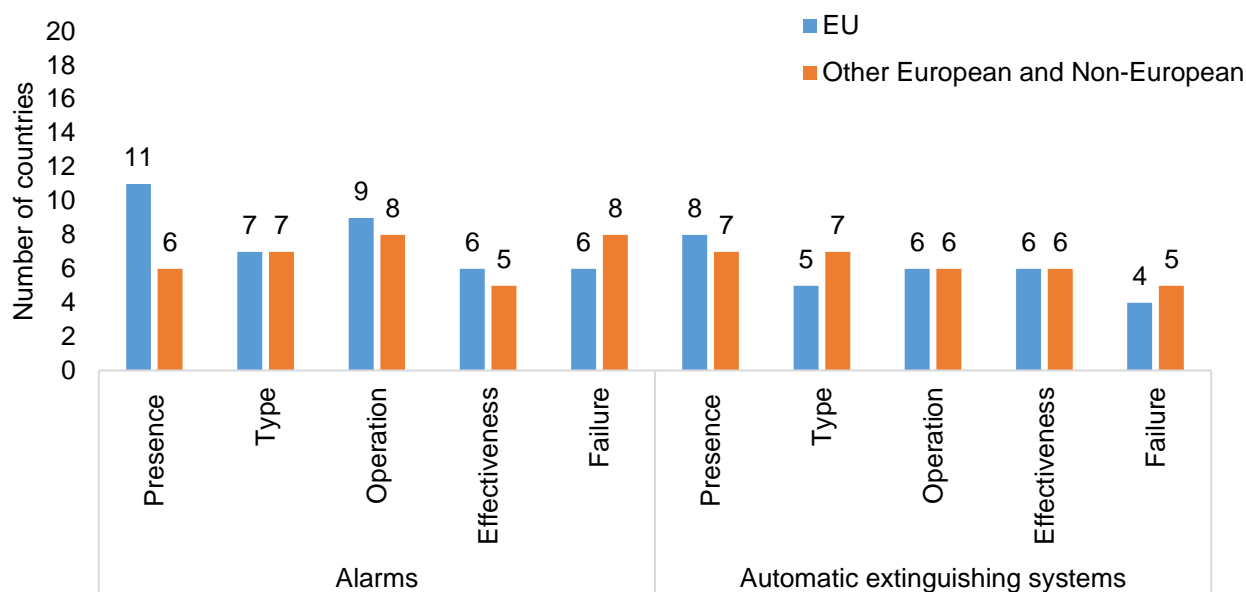


Figure 7: Fields recorded for fire safety measures focused on alarms and automatic extinguishing systems in EU, Other European and Non-European countries.

When other fire safety measures are investigated in Figure 8, the evacuation (8 & 4), the presence of fire brigade on site (7 & 4), smoke extractors (6 & 2) and compartmentation (5 & 3) are the fields highly recorded in EU, and Other European and Non-European countries, respectively. Fire barriers (4 & 1) and escape routes (3 & 2) are the fields recorded less often in EU, and Other European and Non-European countries while the field of safe areas is available only in 2 EU countries.

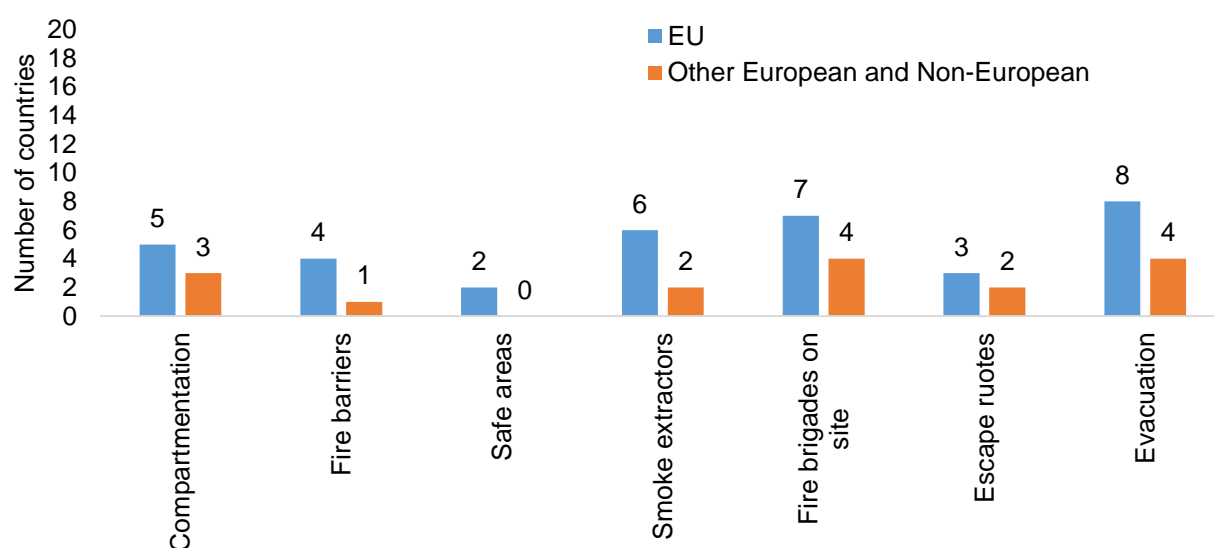


Figure 8: Fields recorded for other fire safety measures in EU, Other European and Non-European countries.

The response time to the fire incident has been classified according to the response of occupants and firefighters as illustrated in Figure 9. The response time of occupants is divided into the time between ignition to discovery and between discovery to call and these two time intervals are available in the fire statistics of 4 and 7 EU countries and both time intervals in 2 Other European and Non-European countries. The response time of the fire brigades is referred to the time between the notification of the fire incident and the arrival of the fire brigade at the fire scene. Moreover, the response time of the fire brigades is composed of 5 steps: notification, dispatch, preparation, travel time and set up time. Based on the information received, between 8 and 12 EU countries and between 1 and 8 Other European and Non-European countries mainly collect the above-mentioned time steps where the notification time is the field usually available in the fire statistics. The last two time intervals examined related to the response time are the occupant rescue and fire extinguishment that are present only in 4 and 5 EU countries and 1 and 2 Other European and Non-European countries, respectively.

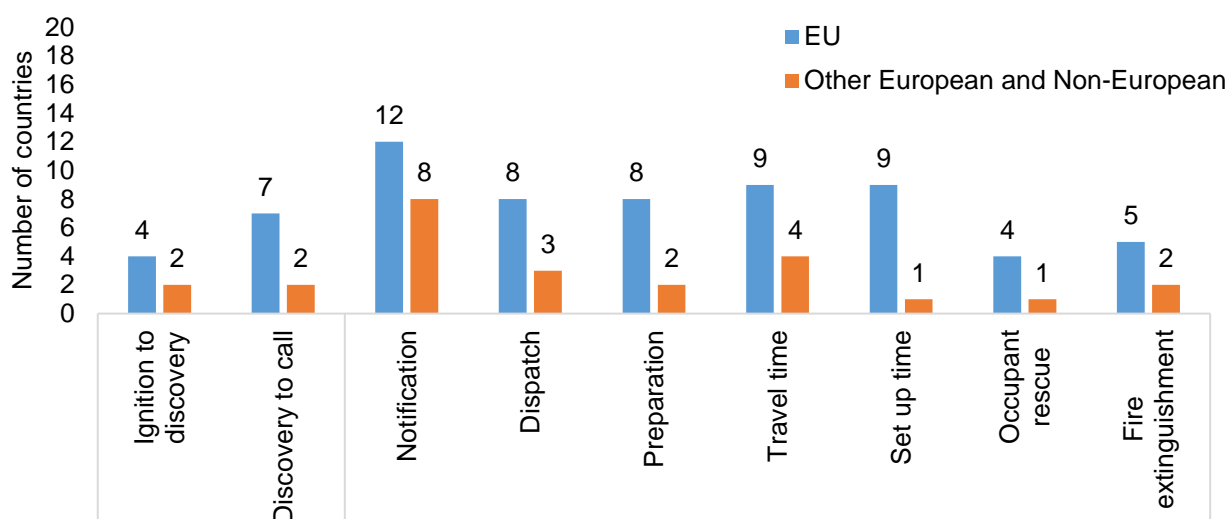


Figure 9: Fields recorded for the fire response time of occupants and fire brigades in EU, Other European and Non-European countries.

Two important areas of investigation highlighted in Table 1 are those of fatalities and casualties related to the life safety aspects derived by the fire incident. They have been investigated separately considering not only occupants but also firefighters. Starting with the analysis of fatalities of Figure 10, the number of victims (20), age (14) and gender (10) are the highest recorded fields in EU countries followed by cause of fatality (8), type of fatality (6) and disability (7). In Other European and Non-European countries, all the fields investigated for the description of fatalities are available for a minimum of 6 countries with the only exception of disability (4) and profession (2). The time between the incident and the fatality is available only in 6 EU and 3 Other European and Non-European countries. If the victims were occupants or firefighters is determined in 10 EU and 5 Other European and Non-European countries, respectively.

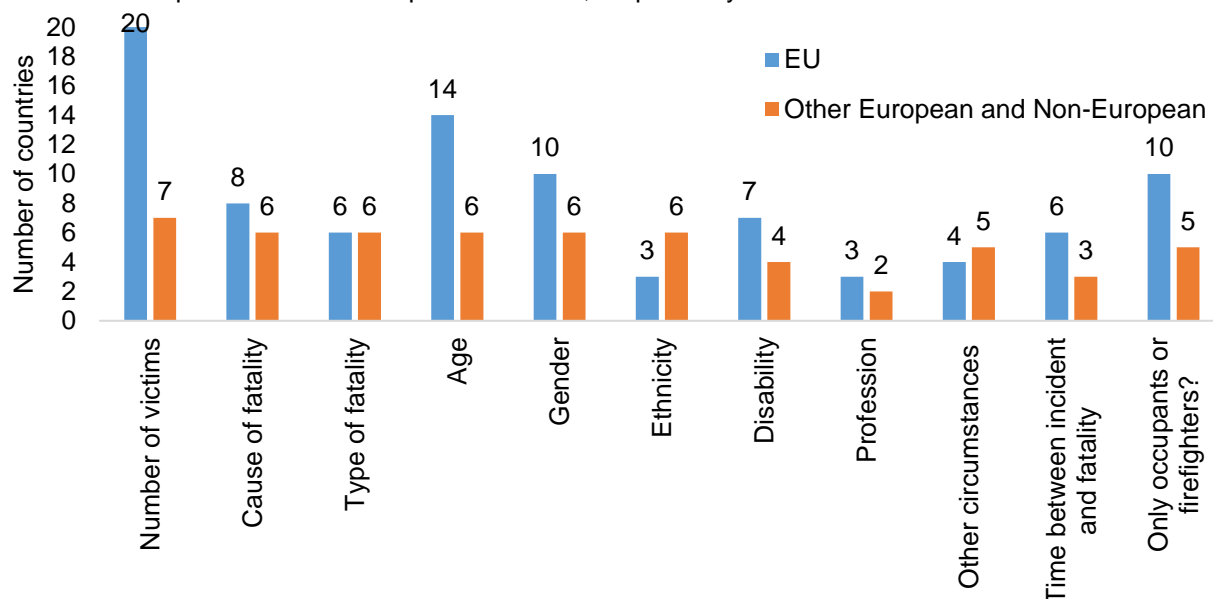


Figure 10: Fields recorded for fatalities in EU, Other European and Non-European countries.

The same analysis applied to casualties provides the outcome that casualties are recorded less often than fatalities. In particular, the fields available with a decreasing number of countries are the number of injured people (15), age (11), type of injury (8), gender (7) and cause of injury (5) in EU countries while the number of injured people (7), cause of injury, age, gender and disability (6) and type of injury (5) in Other European and Non-European countries. The time between the incident and the injury is recorded only in 2 EU and Other European and Non-European countries. The distinction if the injured people were occupants or firefighters is present in the fire statistics of 7 EU and 5 Other European and Non-European countries (Figure 11).

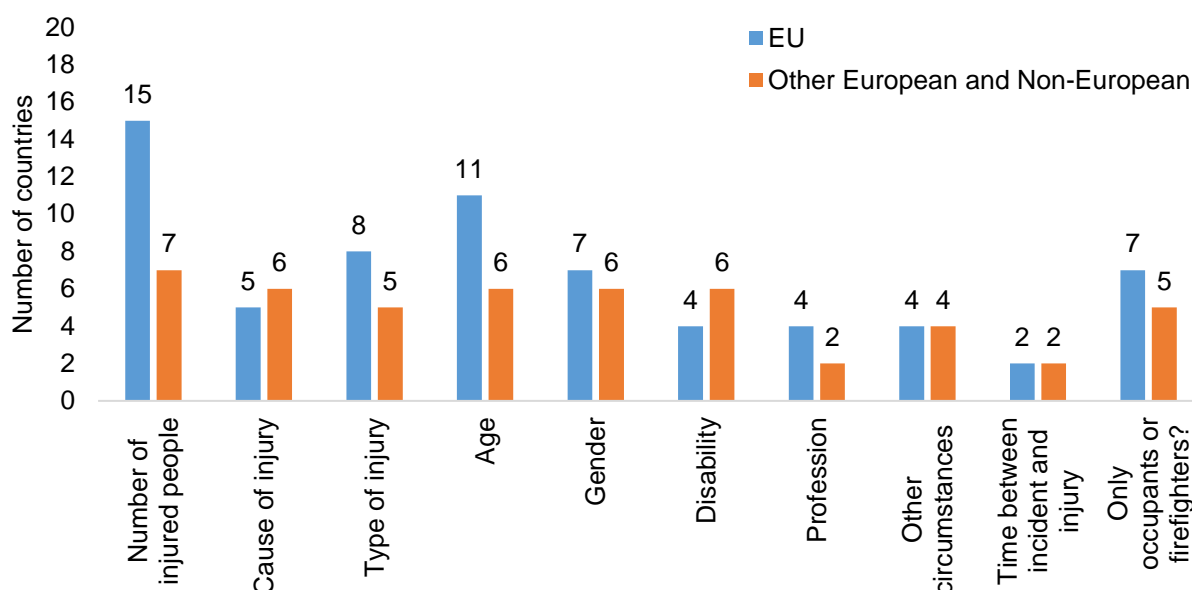


Figure 11: Fields recorded for casualties in EU, Other European and Non-European countries.

Finally, the evaluation of the financial costs derived by the fire incidents is usually classified according to direct and indirect financial losses. As described in Figure 12, the methodology for the evaluation of direct costs caused by fire incidents is usually collected in the fire statistics of 5 EU and 4 Other European and Non-European countries. In particular, the direct costs are evaluated considering mainly property (9 & 5) and medical care (1 & 3) in EU, and Other European and Non-European countries. For the indirect costs, temporal shelter and medical care are available in 1 EU (Denmark) and 1 Other European and Non-European countries (Norway).

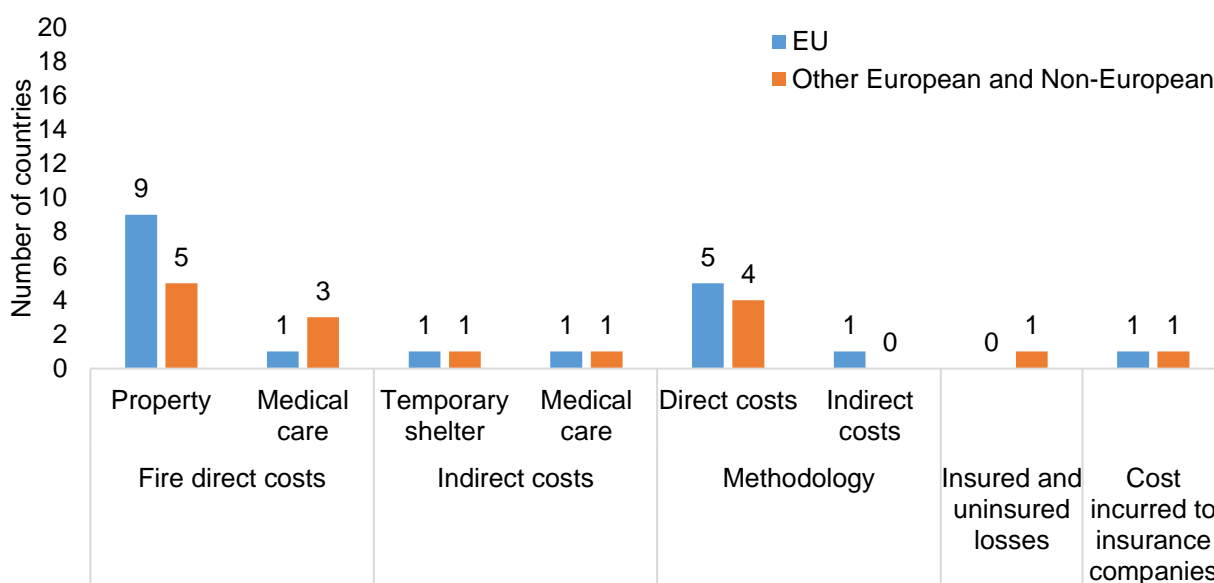


Figure 12: Fields recorded for the fire financial costs in EU, Other European and Non-European countries.

Based on the major areas of investigation, several subfields have been determined considering fire incident description, building characteristics, life safety aspects and fire financial costs collected in the fire statistics of the countries examined. Despite the difference in the number of countries investigated and geographical location (20 EU and 8 Other European and Non-European countries), the findings obtained show that the fire statistics of Other European and Non-European countries appear more detailed especially for what concerns the quantification of damage, the presence, operation and effectiveness of the fire safety measures and description of fatalities and casualties and, indeed, the fire statistics of Australia, Canada, New Zealand, Russia, UK and USA cover also the totality of the fields investigated.

## **5. CONCLUSIONS**

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Task 1 of the EU FireStat project had the aim to provide a general overview on the fire statistics of the 27 EU and 8 Other European and Non-European countries. The 8 Other European and Non-European countries have been chosen based on their structured and complex fire statistics and accuracy in the data elaboration.

In Task 1, summary tables for the countries investigated have been created and subdivided into two parts: Part 1 related to the definitions and Part 2 related to the fields covered by each fire statistics. The summary table usually includes 10 major areas of investigation determining pre- and post-fire conditions in buildings subjected to fire incidents. Considering the 35 countries examined, not all of them were able to provide a list of definitions and the fields recorded. Therefore, the differences in the number of countries considered for each analysis developed have to be based on the methodology and current practice available in current fire statistics.

In Section 2, short abstracts for the countries examined are presented with a clear description of the authority responsible for the fire statistics, the collection methodology, the number of datasets, how data are managed and explanations on the summary tables.

The research developed has been particularly focused on the available definitions to understand the meanings hidden behind the terminology used by each fire statistics. It is essential to have a clear understanding of the fields considered to be able to appropriately compare the data from various countries. The tables with the list of definitions are presented in Appendix I for EU countries and Appendix II for Other European and Non-European countries.

Moreover, a semantic analysis of the definitions has been developed for the examined countries and compared to those present in the ISO TS 17755-2 in Section 3. Such analysis has highlighted differences and analogies in the terms adopted by the various fire statistics. Finally, the fields collected have been investigated to understand the pre- and post-fire variables available in the fire statistics as described in Section 4 for EU and Other European and Non-European countries.

In the following Sections, specific and general conclusions of the work developed by Task 1 are provided.

### **5.1. OVERVIEW OF FIRE STATISTICS**

Our review of national fire data collection systems found that although there was some variation between countries in data collection methodologies, administrative procedures, and information sources, these differences represented differences in national approaches rather than differences on the basis of European Union membership or between European and non-European countries.

The collection of data on fire incidents is primarily the responsibility of fire services in all countries. Data collection originates with the information provided by fire brigades on the fires to which they respond. There are a small number of countries where public entities outside the fire service provide supplementary information to that collected by the fire service. This may include the collection of data on deaths and injuries by health and welfare bodies or by police departments or data on building damage by insurance companies.

The processing of data in most countries appears most often to be conducted by fire service authorities at the national level, although it may be performed at state or provincial levels in countries with more complex administrative systems. In some countries with decentralized structures, processing of data is primarily a state or provincial responsibility and may or may not be routinely consolidated at the national level for further processing. Responsibility for data processing at any level invariably resides with research units, regardless of whether they are part of emergency management bodies or broad statistical offices.

It was possible to identify fire data collection systems in which the reporting of fire incidents is mandatory such as in the Nordic countries and Estonia. However, even in well-established systems with strong participation at the local level (e.g. USA), compliance appears overwhelmingly to be based upon voluntary reporting of fire data. Within the individual national data collection systems, degrees of reporting compliance can be influenced by the support and resources available to encourage the reporting of data. Anecdotal information also suggests that the reporting of fire data may be less reliable in rural areas. However, there is generally little effort by fire data collection systems to assess how completely their methodologies capture the true number of fire incidents or the specific details for which information is sought. To our knowledge, the United States is the only country which attempts to estimate and correct for fires that go unreported in the national data collection system.

## **5.2. SEMANTIC ANALYSIS OF THE DEFINITIONS**

The analysis of the definitions presented in Section 3 provides insights on the meanings related to each variable collected in the various fire statistics. It is fundamental to understand what is covered by each field recorded to be able to appropriately use the data and compared them with other countries. The definitions gathered has been grouped according to the major areas of investigations defined in Task 1 and compared to those available in the ISO TS 17755-2 where possible.

Specific conclusions for each area of investigation are presented below:

Fire incidents:

- In the ISO TS 17755-2, definitions for accidental and fire false alarm are present as well as for arson, deliberate fire, incendiary fire, intentional fire and voluntary fire.
- Generally, in the EU countries, the definition of fire incident includes the various fire incident classifications while specific definitions for accidental, deliberate fire and fire false alarm are available in Estonia and Finland. In Romania and Hungary, only a definition for fire false alarm is present. No definition is provided in Italy and Ireland; however, fire incidents are recorded as false alarm in Italy and as false alarm, malicious and good intent in Ireland.
- In Canada and the USA, a general definition for fire incident is provided where accidental, deliberate fires and false alarms are recorded. A specific definition for accidental and deliberate fires is available in New Zealand, Russia and the UK. False alarms are defined in Norway while in Australia, Russia and the UK, false alarms are recorded in the fire statistics, but a proper definition is not available.

Building description:

- The ISO TS 17755-2 presents definitions for building, building fire, height of the building, dwelling fire, home fire, residential fire.
- Residential and non-residential buildings are recorded in EU, Other European and Non-European countries based on different classifications for the property types covered.

Fire causes:

- The ISO TS 17755-2 has definitions for fire causes, source of ignition and area of origin.
- Various countries mention that definitions are available but not provided.
- Several countries have no definition, but a dropdown menu is available.
- Some countries report concrete possibilities of a cause of the fire, others also first fuel and some circumstances of the fire incident (as stated in the ISO TS 17755-2). However, the fields collected could be difficult to compare statistically. Related to the source of ignition, there is also a deviation in reporting. Some fire statistics refer to heat transfer while others to type of energy that leads to a fire. In a few fire statistics, the material first ignited is reported in this category.

Fire consequences:

- Fire consequences are collected by 5 EU countries and 7 Other European and Non-European countries. Some countries report what is collected while others provide the definitions.
- Fire spread is similarly defined in Estonia, Finland, New Zealand, UK and USA and all these countries use the evaluation of fire spread "at the stop". This expression is adopted in the UK and it is referred to the time when the fire is extinguished. In Sweden, there is an evaluation of the size of the fire at arrival and departure or extent.
- In Australia, fire spread is mainly focused on the reason or factor that allowed the flame spread.
- For the horizontal and vertical fire spread, some countries separate the two terms while in the Netherlands they are combined.
- For the damage, there are some different definitions if the damage is caused by natural causes or accidents. The extent of damage is also evaluated in Canada while in Estonia, there is a mathematical equation to evaluate the damage.
- Various fire damage definitions are available where some of them are more theoretical while others are referred to the evaluation and the same comments can be applicable to the flame damage.

Fire safety measures:

- In the ISO TS 17755-2, only alarms are defined, referred to as the time to the notification to fire service or other local services. This is different from any definitions provided by the countries.
- Definitions are provided only in 6 EU countries and details are only available for 5 of them. For most of the EU countries, the terms are unclear or not reported. The field more consistently

reported are alarm, type of alarms and information on extinguishing systems. This is also applicable to the Other European and Non-European countries.

- There were probably some misunderstandings in the fields examined and inconsistencies in the interpretation of what these fire safety measures were referred to. For example, for the fire brigade on site, this was not always considered as the industrial fire brigade and not municipal fire brigade (in industrial buildings or factories there are private fire brigades on-site). Escape routes, evacuation and compartmentation, those measures are referred to fire safety design features but could also be interpreted if people were able to evacuate.
- Limited information is available for fire barriers, safe areas, and smoke extractor.
- Even in the USA and Canada, where the recording systems are very detailed, there are very few of these safety measures recorded.

#### Fire response:

- The fire response is composed of two parts: “occupant response” and “fire service response”.
- Fire service response time is constituted of several times such as alarm time, departure, arrival, and departure time. Some countries have definitions similar to the one provided by the ISO TS 17755-2 while in others, the fire service response time can be calculated based on the different entries provided.
- The term “occupant fire response” is more ambiguous. The UK has definitions for the time between ignition to discovery and discovery to call while other countries have definitions referred to the actions that the occupants take to control the fire.

#### Fire financial costs:

- In the ISO TS 17755-2, there are definitions for damage, direct losses specifying property damage and indirect losses.
- Direct and indirect financial costs of fire incidents are seldom evaluated in EU, Other European and Non-European countries.
- The evaluation of the direct financial costs of building fires are usually referred to the damage caused by the fire to the property and this could also include contents.
- The indirect financial costs of fire, in Russia, are referred to the material losses due to violation of economic plans in the economy (e.g. a decline in production, a decline in trade and banking operations, a decrease in income, losses due to delays in the transport of goods) while in Slovenia, they are related to the cost of the firefighting operations.
- It is also important to specify that there could be some data related to the costs provided by insurance and it is essential to relate the origin of the data to the source as described in the abstracts provided in Section 2.

#### Fatalities and casualties:

- A description of the definitions available in the ISO 17755-2 is provided. The terms casualty or victims are equally used and referred to a person killed or injured. This can cause misunderstandings in the following definitions. It would be suggested to adopt fatalities for deaths and casualties for injured people.
- Fatalities:
  - Victims and type of fatality are examined. In the investigated countries, a clear distinction between fatalities and casualties is not available and the two terms are sometimes not distinguished. Moreover, in some countries, the term fatality is referred to occupants and in others to fire brigades. Most of the countries have definitions referred to the victims killed as a consequence of the fire.
  - Several countries establish a limit of time in the death of victim while in the ISO TS 17755-2 “a fire victim is a person killed or injured as a direct effect of a fire without any limit of time”.
  - In Canada and the USA, a distinction between civilian and fire service victims is present.
  - The type of fatality is available only in the Netherlands, Romania and the UK.
- Casualties:
  - While in some countries there is a clear distinction between people killed or injured in a fire addressed with two separated terms, in others, they are recorded in a unique field and defined with a unique definition.

The understanding of terminology is essential, and it is therefore unfortunate that different countries have dissimilar meanings for the above-mentioned terms. It is sometimes clear how specific terms refer to different

aspects. From the evaluation of the information obtained, it is possible to confirm that the accuracy of the definitions available for specific fields of the fire statistics is supported by the high number of countries collecting those particular fields. The highest is the number of countries in which a particular field is collected, the more accurate are the definitions available. This is also supported by the fields recorded in the various fire statistics examined in Section 4. For example, the fire incident description is often collected, and this determines the precision of the definitions provided while when fire safety measures are considered, the few definitions available and recorded do not have consistency in their meanings in the various countries. It is, therefore, important to understand the meaning of the variables collected in the fire statistics to be able to provide adequate comparisons and correct evaluations of the aspects included.

### **5.3. FIELDS RECORDED IN THE FIRE STATISTICS**

The analysis developed in Section 4 is focused on the fields recorded in the various fire statistics examined. A total of 98 fields of investigation have been considered and subdivided according to major areas such as fire incidents, building description, fire causes, fire consequences, fire safety measures, fire financial costs and fatalities and casualties. The EU Member States that provided the list of fire statistical fields recorded have been compared to 8 Other European and Non-European countries. It is important to affirm that the 8 Other European and Non-European countries have been chosen on the basis of their structured and detailed fire statistics which continuously undergo improvements and optimizations. Therefore, the comparisons provided for the various areas of investigation need to be interpreted considering the differences that inevitably arise.

Usually, fire incidents are described considering the incident time, date and location in a maximum of 16 and 8 while the distinction between accidental and deliberate fire is recorded in 9 and 5 EU and Other European and Non-European countries, respectively. The description of the property type subdivided into residential and non-residential buildings is available in the majority of countries examined while further building characteristics are seldom recorded. Fire causes are available in the fire statistics of 15 EU and 5 Other European and Non-European countries and the other fields related to the source of ignition, item and material first ignited, material mainly responsible for the development of the fire and fire room of origin are determined in a maximum of 10 EU and 6 Other European and Non-European countries.

For the consequences of fire, fire spread is recorded in 7 EU countries and in the majority of Other European and Non-European countries. When fire damage is investigated, the number of EU countries decreases for what concerns how damage is recorded. In particular, it appears that a distinction between fire and total damage is available only in 7 EU countries and in 5 of them damage is recorded in m<sup>2</sup>. In 2 Other European and Non-European countries, the fire damage is also classified according to types of damage such as fire, flame, smoke and water damage. For the evaluation of the fire safety measures, the various fire statistics seem to record more often alarms and automatic extinguishing systems than compartmentation, smoke extractors, fire barriers, escape routes and others. In particular, the fields related to the description of the alarms and automatic extinguishing systems mainly cover presence, operation, type and reasons for failure. Another important consideration is that the understandings of the other fire safety measures have not always been correctly evaluated and this is also supported by the description provided in Section 3.5 and by the limited number of countries which collect these fields.

The response time is usually referred as the time between the notification of the fire incidents to the fire brigade and the arrival of the fire brigade at the fire scene. Only in 4 EU countries and 2 Other European and Non-European countries, the time between ignition to discovery and between discovery to call are available. The fire financial costs are usually related to the direct losses of the property in 9 and 5 and to the medical care in 1 and 3 EU and, Other European and Non-European countries, respectively. The indirect financial costs are recorded for temporary shelter and medical care only in Denmark and Norway.

Finally, the number of fatalities are recorded in 20 and 7 while the number of casualties in 15 and 7 EU and, Other European and Non-European countries, correspondingly. The fields related to the number of deaths and injured people are mainly focused on the description of the person affected providing the age, gender and type of fatality or injury.

The fields recorded more often are those related to the description of the fire incidents, fatalities and casualties. However, as already described in Section 5.2, the variables covered by these fields can be referred to as different interpretations in the various countries examined. Therefore, it is suggested to link the considerations presented for the analysis of the definitions with the elaborations of the fields recorded by the various statistics and to the information related to the collection methodologies described in the short abstract of each country.

#### **5.4. FINAL CONCLUSIONS OF TASK 1**

Our review of fire data collection measures within and outside the European Union is critical for understanding the degree of commonality across the various systems and also for identifying opportunities and challenges in any efforts to create uniform measures that will facilitate comparisons in fire experience. The ability to research variations in fire experience on the basis of comparable variables should facilitate the ability of policymakers and the fire safety community to identify opportunities for introducing improvements in fire safety practices in their own countries.

It is clear that meaningful comparison of fire incidents is influenced by similarities or differences in the way critical data elements are defined and measured. In this review, we found considerable variation between national data collection systems both in relation to the number of data elements they included and in the way in which these elements were defined and measured. Indeed, such differences were found to extend in some cases to data collection systems by separate jurisdictions within the same country. An additional complication identified in this review is that different institutions may serve as data providers in different countries, and different institutions may employ their own forms of measurement.

Although it was not possible to identify information on data collection measures from a number of countries, it appears that fire data collection systems in the European Union fall into different tiers with respect to the amount of information collected. Some systems collect a limited amount of fairly basic information, such as information on the date, time, and location of the fire, type of fire (building, vehicle, etc.), type of building, fire cause, and number of deaths or injuries. Countries with more advanced data collection systems include to varying degrees a number of additional data elements. These may determine information on the room where the fire originated, degree of fire spread, material contributing to fire spread, type of equipment involved in the fire, information on victim characteristics and involvement with the fire, types of fire safety measures, and other relevant information.

As our review indicates, there is also substantial variation in the amount and type of information sought by data elements that are common to different data collection instruments. For instance, spread of fire may be recorded on the basis of number of rooms involved or some other physical measure, while automatic extinguishing equipment as to whether it was present or absent or involved specific types of equipment. It appears that some of the most detailed national fire data collection systems are represented by countries outside the European Union, as exemplified by New Zealand, Canada, and the United States.

Looking forward, comparability of fire data between systems will require the development and adoption of a core set of measures that have common categories or classifications. In light of our findings, it does not seem realistic to expect that those countries with less advanced histories of fire data collection can simply adopt the more detailed data collection systems that have been built over time in countries with more extensive practices and traditions. It may be useful as an initial step to explore the feasibility of identifying a set of major indicators with moderate levels of detail that could form a common content for a unified fire data collection instrument. Development of a limited set of common measures would not preclude individual countries with more mature data collection systems from collecting additional and more detailed information in areas of particular interest or concern. Over time, participation in a common data collection system may encourage countries with less mature systems to enhance their data collection practices and to add data elements to the common core.



**Task 1**  
**FINAL REPORT**

**APPENDIX I - EU COUNTRIES, DEFINITIONS**

<b>AUSTRIA DEFINITIONS 1/1</b>			
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	b	<p>Fire Incident report (Fire service Graz)</p> <p>DMBUE (Datenmanagement in der Brandursachenermittlung) / SIZ (Sicherheitsinformationszentrum) <a href="http://www.siz.cc/bund/sicherheit/show/231">http://www.siz.cc/bund/sicherheit/show/231</a></p> <p>BVS - Brandverhütungsstelle für Oberösterreich</p> <p>Property loss : <a href="https://www.bvs-ooe.at/services-und-leistungen/brandschadenstatistiken/">https://www.bvs-ooe.at/services-und-leistungen/brandschadenstatistiken/</a></p> <p>Landesstelle Steiermark, <a href="http://www.bv-stmk.at/index.php/statistik">http://www.bv-stmk.at/index.php/statistik</a></p>
	Deliberate fire	b	
		False alarm	
<b>BUILDING DESCRIPTION</b>	Building fire	b	
	Residential buildings	b	
	Non-residential buildings	b	
<b>FIRE CAUSES</b>	Fire causes	a	
	Source of ignition	a	
	Area of fire origin	a	
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	a	
	Fire horizontal spread	a	
	Fire vertical spread	a	
	Damage	a	
	Fire	a	
	Flame	b	
	Smoke	a	
	Water	a	
Total			
<b>FATALITIES</b>	Victims	a	
	Type of fatality	b	
<b>CASUALTIES</b>	Injured person	a	
	Type of injury	b	
<b>FIRE SAFETY MEASURES</b>	Alarm	a	
	Type of alarms	a	
	Automatic extinguishing systems	b	
	Type of automatic extinguishing systems	b	
	Compartmentation	b	
	Fire barriers	b	
	Safe areas	b	
	Smoke extractors	b	
	Fire brigades on site	b	
	Escape routes	b	
	Evacuation	b	
<b>FIRE RESPONSE</b>	Fire service time of response	a	
	Occupant fire response	a	
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	b	
	Indirect financial costs	b	
<b>FIRE PREVENTION</b>	Fire regulations	b	
	Fire prevention	b	

BULGARIA DEFINITIONS 1/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението" <a href="http://www.mvr.bg/gdpbzn">http://www.mvr.bg/gdpbzn</a>
	Deliberate fire	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population" <a href="http://www.mvr.bg/gdpbzn">http://www.mvr.bg/gdpbzn</a>
	False alarm	c		
<b>BUILDING DESCRIPTION</b>	Building fire	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Residential buildings	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"
	Non-residential buildings	c		
<b>FIRE CAUSES</b>	Fire causes	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Source of ignition	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"
	Area of fire origin	c		
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Fire horizontal spread	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"
	Fire vertical spread	c		
	Damage	c		
	Fire	c		
	Flame	c		
	Smoke	c		
	Water	c		
Total	c			
<b>FATALITIES</b>	Victims	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Type of fatality	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"

BULGARIA DEFINITIONS 2/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>CASUALTIES</b>	Injured person	c		
	Type of injury	c		
<b>FIRE SAFETY MEASURES</b>	Alarm	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Type of alarms	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"
	Automatic extinguishing systems	c		
	Type of automatic extinguishing systems	c		
	Compartmentation	c		
	Fire barriers	c		
	Safe areas	c		
	Smoke extractors	c		
	Fire brigades on site	c		
<b>FIRE RESPONSE</b>	Fire service time of response	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Occupant fire response	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Indirect financial costs	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"
<b>FIRE PREVENTION</b>	Fire regulations	c	The studied sources have no link to definitions	Главна дирекция "Пожарна безопасност и защита на населението"
	Fire prevention	c	The studied sources have no link to definitions	General Directorate "Fire Safety and Protection of the Population"

CROATIA DEFINITIONS 1/1					
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE	
FIRE INCIDENT	Accidental fire	No list of all definitions	Number of fires by size collected by Croatian Firefighting Association	<p>Vatronet: Fire-fighting net</p> <p>GIS i sustav za praćenje vozila- GIS and tracking system</p> <p>Sustav za uzbunjivanje-Alarm system</p> <p>Interaktivna baza opasnih tvari: Dangerous materials</p> <p>SPIS: Central portal of internet pages of fire-fighting organizations</p> <p>UVI: Incident management system.</p> <p>Instructions for use are published only for Geo information and tracking system</p> <p>(<a href="http://www.hvz.hr/informatizacija/sustav-za-pra%C4%87enje-vozila">http://www.hvz.hr/informatizacija/sustav-za-pra%C4%87enje-vozila</a> ); the other web-applications have no written manuals (is planned to be made in near future), but our office gives assistance if problems with use</p> <p>(<a href="http://www.hvz.hr/informatizacija/korisni%C4%8Dka-podr%C5%A1ka">http://www.hvz.hr/informatizacija/korisni%C4%8Dka-podr%C5%A1ka</a> ) and organize in each county educations each year for each application</p>	
	Deliberate fire		Fires by fire objects (buildings types, sectors of industry, etc.) collected by Croatian Firefighting Association		
	False alarm		Fire causes collected by Ministry of interior		
BUILDING DESCRIPTION	Building fire				
	Residential buildings				
FIRE CAUSES	Non-residential buildings				
	Fire causes				
	Source of ignition				
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Area of fire origin				
	Fire spread				
	Fire horizontal spread				
	Fire vertical spread				
	Damage				
	Fire				
	Flame				
	Smoke				
	Water				
FATALITIES	Total				
	Victims		Number of victims (deaths, injured, rescued persons, missing persons) collected by Ministry of interior		
CASUALTIES	Type of fatality				
	Injured person				
FIRE SAFETY MEASURES	Type of injury				
	Alarm				
	Type of alarms				
	Automatic extinguishing systems				
	Type of automatic extinguishing systems				
	Compartmentation				
	Fire barriers				
	Safe areas				
	Smoke extractors				
	Fire brigades on site				
	Escape routes				
FIRE RESPONSE	Evacuation				
	Fire service time of response				
FIRE FINANCIAL COSTS	Occupant fire response				
	Direct financial costs				
FIRE PREVENTION	Indirect financial costs				
	Fire regulations and prevention				

CZECH REPUBLIC DEFINITIONS 1/1			
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS
<b>FIRE INCIDENT</b>	Accidental fire	The number of fires is shown in the statistics, but definitions are not available.	Definitions are given by the laws and government decisions and other internal acts
	Deliberate fire		
	False alarm		
<b>BUILDING DESCRIPTION</b>	Building fire	The type of building affected by fires is shown in the statistics, but definitions are not available.	
	Residential buildings		
	Non-residential buildings		
<b>FIRE CAUSES</b>	Fire causes	The cause of fires is shown in the statistics, but definitions are not available.	
	Source of ignition		
	Area of fire origin		
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	c	
	Fire horizontal spread	c	
	Fire vertical spread	c	
	Damage	c	
	Fire	c	
	Flame	c	
	Smoke	c	
	Water	c	
Total	c		
<b>FATALITIES</b>	Victims	The number of fires deaths shown in the statistics, but definitions are not available.	
	Type of fatality		
<b>CASUALTIES</b>	Injured person	The number of fires injuries shown in the statistics, but definitions are not available.	
	Type of finjury		
<b>FIRE SAFETY MEASURES</b>	Alarm	c	
	Type of alarms	c	
	Automatic extinguishing systems	c	
	Type of automatic extinguishing systems	c	
	Compartmentation	c	
	Fire barriers	c	
	Safe areas	c	
	Smoke extractors	c	
	Fire brigades on site	c	
	Escape routes	c	
Evacuation	c		
<b>FIRE RESPONSE</b>	Fire service time of response	Please see to column DEFINITIONS	
	Occupant fire response	Please see to column DEFINITIONS	
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	Please see to column DEFINITIONS	
	Indirect financial costs	Please see to column DEFINITIONS	
<b>FIRE PREVENTION</b>	Fire regulations	c	
	Fire prevention	c	

DENMARK DEFINITIONS 1/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	c	Maybe police has a definition	
	Deliberate fire	c	Maybe police has a definition	
	False alarm	a	There are two types of false alarm. "Blind" alarm: An alarm which is given accidental or in good faith without fire or risk of a fire or any damage which require or could require the fire brigade. A False alarm: An Alarm which is given intentionally and in bad faith without fire or risk of a fire or any damage which requires or could require the fire brigade or where there are no other damage.	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
BUILDING DESCRIPTION	Building fire	a	The building description is defined in a "pick list" which specifies which type of building, that is on fire	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Residential buildings	a	The building description is defined in a "pick list" which specifies which type of building, that is on fire	
	Non-residential buildings	a	The building description is defined in a "pick list" which specifies which type of building, that is on fire	
FIRE CAUSES	Fire causes	a	In the database the fire cause is described in a dropdown menu with suggestions of different fire causes	
	Source of ignition	a	In the database the source of ignition is described in a dropdown menu with suggestions of different sources of ignition. Heat source (open flame, spark, glow, lightning, etc.) Material that was first ignited (paper, cardboard, plastic, textile, wood, etc.) Equipment involved in the ignition (machines, combustion plants, electrical installations, etc.), including make, model and serial number Object that was subsequently ignited (building construction, furniture, storage, waste storage in container, etc.)	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Area of fire origin	a	In the database the place of origin is described in a dropdown menu with suggestions of different places. Origin of fire (corridor area, kitchen, barn, etc.) is recorded.	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	a	In the database a possible fire spread is described in a dropdown menu with suggestions of different scenarios of fire spread. Evaluation of the extent of fire at arrival a (smoke development, visible flames, etc.).	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Fire horizontal spread	b		
	Fire vertical spread	b		
	Damage	b		
	Fire	b		
	Flame	b		
	Smoke	b		
	Water	b		
Total	b			

DENMARK DEFINITIONS 2/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FATALITIES</b>	Victims	a	A fatality in a fire is defined as a person which is dead in a fire or within 30 days because of a fire, typically from smoke poison or burns. A "Fatal fire" is a fire where one or more persons is killed in a fire. "Accidental Fatal fire": when started because of an accidental human act or failure in the electric equipment or an external cause. "Deliberate Fatal fire (dødsbrand)": when deliberately is started either by the victim or another person with the intention to start a fire.	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Type of fatality	c		
<b>CASUALTIES</b>	Injured person	c		
	Type of injury	c		
<b>FIRE SAFETY MEASURES</b>	Alarm	a	Detector number, Detector type, Cause of the alarm (tobacco smoking, steam, craftsman work, technical faults, etc.)	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Type of alarms	a	Ion detector, optical smoke detector, thermodetector, multifunction detector	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Automatic extinguishing systems	a		Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Type of automatic extinguishing systems	a		Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Compartmentation	a	Fire spread from hearth spaces, including presumed cause of the fire spread (open standing doors, holes in floor separation, etc.) Fire technical equipment and functionality (smoke alarm, fire blanket, fire technical installations lationer m.v.)	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Fire barriers	a	Included in compartmentation.	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Safe areas	b		
	Smoke extractors	a		Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Fire brigades on site	b		
	Escape routes	b		
Evacuation	b			

DENMARK DEFINITIONS 3/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE RESPONSE</b>	Fire service time of response	a	Alarmed (date and time) Departure (date and time) Promotion at the scene of the accident (date and time) Released from place of injury (date and time) Ready at station (date and time)	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a>
	Occupant fire response	c		
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	b		
	Indirect financial costs	b		
<b>FIRE PREVENTION</b>	Fire regulations	a	If it is regulated by DEMA's preparedness act.	Beredskabsstyrelsen (DEMA) <a href="http://www.brs.dk">http://www.brs.dk</a> Trafik- bygge- og boligstyrelsen
	Fire prevention	c		

**Useful links for Denmark:**

Beredskabsstyrelsen DEMA ([www.brs.dk](http://www.brs.dk)):

<https://brs.dk/da/nyheder-og-publikationer/publikationer2/alle-publikationer/2018/dodsbrandsrapport-2018/>

Beredskabsstyrelsen DEMA ([www.brs.dk](http://www.brs.dk)):

<https://brs.dk/globalassets/brs---beredskabsstyrelsen/dokumenter/forskning-statistik-og-analyse/odin-dokumenter/-liste-foerste-melding-ordlyd-.pdf>

Beredskabsstyrelsen DEMA ([www.brs.dk](http://www.brs.dk)):

<https://www.retsinformation.dk/eli/retsinfo/2015/9111>

Beredskabsstyrelsen DEMA ([www.brs.dk](http://www.brs.dk)):

<https://brs.dk/globalassets/brs---beredskabsstyrelsen/dokumenter/forskning-statistik-og-analyse/odin-dokumenter/-notat-blinde-falske-reelle-alarmer-2.pdf>

Beredskabsstyrelsen DEMA ([www.brs.dk](http://www.brs.dk)): Trafik- bygge- og boligstyrelsen



ESTONIA DEFINITIONS 1/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	a	Unexpected and unintended event, which causes damage to persons life, property or environment. Crucial elements of accident are suddenness, involuntary and damage.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Deliberate fire	a	Intentional activity, which purpose is to make harm to another person, using fire for it.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	False alarm	a	A false alarm of an automatic fire alarm system is an alarm caused by other factors than a fire.	Fire Safety Act
<b>BUILDING DESCRIPTION</b>	Building fire	a	A building is a construction work that has an interior space that is separated from the external environment by the roof and other parts of the building envelope	Building Code
	Residential buildings	b	House, block of flats, dormitory, auxiliary buildings	
	Non-residential buildings	b	Public buildings, industrial buildings	
<b>FIRE CAUSES</b>	Fire causes			
	Soruce of ignition	a	Original spark, flame, hot object, which causes ignition	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Area of fire origin			
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	a	Fire expansion both in the room of origin as well as from room to room or from building to building.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Fire horizontal spread	b		
	Fire vertical spread	b		
	Damage	a	Property damage = [(building square metre value) * (burnt area square metre)] * [(100% - depreciation percentage) + sanitary repairs + renovation + capital repairs + warranty repair] / 100 <i>(Right now this formula undergoes changes)</i>	Estonian Academy of Security Sciences
	Fire	a	Combustion process, which is characterized by heat release, smoke and/or flames.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Flame	a	Combustion zone in the vapor phase which emits light.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Smoke	a	A visible suspension of solid and/or liquid particles in gas formed by combustion or pyrolysis.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Water	b		
Total	b			

ESTONIA DEFINITIONS 2/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FATALITIES	Victims	a	According to the decree No. 444 of 28.12.2015 of the director general of the Rescue Board, a person deemed to have died in fire if they died due to the consequences resulting from open or closed fire in a building or outside the building on site or within 30 days after the fire occurrence. The person is also deemed to have died in fire whose cause of death has been falling or jumping from a burning building or collapsing of burning constructions, health problems occurred due to fire (stroke, heart attack etc.), if there is reason to assume based on the collected data that the fire has started before the health problem and the occurrence of fire is the cause of the health problem, or carbon monoxide poisoning as a result of closed burning process.	Definition by Estonian Rescue Board <a href="https://www.rescue.ee/">https://www.rescue.ee/</a>
	Type of fatality			
CASUALTIES	Injured person	a	Evacuated from a fire - a person who is being led by a firefighter or on the instructions of the person applied to the rescue work out of a potentially endangered area. Self-rescued from a fire – a person, who has independently left the dangerous environment. Rescued from a fire – a person, who is helped out from dangerous environment by other people, including by firefighter or by a person, who is applied for rescue work.	Definition by Estonian Rescue Board <a href="https://www.rescue.ee/">https://www.rescue.ee/</a>
	Type of injury	b		
FIRE SAFETY MEASURES	Alarm	b		
	Type of alarms	a	1) an autonomous fire alarm sensor; 2) an autonomous fire alarm system; 3) an automatic fire alarm system;	Fire Safety Act
	Automatic extinguishing systems	a	System or equipment, which is meant for detecting and extinguishing fire in the early stage or localising the fire making it possible to extinguish the fire with other means.	Määrus "Ehitisele esitatavad tuleohutusnõuded ja nõuded tuletõrje veevarustusele" (regulation "Fire safety requirements for building and requirements for fire water supply")
	Type of automatic extinguishing systems	b		

ESTONIA DEFINITIONS 3/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE SAFETY MEASURES</b>	Compartmentation	a	Load-bearing or non-load-bearing structure of a building which is fire-retardant and forms a fire-retardant section.	Määrus "Ehitisele esitatavad tuleohutusnõuded ja nõuded tuletõrje veevarustusele" (regulation "Fire safety requirements for building and requirements for fire water supply")
	Fire barriers	a	A part of the room or room of a building on one floor or through several floors, which is separated from the surrounding parts of the building in such a way, that the spread of fire in or out of that part of the building is prevented for a predetermined time.	Määrus "Ehitisele esitatavad tuleohutusnõuded ja nõuded tuletõrje veevarustusele" (regulation "Fire safety requirements for building and requirements for fire water supply")
	Safe areas	a	Area, from where person is evacuated or ordered to shade and where is allowed to be only people, who are directly involved with rescue work, where only persons directly involved in the rescue work and persons and equipment authorized by the rescue worker are permitted	Määrus "Päästesündmusel osalevate riigi- ja kohaliku omavalitsuse asutuste ning isikute koostöö kord" (Regulation "Procedure for co-operation between state and local government agencies and persons participating in a rescue event")
	Smoke extractors	a	A smoke extraction system permanently installed in the building which consists of a smoke outlet, a smoke extraction fan, a starting device and so one.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Fire brigades on site			
	Escape routes	a	Single part of the building, which may form part of the fire compartment, as well as one or more fire compartments and from which the exit from the building begins. The evacuation area is generally considered to be on the one floor level.	Määrus "Ehitisele esitatavad tuleohutusnõuded ja nõuded tuletõrje veevarustusele" (regulation "Fire safety requirements for building and requirements for fire water supply")
	Evacuation	a	Forced movement of building users to a place of safety in the event of fire, risk of fire or in another dangerous situation.	Määrus "Ehitisele esitatavad tuleohutusnõuded ja nõuded tuletõrje veevarustusele" (regulation "Fire safety requirements for building and requirements for fire water supply")
<b>FIRE RESPONSE</b>	Fire service time of response	a	Period from the departure order given by Emergency Alarm Center to the moment when rescue team has reached to the scene.	Definition by Estonian Rescue Board
	Occupant fire response	b		

ESTONIA DEFINITIONS 4/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE FINANCIAL COSTS	Direct financial costs	a	The amount of damage to the building caused by the fire in monetary terms. Damage to furniture or the environment is not taken into account.	Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms)
	Indirect financial costs	b	No	
FIRE PREVENTION	Fire regulations	a	Fire safety requirement is a technical regulation or restriction on activities for the purpose of ensuring the fire safety of buildings, operation of devices or activities of persons and the possibility of evacuation and rescue operations in the case of an outbreak of fire.	Fire Safety Act
	Fire prevention	a	Prevention work means raising people's awareness and readiness in order to prevent and prepare for a rescue event, collecting information about a rescue event that has taken place and about people's awareness and readiness, and analysing such information.	Rescue Act

#### Useful links for Estonia:

Building Code: <https://www.riigiteataja.ee/en/eli/520112020001/consolide>

Definition by Estonian Rescue Board

Definition by Estonian Rescue Board: <https://www.rescue.ee/>

Definition by Estonian Rescue Board: <https://www.rescue.ee/>

Estonian Academy of Security Sciences

Fire Safety Act: <https://www.riigiteataja.ee/en/eli/521012019007/consolide>

Määrus "Ehitisele esitatavad tuleohutusnõuded ja nõuded tuletõrje veevarustusele" (regulation "Fire safety requirements for building and requirements for fire water supply"): <https://www.riigiteataja.ee/akt/104042017014?leiaKehtiv>

Määrus "Päästesündmusel osalevate riigi- ja kohaliku omavalitsuse asutuste ning isikute koostöö kord" (Regulation "Procedure for co-operation between state and local government agencies and persons participating in a rescue event"): <https://www.riigiteataja.ee/akt/114012011005?leiaKehtiv>

Päästetöö terminite seletav sõnaraamat (Glossary of rescue terms): <https://digiriul.sisekaitse.ee/handle/123456789/963>

Rescue Act: <https://www.riigiteataja.ee/en/eli/513072020003/consolide>

FINLAND DEFINITIONS 1/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	a	Accidental fires include those where the motive for the fire was presumed to be either accidental, negligent or not known (or unspecified).	<a href="http://prontonet.fi">http://prontonet.fi</a>
	Deliberate fire	a	Deliberate fires include those where the motive for the fire was 'thought to be' or 'suspected to be' deliberate. This includes fires to an individual's own property, others' property or property of an unknown owner.	
	False alarm	a	No fire at the scene	
BUILDING DESCRIPTION	Building fire	a	Lots of building characteristics are reported on separated Building form.	
	Residential buildings	a	Detached house, attached house or block of flats, free-time residents	
	Non-residential buildings	a	Commercial building, office building, office building, transport and communication building, institutional and healthcare building, assembly building, educational building, industrial building, warehouse, building for fire services, agricultural building or other building	
FIRE CAUSES	Fire causes	a	Cause of fire, cause of ignition	
	Source of ignition	a	Several sources of ignition are listed.	
	Area of fire origin	a	Room/compartment of origin is recorded.	
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	a	Evaluation of the extent of flame and smoke damage at arrival, at largest and at stop.	
	Fire horizontal spread	a	Horizontal area damage in m <sup>2</sup> by flame and smoke are recorded.	
	Fire vertical spread	a	Spreading to next or previous level recorded.	
	Damage	a	Square meters and Euros	
	Fire	a	Square meters and Euros	
	Flame	a	Square meters and Euros	
	Smoke	a	Square meters and Euros	
	Water	a	Square meters and Euros	
FATALITIES	Total	a	Square meters and Euros	
	Victims	a	Death caused by fire	
CASUALTIES	Type of fatality	a	immediately or within 30 days	
	Injured person	a	Injured by fire	
FIRE SAFETY MEASURES	Type of injury	a	Serious or mild	
	Alarm	a	Alarm presence, type, location, operation and reason for failure are recorded.	
	Type of alarms	a	Type of smoke alarm	
	Automatic extinguishing systems	a	Sprinkler or not	
	Type of automatic extinguishing systems	a	Type of sprinkler	
	Compartmentation	a	Type of compartment	
	Fire barriers	a	Included in compartmentation.	
	Safe areas	b		
	Smoke extractors	a	Automatic or manual	
	Fire brigades on site	a	Arrival time	
Evacuation	a	Were they, could they be used, were there Lightning data on people evacuated with or without assistance.		

FINLAND DEFINITIONS 2/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE RESPONSE</b>	Fire service time of response	a	Time of arrival	<a href="https://prontonet.fi/">https://prontonet.fi/</a>
	Occupant fire response	a	Times after call recorded. in case of human loss Time before call recorded.	
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	a	Estimated by fire and smoke and water	
	Indirect financial costs	b		
<b>FIRE PREVENTION</b>	Fire regulations	a	if the fire safety regulations apply	
	Fire prevention	b		

FRANCE DEFINITIONS 1/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	b		
	Deliberate fire	b		
	False alarm	b		
BUILDING DESCRIPTION	Building fire	b		
	Residential buildings	a	There are definitions for different types of buildings in French regulations for dwellings (by type and height). These are also used in Fire statistics from firefighters	Arrêté du 31 janvier 1986 relatif à la protection contre l'incendie des bâtiments d'habitation <a href="https://www.legifrance.gouv.fr/loda/id/JORFTE_XT000000474032/2020-10-20/">https://www.legifrance.gouv.fr/loda/id/JORFTE_XT000000474032/2020-10-20/</a>
	Non-residential buildings	a	There are definitions for different types of public buildings (by type and height). These are also used in Fire statistics from firefighters	Règlement de sécurité contre l'incendie relatif aux établissements recevant du public <a href="https://www.legifrance.gouv.fr/loda/id/LEGITE_XT000020303557/2020-10-20/">https://www.legifrance.gouv.fr/loda/id/LEGITE_XT000020303557/2020-10-20/</a>
FIRE CAUSES	Fire causes	b		
	Source of ignition	b		
	Area of fire origin	b		
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	b		
	Fire horizontal spread	b		
	Fire vertical spread	b		
	Damage	b		
	Fire	b		
	Flame	b		
	Smoke	b		
	Water	b		
Total	b			
FATALITIES	Victims	a	No official definition, but in practice all the deaths which occurred on the scene of a fire are taken into account in the database realized by the Home Ministry. Deaths (due to acute fire effects) of firefighters, fire officers, fire brigade personnel and other emergency responders are also reported. Fire casualties which will die at the hospital or during their transportation to the hospital by EMS are not taken into account	
	Type of fatality	b		
CASUALTIES	Injured person	c		
	Type of Injury	b	Before 2011 there were 3 types of injuries: Severe, light, involved. Between 2011-2017 there were 3 types of injuries: With medical care, non-medical care, involved. from 2017: there are 3 types of injuries absolute emergency; relative emergency, involved.	

FRANCE DEFINITIONS 2/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE SAFETY MEASURES	Alarm	b		
	Type of alarms	b		
	Automatic extinguishing systems	b		
	Type of automatic extinguishing systems	b		
	Compartmentation	b		
	Fire barriers	b		
	Safe areas	b		
	Smoke extractors	b		
	Fire brigades on site	b		
	Escape routes	b		
	Evacuation	b		
FIRE RESPONSE	Fire service time of response	b		
	Occupant fire response	b		
FIRE FINANCIAL COSTS	Direct financial costs	b		
	Indirect financial costs	b		
FIRE PREVENTION	Fire regulations	b		
	Fire prevention	b		



GERMANY DEFINITIONS 1/1				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	b	Police might have definition	Einsatzbericht - Brand / Evaluierungsbogen zu Maßnahmen des Vorbegehenden Brand- und Gefahrenschutzes / Jahresbericht
	Deliberate fire	b	Police might have definition	
	False alarm	c	Three words in German language.	
BUILDING DESCRIPTION	Building fire	b		
	Residential buildings	b		
	Non-residential buildings	b		
FIRE CAUSES	Fire causes	a	Defintions not publicly available	
	Soruce of ignition	a		
	Area of fire origin	a		
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	a		
	Fire horizontal spread	a		
	Fire vertical spread	a		
	Damage			
	Fire			
	Flame			
	Smoke			
	Water			
Total				
FATALITIES	Victims	a	Definition not publicly available	
	Type of fatality	b		
CASUALTIES	Injured person	a	Definition not publicly available	
	Type of injury	b		
FIRE SAFETY MEASURES	Alarm	a	Defintions not publicly available	
	Type of alarms	a		
	Automatic extinguishing systems	a		
	Type of automatic extinguishing systems	a		
	Compartmentation	a		
	Fire barriers	a		
	Safe areas	a		
	Smoke extractors	a		
	Fire brigades on site	a		
	Escape routes	a		
Evacuation	a			
FIRE RESPONSE	Fire service time of response	a		
	Occupant fire response	a		
FIRE FINANCIAL COSTS	Direct financial costs	a		
	Indirect financial costs	a		
FIRE PREVENTION	Fire regulations	a		
	Fire prevention	a		

HUNGARY DEFINITIONS 1/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	b		
	Deliberate fire	b		
	False alarm	a	False alarm: There is no incident at the indicated location, no event requiring the intervention of firefighters, only an event deemed to be by a caller or fire alarm device (the notifier misjudged the event). The use of detection and surveillance tools does not mean intervention, e.g. lamp, thermal imager, gas sensor. But here counted chimney fires that do not require the intervention of firefighters and the fire does not spread from the chimney to its surroundings.	National Directorate General for Disaster Management (NDGDM) filling instructions to fire and technical rescue report (FTRR)
BUILDING DESCRIPTION	Building fire	b		
	Residential buildings	b		
	Non-residential buildings	b		
FIRE CAUSES	Fire causes	a	There is a difficult fire cause structure with nine main classes and several sub-classes (from electrical power to other), which all have a description.	National Directorate General for Disaster Management (NDGDM) filling instructions to fire investigation data sheet.
	Source of ignition	b		
	Area of fire origin	b		
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	b	We interpreted it, but we do not have definition about it. We have definition about protection against the fire spread	National Fire Protection Regulations - Ministry of the Interior
	Fire horizontal spread	b	We interpreted it, but we do not have definition about it.	
	Fire vertical spread	b	We interpreted it, but we do not have definition about it. We have definition about protection against facade fire spread	National Fire Protection Regulations - Ministry of the Interior
	Damage	b	We interpreted, but we have no definition about it.	
	Fire	a	The process of combustion which endangers or damages life, physical integrity, or material goods	Fire protection law
	Flame	b	We interpreted it, but we do not have definition about it.	
	Smoke	b	We interpreted it, but we do not have definition about it. We have definition about heat and smoke protection: a set of solutions to limit the spread of heat and smoke in the event of a fire, to ensure its extraction and smoke extraction	National Fire Protection Regulations - Ministry of the Interior
	Water	b	We interpreted it, but we do not have definition about it.	
	Total			

HUNGARY DEFINITIONS 2/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FATALITIES</b>	Victims	a	The number of death persons (determined by a doctor) found at the scene of the fire, if the cause of death was the result of, or in connection with the fire. If a person dies during transport to the hospital or later in the hospital, he/she does not have to be included to the report from the fire.	National Directorate General for Disaster Management (NDGDM) filling instructions to fire and technical rescue report (FTRR)
	Type of fatality	b		
<b>CASUALTIES</b>	Injured persons	a	The number of persons injured on the site as a result of fire must be reported.	National Directorate General for Disaster Management (NDGDM) filling instructions to fire and technical rescue report (FTRR)
	Type of injury	b		
<b>FIRE SAFETY MEASURES</b>	Alarm	a	Alarm presence, type, location, operation and reason for failure are recorded.	On rules for the investigation of fires
	Type of alarms	a	What does it come from: fire alarm system, phone, speech other; type of detection: smoke, flame, aspiration system, line fire alarm, heat, combined alarm; where does it come from: below ground level, above ground level	On rules for the investigation of fires
	Automatic extinguishing systems	a	Built-in extinguishing equipment: fixed, automatic or manual start-up, non-fire-fighting equipment, installed in a building or outdoors, used to extinguish a fire, facilitate intervention, prevent the spread of fire, reduce fire damage with the permission of the fire protection authority,	National Fire Protection Regulations - Ministry of the Interior
	Type of automatic extinguishing systems	a	Sprinklers; Water mist; Gaseous system - halon substitute; Gaseous system - other; Pressurisation; Smoke ventilation; Drencher; Foam; Powder; Other	
	Compartmentation	a	The approximate size of the compartment is recorded. The compartment classification is the following: Stopped/checked spread; Breached - current building work; Breached - previous building work; Breached - fire doors left open or incorrectly fitted; Damage to compartmentation; Fire spread through gaps or voids in construction; No compartmentation in building; Not applicable; Other	On rules for the investigation of fires
	Fire barriers	c		
	Safe areas	a	Temporary safe areas: means a room, group of rooms or space which, in the event of a fire, is designed to ensure the safety of persons fleeing or who have fled there temporarily, until a rescue or further escape is carried out	National Fire Protection Regulations - Ministry of the Interior

HUNGARY DEFINITIONS 3/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE SAFETY MEASURES</b>	Smoke extractors	a	Heat and smoke extraction device: a device which, in the event of a fire, ensures the flow of heat and smoke to the open air by forced flow	National Fire Protection Regulations - Ministry of the Interior
	Fire brigades on site	a	Facility firefighter: a person who performs the task of a firefighter in the organization of the main occupational facility fire brigade or an occasional facility fire brigade or who manages the professional duties of the facility fire brigade, who is registered and certified as a facility firefighter	On the rules for municipal and institutional fire brigades and the contribution to the maintenance of a professional fire brigade, a municipal fire brigade and a voluntary fire brigade association
	Escape routes	a	The transport route used by the fleeing persons, which ensures the safety of the fleeing persons in the second stage of evacuation in the event of a fire - on the route following the door for evacuation of the room in the case of a public accommodation for the period necessary to escape	National Fire Protection Regulations - Ministry of the Interior
	Evacuation	a	Departure and removal of persons in the building, building, special structure, outdoors in case of fire, which lasts from leaving the place of residence until reaching the temporary protected space or the safe space	National Fire Protection Regulations - Ministry of the Interior
<b>FIRE RESPONSE</b>	Fire service time of response	a	The alerted fire vehicle of a professional fire brigades must leave its position within 2 minutes after alert and start moving. The standard alert time of fire vehicles with replaceable superstructures is six minutes.	39/2011. (XI. 15.) Order of the Minister of the Interior about the general rules of fire fighting and technical rescue of fire brigade, Section 37
	Occupant fire response	a	Anyone who detects a fire, or its imminent danger must report it immediately to the authorities. Those subject to the scope of the law are obliged to participate in firefighting - without compensation - with the personal participation that can be expected on the basis of their age, health and physical condition, and with communication of data.	Act XXXI. of 1996 about the protection against fire, technical rescue and fire brigade, Section 5 (1), Section 6 (1)
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	b		
	Indirect financial costs	b		
<b>FIRE PREVENTION</b>	Fire regulations	b		
	Fire prevention	a	The system of fire protection legislation, standards, authorial regulations and their enforcement in order to prevent the occurrence of fires, to prevent their spread and to ensure the basic conditions of firefighting, which have to be maintained during construction and use.	Act XXXI. of 1996 about the protection against fire, technical rescue and fire brigade, Section 4 c)

**Useful links for Hungary:**

39/2011. (XI. 15.) Order of the Minister of the Interior about the general rules of fire fighting and technical rescue of fire brigade, Section 37:

[http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=138182.291370](http://njt.hu/cgi_bin/njt_doc.cgi?docid=138182.291370)

Act XXXI. of 1996 about the protection against fire, technical rescue and fire brigade, Section 5 (1), Section 6 (1):

[http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=26565.383670](http://njt.hu/cgi_bin/njt_doc.cgi?docid=26565.383670)

Act XXXI. of 1996 about the protection against fire, technical rescue and fire brigade, Section 4 c): [http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=26565.383670](http://njt.hu/cgi_bin/njt_doc.cgi?docid=26565.383670)

Fire protection law: [http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=26565.383670](http://njt.hu/cgi_bin/njt_doc.cgi?docid=26565.383670)

National Directorate General for Disaster Management (NDGDM) filling instructions to fire and technical rescue report (FTRR) only for registered users available in Hungarian

National Directorate General for Disaster Management (NDGDM) filling instructions to fire investigation data sheet only for registered users available in Hungarian

National Fire Protection Regulations - Ministry of the Interior: [http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=172805.371247](http://njt.hu/cgi_bin/njt_doc.cgi?docid=172805.371247)

On rules for the investigation of fires: [http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=138282.372056](http://njt.hu/cgi_bin/njt_doc.cgi?docid=138282.372056)

On the rules for municipal and institutional fire brigades and the contribution to the maintenance of a professional fire brigade, a municipal fire brigade and a voluntary fire brigade association: [http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=140054.326158](http://njt.hu/cgi_bin/njt_doc.cgi?docid=140054.326158)

IRELAND DEFINITIONS 1/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	b		
	Deliberate fire	b		
	False alarm	a	Fire false alarm: Malicious, Good Intent	Fire statistics operational
<b>BUILDING DESCRIPTION</b>	Building fire	a	Fires are recorded in Domestic buildings, Institutions, Industrial, Commercial, Service and Other	Fire statistics operational
	Residential buildings	a	Domestic buildings: Chimney Fires in Houses; Other House Fires; Apartments, flats and bedsitters; Caravans/Mobile Homes.	Fire statistics operational
	Non-residential buildings	a	Institutions: Hospitals; Schools; Other institutions	Fire statistics operational
			Industrial: Factories, Chemical Plants; Storage Buildings/Warehouses	Fire statistics operational
			Commercial: Shops/Supermarkets; Offices; Hotels/Guesthouses/Boarding Houses, etc.	Fire statistics operational
Service: Places of Public Entertainment (Dance Halls, Discos, Cinemas, Theatres, Bingo Halls); Public Houses; Restaurants	Fire statistics operational			
<b>FIRE CAUSES</b>	Fire causes	a	Chimneys/Flues/Soot/Hot Ashes; Smoking Materials; Matches/Cigarette Lighters; Rubbish Burning; Using Fuels to Kindle Fires; Cooking and Heating; Electrical Equipment; Other Equipment; Electrical Wiring Installations; Explosions; Malicious; Other Suspected Causes; Unknown Causes	Fire statistics operational
	Source of ignition	b		
	Area of fire origin	a	Kitchen; Bedroom; Living room; Other specify	Fire fatalities report
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	b		
	Fire horizontal spread	b		
	Fire vertical spread	b		
	Damage	b		
	Fire	b		
	Flame	b		
	Smoke	b		
	Water	b		
Total	b			
<b>FATALITIES</b>	Victims	b		
	Type of fatality	b		
<b>CASUALTIES</b>	Injured person	b		
	Type of injury	b		

IRELAND DEFINITIONS 2/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE SAFETY MEASURES</b>	Alarm	b		
	Type of alarms	b		
	Automatic extinguishing systems	b		
	Type of automatic extinguishing systems	b		
	Compartmentation	b		
	Fire barriers	b		
	Safe areas	b		
	Smoke extractors	b		
	Fire brigades on site	b		
	Escape routes	b		
<b>FIRE RESPONSE</b>	Evacuation	b		
	Fire service time of response	b		
<b>FIRE FINANCIAL COSTS</b>	Occupant fire response	b		
	Direct financial costs	b		
<b>FIRE PREVENTION</b>	Indirect financial costs	b		
	Fire regulations	b		
	Fire prevention	a		

ITALY DEFINITIONS 1/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	b		Statistical Yearbook of the Italian National Fire Brigade (1st January - 31st December 2017) <a href="http://www.vigilfuoco.it/asp/ReturnDocum ent.aspx?IdDocum ento=13103">http://www.vigilfuoco.it/asp/ReturnDocum ent.aspx?IdDocum ento=13103</a> <a href="http://www.vigilfuoco.it/asp/ReturnDocum ent.aspx?IdDocum ento=13103">http://www.vigilfuoco.it/asp/ReturnDocum ent.aspx?IdDocum ento=13103</a>
	Deliberate fire	b		
	False alarm	a	False alarms	
BUILDING DESCRIPTION	Building fire	b		
	Residential buildings	a	Residential Places and Homes: Private flats and homes; Generic building; Others; Private parking; Gypsy camps; Temporary buildings; waste storage rooms; Switchboard room	
	Non-residential buildings	a	Places for specific uses; Storages of solid combustibles; Commercial and sales stores; Agricultural and farming places; Traffic and parking areas; Mountain areas; Other places	
FIRE CAUSES	Fire causes	a	Causes provoking need of rescue to persons; Causes of accident of transportation means and vehicles; Cause of fire ignition (Chimney and/or Owen ducts; cigarette butts and matches; Electrical causes; Fault on heating production plants; Fireworks; Glitter from friction of mechanic parts; Household appliances; Lack of safety and cautioned measures of management; lighting; Other; Over heating of engines machines; Self combustion); Malicious/Intentional causes; Not being possible to evaluate; Causes of Other type of intervention	
	Source of ignition	b		
	Item and Material first ignited	a	Solid combustible; Other flammables and combustibles; Building products; Transportation means; Others	
	Area of fire origin	b		
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	b		
	Fire horizontal spread	b		
	Fire vertical spread	b		
	Damage	b		
	Fire	b		
	Flame	b		
	Smoke	b		
	Water	b		
Total	b			
FATALITIES	Victims	a	Victims recorded at the time of the intervention	
	Type of fatality	b		
CASUALTIES	Injured person	a	People injured during the incident	
	Type of injury	b		



ITALY DEFINITIONS 2/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE SAFETY MEASURES</b>	Alarm	b		Statistical Yearbook of the Italian National Fire Brigade (1st January - 31st December 2017) <a href="http://www.vigilfuoco.it/asp/ReturnDocument.aspx?IdDocumento=13103">http://www.vigilfuoco.it/asp/ReturnDocument.aspx?IdDocumento=13103</a> <a href="http://www.vigilfuoco.it/asp/ReturnDocument.aspx?IdDocumento=13103">http://www.vigilfuoco.it/asp/ReturnDocument.aspx?IdDocumento=13103</a>
	Type of alarms	b		
	Automatic extinguishing systems	b		
	Type of automatic extinguishing systems	b		
	Compartmentation	b		
	Fire barriers	b		
	Safe areas	b		
	Smoke extractors	b		
	Fire brigades on site	b		
	Escape routes	b		
<b>FIRE RESPONSE</b>	Evacuation	b		
	Fire service time of response	a		
<b>FIRE FINANCIAL COSTS</b>	Occupant fire response	b		
	Direct financial costs	b		
<b>FIRE PREVENTION</b>	Indirect financial costs	b		
	Fire regulations	b		
	Fire prevention	a	Fire prevention activities of the fire brigades	

NETHERLANDS DEFINITIONS 1/2			
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS
<b>FIRE INCIDENT</b>	Accidental fire	a	
	Deliberate fire	a	
	False alarm	b	
<b>BUILDING DESCRIPTION</b>	Building fire	b	
	Residential buildings	a	Buildings where people live for at least 6 months a year (houseboat and holiday home can be included)
	Non-residential buildings	a	All building types that are not residential
<b>FIRE CAUSES</b>	Fire causes	a	Human interacting (smoking etc), technical cause of building, technical of appliances (type and brand), thunder.
	Source of ignition	a	Kinetisch, moleculair, aardse inwerking, kosmische inwerking, elektrisch (22 subcatgeories)
	Area of fire origin	a	Hallway, basement, fuse box, extra kitchen hallway first floor, hallway second floor, toilet, stairs, kitchen, living room, bedroom, study, bathroom, shed, garage, chimney, balcony, attic, roof, terrace
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	a	Combination of fire horizontal spread+vertical spread
	Fire horizontal spread	c	Inside or outside the building
	Fire vertical spread	c	Inside the building: how many floors did the fire cover?
	Damage	b	
	Fire	b	
	Flame	b	
	Smoke	b	
	Water	b	
<b>FATALITIES</b>	Total	b	
	Victims	c	Involved occupants of the building
<b>CASUALTIES</b>	Type of fatality	a	Based upon if the victim died due natural cause (and started fire afterwards), suicide or accidently
	Injured person	b	
<b>FIRE SAFETY MEASURES</b>	Type of injury	b	
	Alarm	b	
	Type of alarms	b	
	Automatic extinguishing systems	b	
	Type of automatic extinguishing systems	b	
	Compartmentation	b	
	Fire barriers	b	
	Safe areas	b	
	Smoke extractors	b	
	Fire brigades on site	b	
	Escape routes	b	
Evacuation	a	When the victim was not in a direct threat but was helped by the fire brigade. Evacuation is when the occupants leave their homes for a short period of time.	

NETHERLANDS DEFINITIONS 2/2			
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS
<b>FIRE RESPONSE</b>	Fire service time of response	a	Time between emergency call and arrival of the fire brigade at the building
	Occupant fire response	a	If there is an attempt to put out the fire by an occupant (by means of water, fire extinguisher, a lit of a pot, fire blanket)
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	b	
	Indirect financial costs	b	
<b>FIRE PREVENTION</b>	Fire regulations	b	
	Fire prevention	b	

ROMANIA DEFINITIONS 1/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	
<b>FIRE INCIDENT</b>	Fires	a	Fire - self-sustaining combustion, which takes place without control in time and space, which causes loss of life and / or material damage and requires an organized intervention in order to interrupt the burning process	LAW no. 307 of July 12, 2006 (* republished *) on fire protection <a href="https://www.lege-online.ro/lr-LEGE-307%20-2006-(212916)-(1).html">https://www.lege-online.ro/lr-LEGE-307%20-2006-(212916)-(1).html</a>
	False alarm	a	False alarm - Upon arrival of the crews at the scene it is found that it does not exist	Internal procedure (Order of the General Inspector of IGUSU)
<b>BUILDING DESCRIPTION</b>	Building fire	b	There is no official definition - fire occurs in one or more buildings	Internal procedure - nomenclatures
	Residential buildings	b	There is no official definition - fire occurs in one or more apartment buildings	Internal procedure (Order of the General Inspector of IGUSU)
	Non-residential buildings	b	There is no official definition - fire occurs in one or more non-residential buildings	Internal procedure (Order of the General Inspector of IGUSU)
<b>FIRE CAUSES</b>	Fire causes (probable source of ignition; the means that produced the ignition; the first material to ignite and the determining circumstances that led to ignition)	a	Probable cause of fire - the sum of the factors that contribute to the initiation of the fire, which usually consists of the probable source of ignition, the means that caused the ignition, the first material that ignited, and the determining circumstances that led to its outbreak.	Internal procedure - nomenclatures with the 4 categories (Order of the General Inspector of IGUSU)
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	c	Evaluation of the extent of flame damage at stop	Internal procedure (Order of the General Inspector of IGUSU)
	Fire horizontal spread			
	Fire vertical spread			
	Damage	a	Estimation of damage caused by fire (area affected by fire in m <sup>2</sup> )	Internal procedure (Order of the General Inspector of IGUSU)
	Fire			
	Flame			
	Smoke			
Water				
Total				
<b>FATALITIES</b>	Victims	a	Fire-related fatalities are, in general, those that would not have otherwise occurred had there not been a fire. This includes any fatal casualty which is the direct result of injuries caused by a fire incident.	Internal procedure (Order of the General Inspector of IGUSU)
	Type of fatality		Depending on the cause of death they are divided into 3 categories: burned, asphyxiated and other causes. They are also divided in 6 age categories.	Internal procedure (Order of the General Inspector of IGUSU)
<b>CASUALTIES</b>	Injured person		Fire-related fatalities are, in general, those that would not have otherwise occurred had there not been a fire. This includes any injury which is the direct result a fire incident.	Internal procedure (Order of the General Inspector of IGUSU)
	Type of injury		Depending on the cause of injury they are divided into 3 categories: burns, intoxicated with smoke and other causes. They are also divided in 6 age categories.	Internal procedure (Order of the General Inspector of IGUSU)

ROMANIA DEFINITIONS 2/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	
<b>FIRE SAFETY MEASURES</b>	Alarm			
	Type of alarms			
	Automatic extinguishing systems			
	Type of automatic extinguishing systems			
	Compartmentation			
	Fire barriers			
	Safe areas			
	Smoke extractors			
	Fire brigades on site			
	Escape routes			
	Evacuation	a	Yes, the number of people evacuated with or without assistance.	
<b>FIRE RESPONSE</b>	Fire service time of response	a	Response time - the interval between the moment of receiving the emergency call and the arrival of the first crew at the place of intervention.	Internal procedure (Order of the General Inspector of IGSU)
	Occupant fire response			
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs			
	Indirect financial costs			
<b>FIRE PREVENTION</b>	Fire regulations			
	Fire prevention			

SLOVAKIA DEFINITIONS 1/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	a	A fire is any unwanted burning in which the lives or health of individuals or animals, property or the environment are immediately endangered, which results in damage to property, the environment or which results in the injury or death of a natural person or animal.	Zákon NR SR č. 314/2001 Z. z. o ochrane pred požiarimi
	Deliberate fire	b		
	False alarm	a	A false alarm is an emergency call when there is no or no emergency	STN ISO 8421-8 (92 002) ISO 8421-8: 1990
BUILDING DESCRIPTION	Building fire	b		
	Residential buildings	a	The residential part of a building is the part of the building that contains flats or a flat intended for long-term housing; the residential part of the building should have a separate entrance from the public space	STN 73 4301
	Non-residential buildings	b		
FIRE CAUSES	Fire causes	b		
	Soruce of ignition	c		
	Area of fire origin	c		
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	b		
	Fire horizontal spread	b		
	Fire vertical spread	c		
	Damage	b		
	Fire	c		
	Flame	c		
	Smoke	c		
FATALITIES	Victims	a	killed persons are persons who died in the place of the accident (or in the place of fire), or when being transported to hospital, or within 24 hours after the accident.	Statistical Yearbook of the Slovak Republic 2019
	Type of fatality	b		
	Injured person	b		
CASUALTIES	Type of injury	b		

SLOVAKIA DEFINITIONS 2/3

	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE SAFETY MEASURES	Alarm	a	The electrical fire alarm must identify at least one physical or chemical phenomenon caused by a fire in the guarded area, acoustically or optically signal an alarm in or around the guarded area and control the equipment connected to it.	Vyhláška Ministerstva vnútra Slovenskej republiky č. 726/2002 Z.z., ktorou sa ustanovujú vlastnosti elektrickej požiarnej signalizácie, podmienky jej prevádzkovania a zabezpečenia jej pravidelnej kontroly
	Type of alarms	b		
	Automatic extinguishing systems	a	A stable fire extinguishing device is an extinguishing device which contains, in particular, a stable source of extinguishing agent, a distribution pipe, a drain fitting, a trigger mechanism and a signaling device.	Vyhláška Ministerstva vnútra Slovenskej republiky č. 169/2006 Z.z., o konkrétnych vlastnostiach stabilného hasiaceho zariadenia a polostabilného hasiaceho zariadenia a o podmienkach ich prevádzkovania a zabezpečenia ich pravidelnej kontroly
	Type of automatic extinguishing systems	b		
	Compartmentation	b		
	Fire barriers	a	A fire and a barrier is a barrier in the entire thickness of the thermal insulation contact system, which limits the spread of fire through the thermal insulation contact system and along the outer surface of the perimeter wall with thermal protection by the thermal insulation contact system.	STN 73 2901
	Safe areas	b		
	Smoke extractors	a	The fire smoke extractor is a manually or automatically controlled stable fan that can be operated to remove smoke and hot gases from a building engulfed in fire.	STN ISO 8421-8 (92 002) ISO 8421-8: 1990
	Fire brigades on site	b		
	Escape routes	a	An escape route is a permanently free road or space in or on a building which allows the safe evacuation of persons from the building or from a fire compartment endangered by fire to an open space or to an area which is not endangered by fire.	Vyhláška Ministerstva vnútra Slovenskej republiky č.94/2004 Z.z., ktorou sa ustanovujú technické požiadavky na protipožiarnu bezpečnosť pri výstavbe a pri užívaní stavieb
	Evacuation	a	Evacuation is the removal of endangered persons, animals or things from a certain area	Zákon Národnej rady Slovenskej republiky č. 42/1994 Z. z. o civilnej ochrane obyvateľstva

SLOVAKIA DEFINITIONS 3/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE RESPONSE</b>	Fire service time of response	b		
	Occupant fire response	b		
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	a	Direct material loss is the sum of losses calculated from estimated residual value of tangible fixed assets, materials and other values destroyed by the fire.	Statistical Yearbook of the Slovak Republic 2019
	Indirect financial costs	b		
<b>FIRE PREVENTION</b>	Fire regulations	b		
	Fire prevention	a	Fire prevention includes measures to prevent or limit the effects of a fire	STN ISO 8421-1 (92 002) ISO 8421-1: 1987



SLOVENIA DEFINITIONS 1/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	a	An incident is an event or a group of events that are caused by uncontrolled natural or other forces, which can endanger the life or health of people and animals. It can also cause damage of property, cultural heritage and the environment in such extend, that it is required to use special measures, forces and resources to control the incident, since regular activities, forces and resources are not sufficient [1] Fire is a process of rapid burning that is spreading uncontrollably in time and space. The fire characteristics are energy release together with smoke, toxic gases and flames. The consequence of rapid burning is an explosion [2].	[1] ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN) , [2] Zakon o varstvu pred požarom
	Deliberate fire	c		
	False alarm	c		
BUILDING DESCRIPTION	Building fire	a	<p><b>Article 17 (fire safety)</b></p> <p>(1) In order to reduce the risk to people in or near them and the environment, facilities must ensure fire safety and enable effective and safe action by firefighters and rescuers. A sufficient amount of water for extinguishing must be provided.</p> <p>(2) The load-bearing structure of a building must maintain the required load-bearing capacity for a certain period of time in the event of a fire. To limit the rapid spread of fire throughout the building, building elements must be used that are difficult to ignite, emit small amounts of heat and smoke when ignited, and limit the rapid spread of fire over the surface.</p> <p>(3) In order to limit the spread of fire throughout the building, the building must be divided into fire sectors.</p> <p>(4) Facilities must provide a sufficient number of properly carried out evacuation routes and exits at appropriate locations so that people can leave them quickly and safely. To ensure the rapid and safe evacuation of people and the rapid intervention of firefighters and rescuers in the facility, fire alarm and alarm systems must be installed.</p> <p>(5) Unobstructed and safe access for firefighting and rescue must be provided in and around facilities.</p> <p>(6) Appropriate fire-fighting systems and devices and equipment must be installed or installed in the facilities.</p> <p>(7) The external walls and roofs of buildings, partition walls, together with doors, windows and other penetrations, must reduce the risk of the fire spreading to neighboring buildings.</p>	<p>(1) Gradbeni zakon (Uradni list RS, št. 61/17, 72/17 – popr. in 65/20)</p> <p>(2) Pravilnik o požarni varnosti v stavbah (Uradni list RS, št. 31/04, 10/05, 83/05, 14/07, 12/13 in 61/17 – GZ)</p> <p>(3) TSG-1-001:2019 Tehnična smernica - požarna varnost v stavbah</p>
	Residential buildings	a	Residential buildings are defined as buildings of which at least half of the usable floor area is used for residential purposes. In case less than half of the usable floor area is used for residential purposes, the building is categorised as non-residential, depending on the purpose of the building.	<p>(1) TSG_V_006_2018 Razvrščanje objektov</p> <p>(2) Uredba o razvrščanju objektov (Uradni list RS, št. 37/18)</p>
	Non-residential buildings	a	The non-residential buildings are mainly used for non-residential purposes. In case more than half of the floor area is used for residential purposes, the building is defined as residential.	

SLOVENIA DEFINITIONS 2/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE CAUSES</b>	Fire causes	a	The perpetrator of an accident is every physical or legal person that causes an incident due to their improper behaviour and is therefore legally responsible. The unknown perpetrator is every physical or legal person, which causes an accident but is unknown to the authority at the time of the rescue and assistance.	ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN)
	Sorce of ignition	b		
	Area of fire origin	b		
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	b		
	Fire horizontal spread	b		
	Fire vertical spread	b		
	Damage	a	Damage that is caused by natural or other accident includes direct damage, costs of interventions and measures with which they prevent the possible spread of harmful effects. / Damage that is caused by natural or other accident is assessed based on the decision of The Administration of the Republic of Slovenia for Civil Protection and Disaster Relief that defines the size of the area, commission group for assessment as well as other questions that are significant for the comprehensive evaluation of the damage. The initiative for the beginning of the damage assessment may be given by The Administration of the Republic of Slovenia for Civil Protection and Disaster Relief, ministry, or any organisation where the damage occurred.	ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN)
	Fire	b		
	Flame	b		
	Smoke	b		
	Water	b		
Total	a	Material and other damage caused by natural or other incidents is assessed based on the methodology prescribed by the government.	ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN)	
<b>FATALITIES</b>	Victims	b		
	Type of fatality	b		
<b>CASUALTIES</b>	Injured person	a	Injured people and patients are everyone that was injured during an incident regardless of their gender, age or citizenship.	ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN)
	Type of injury	b		

SLOVENIA DEFINITIONS 3/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE SAFETY MEASURES	Alarm	c	<p>(1) Protection includes organisational, technical and other measures as well as the use of technical and other resources for the direct protection of people, animals, property, cultural heritage and environment ahead of the consequences caused by the natural and other incidents.</p> <p>(2) Fire protection measures are all spatial, construction, technological and organisational measures which reduce the fire risk and ensure fire safety. (2) Fire safety includes the safety of people, animals and property in case of a fire. With this law, the fire protection measures ensure the safety of people, animals, property and prevent the occurrence of major fires.</p> <p>(2) Active fire protection measures are all technical and organisational measures, which are intended for fire extinguishing. Among these measures are included the systems, devices, equipment and procedures for fire detection and extinguishing as well as for the removal of heat and smoke in case of a fire. (2) The active fire protection includes systems and equipment that are installed and intended for reducing the risk of people, animals, property as well as for detection, extinguishing of the fire and removing the smoke and heat in case of a fire.</p>	(1) ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN) / (2) Zakon o varstvu pred požarom
	Type of alarms	c		
	Automatic extinguishing systems	c		
	Type of automatic extinguishing systems	c		
	Compartmentation	c		
	Fire barriers	c		
	Safe areas	c		
	Smoke extractors	c		
	Fire brigades on site	c		
	Escape routes	c		
Evacuation	c			
FIRE RESPONSE	Fire service time of response	a	(1) Rescue includes measures and procedures for rescuing people, whose lives or health are endangered, rescuing of animals, property as well as a cultural heritage from the consequences of natural and other incidents. (2) The system of informing firefighters is part of the protection against natural and other accidents, and it includes a system of observation, information and alarming. (2) The time for the arrival of the fire brigades to the scene of an accident is comprised of the time from receiving the call to activating the fire unit, the time to transfer the call, the time required for arrival of the firefighters on the scene of the accident. The arrival time is also dependent on the type of a fire unit, the route to the fire scene and area where the accident occurred.	(1)ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN), / (2) Zakon o gasilstvu (ZGas)
	Occupant fire response	b		

SLOVENIA DEFINITIONS 4/4				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE FINANCIAL COSTS	Direct financial costs	a	Physical or legal person who intentionally caused an accident or because of negligence and the incident induced costs due to the emergency is required to cover the following: costs of the rescue intervention, costs of restoration to the previous condition, costs of compensation for physical and legal people. / Funds for assessing the damage in the event of a natural or other incident is provided by the government.	ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN)
	Indirect financial costs	a	The owner or manager of the facility is obliged to cover the costs of performing firefighting operations. The costs of the intervention that arise due to the tasks performed by the fire brigade are covered by the municipality. Irrespective of the previous two sentences, the costs of the intervention are covered by: <ol style="list-style-type: none"> <li>1. The person responsible for the accident that was caused intentionally or due to negligence</li> <li>2. Whoever is not taking precautions when transporting, storing or carrying out other tasks with toxic substances</li> <li>3. Whoever is not organising that the firefighters to be present at an event or activity according to the regulations</li> <li>4. Whoever is on purpose contacting the fire unit without reason</li> </ol> The costs of interventions that arise due to the interventions performed outside of the municipality of the fire unit are covered by the Republic of Slovenia if the intervention was performed on the basis of national protection.	Zakon o gasilstvu (ZGas)
FIRE PREVENTION	Fire regulations	a	(1) Preventive measures count as all measures that prevent the accident or with which the consequences are reduced. (2) Preventive fire protection measures are all spatial, construction, technological, technical and organisational measures that reduce the possibility of a fire and when it occurs to ensure the safe evacuation of people and property as well as prevent the fire spread.	(1) ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN) / (2) Zakon o varstvu pred požarom
	Fire prevention	a		

**Useful links for Slovenia:**

(1) Gradbeni zakon (Uradni list RS, št. 61/17, 72/17 – popr. in 65/20) (2) Pravilnik o požarni varnosti v stavbah (Uradni list RS, št. 31/04, 10/05, 83/05, 14/07, 12/13 in 61/17 – GZ) (3) TSG-1-001:2019 Tehnična smernica - požarna varnost v stavbah":

<http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO7108>

TSG\_V\_006\_2018 Razvrščanje objektov: [https://www.gov.si/assets/ministrstva/MOP/Dokumenti/Graditev/TSG\\_V\\_006\\_2018.pdf](https://www.gov.si/assets/ministrstva/MOP/Dokumenti/Graditev/TSG_V_006_2018.pdf)

Uredba o razvrščanju objektov (Uradni list RS, št. 37/18): <http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED7671>

Zakon o gasilstvu (ZGas): <http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO301#>

ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN): <http://pisrs.si/Pis.web/pregledPredpisa?id=ZAKO3647>

ZAKON o varstvu pred naravnimi in drugimi nesrečami (ZVNDN): <http://pisrs.si/Pis.web/pregledPredpisa?id=ZAKO364>

Zakon o varstvu pred požarom: <https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina?urlid=20073&stevilka=102>

SWEDEN DEFINITIONS 1/2			
	GENERIC GROUPS	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	Fire or fire incident: In Swedish fire is to some extent defined by language, we have separate words for unwanted and wanted fires (like a fire for heating your house). In addition a definition like "uncontrolled flame, glow or smoke that caused damage" for Brand (fire). Fire incident is defined as danger that a flame, glow, smoke or heating of flammable material might cause damage	
	Deliberate fire		
	False alarm		
<b>BUILDING DESCRIPTION</b>	Building fire	Building is a permanent construction with a roof or roof and walls placed on gr ground or partly below ground or placed for a long period at a certain place in water constructed so that people can be in it.	not defined
	Residential buildings		Separate definition for each category, hospital, elderly home, industry etc.
	Non-residential buildings		
<b>FIRE CAUSES</b>	Fire causes		
	Source of ignition		Definitions/clarification for some of the ignition sources
	Area of fire origin		Definitions/clarification for some of the fire origins
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread		A note that many buildings consist of only one fire compartmentation
	Fire horizontal spread		
	Fire vertical spread		
	Damage		
	Fire		
	Flame		
	Smoke		
	Water		
Total			
<b>FATALITIES</b>	Victims	The definition for fatality differs for the different sources. In the fire database, all people (except fire fighter) who died at scene are counted. In the fire death statistics it is people who dies within 90 days of the fire as a direct consequence of the fire, i.e. not when trying to flee the fire etc. In the socialstyrelsen data it is only Swedish citizens that are counted.	
	Type of fatality		
<b>CASUALTIES</b>	Injured person	An estimate of the rescue service on site	
	Type of injury		

SWEDEN DEFINITIONS 2/2			
	GENERIC GROUPS	DEFINITIONS	REFERENCE
<b>FIRE SAFETY MEASURES</b>	Alarm	No special definitions	
	Type of alarms		
	Automatic extinguishing systems		
	Type of automatic extinguishing systems		
	Compartmentation		
	Fire barriers		
	Safe areas		
	Smoke extractors		
	Fire brigades on site		
	Escape routes		
Evacuation			
<b>FIRE RESPONSE</b>	Fire service time of response		
	Occupant fire response		
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	Potentially provided by insurance company	
	Indirect financial costs	Potentially provided by insurance company	
<b>FIRE PREVENTION</b>	Fire regulations		
	Fire prevention		

APPENDIX II - OTHER EUROPEAN AND NON-EUROPEAN COUNTRIES, DEFINITIONS

AUSTRALIA DEFINITIONS 1/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	c		Australian Incident Reporting System (AIRP). The AIRS includes definitions and it is composed of 10 parts as follows: A. Incident report header B. False alarm C. Hazardous materials D. Casualties, rescue and evacuation E. Ignition (all fires) F. Firefighting G. Bush, Forest, Grass fires H. Dollar loss fires I. Mobile property J. Structure fires
	Deliberate fire	c		
	False alarm	a		
	Type of incident	a	Building fire; structure; explosion; rupture; event	
<b>BUILDING DESCRIPTION</b>	Complex	a	A complex is a property complying with all three of the following: <ul style="list-style-type: none"> <li>• a property under one management or ownership and;</li> <li>• located within a continuous boundary and;</li> <li>• with multiple uses i.e.</li> </ul> (a) a single building with two or more property uses, or (b) more than one building with the same or different fixed property uses, or (c) other multiple uses.	
	Building fire	a	Determining which major division, the fixed property falls within will assist in finding the correct subdivision. Three digits must be recorded for this code. <ul style="list-style-type: none"> <li>• Public Assembly Property Division 1</li> <li>• Educational Property Division 2</li> <li>• Institutional Property Division 3</li> <li>• Residential Property Division 4</li> <li>• Shop/Store, Office Property Division 5</li> <li>• Primary Industry, Utility, Defence Property Division 6</li> <li>• Manufacturing Property Division 7</li> <li>• Storage Property Division 8</li> <li>• Special Property Division 9</li> <li>• Unclassified Division 0</li> </ul> For each of them property subtypes are available	
	Structure type	a	The type of structure, in terms of its configuration, in which the fire has occurred.	
	Construction type	a	The way in which the structure is constructed in terms of its resistivity to fire and fire spread.	
<b>FIRE CAUSES</b>	Fire causes			
	Material contributing most to fire intensity	a	The type of material which generated the most heat and flame.	
	Material generating most smoke	a	The type of material which generated the most smoke.	
	Area of fire origin	a	The area within a property where the fire originated. The Area of Fire Origin is defined by its use at the time of the fire ignition.	

AUSTRALIA DEFINITIONS 2/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Factor contributing to flame spread	a	The most important factor or avenue that allowed rapid, unusual or intense flame spread (char) beyond the room or area of origin.	Australian Incident Reporting System (AIRP).
	Fire horizontal spread	a	Fire confined to item, room, floor	
	Fire vertical spread	a	Fire confined to structure or extent beyond structure	
	Damage	b		
	Fire	b		
	Flame	a	The extent of the area burned or charred by flame impingement	
	Smoke	a	The extent of the smoke and heat scorch or browned damage to the structure.	
	Water	c	The extent of the damage to the building and contents or beyond caused by water or other extinguishing agents.	
Total	b			
<b>FATALITIES</b>	Victims	a	The number of brigade personnel fatalities attributed to the incident or the action of handling the incident. The number of fatalities that are attributable to the incident or the action of handling the incident.	
	Type of fatality	b		
<b>CASUALTIES</b>	Injured person	a	A casualty is a person who dies or is physically injured as the result of an incident or the action of handling the incident and includes injuries sustained whilst responding to and returning from the incident. To be recorded, the injury must be severe enough to require treatment by a medical practitioner, regardless of whether treatment is actually received, or the injury must result in at least one day of restricted activity immediately following the incident. A death is recorded if it is attributable to the incident or the action of handling the incident.	
	Type of injury	b		
<b>FIRE SAFETY MEASURES</b>	Alarm	a	The presence of smoke alarms/detectors in the structure involved in fire.	
	Type of alarms	a		
	Automatic extinguishing systems	a	The status and operation of sprinklers in the structure involved in fire.	
	Type of automatic extinguishing systems	a		
	Compartmentation	a	The size of the smallest compartment within which the fire is contained as found on arrival	
	Fire barriers	b		
	Safe areas	b		
	Smoke extractors	b		
	Fire brigades on site	b		
<b>FIRE RESPONSE</b>	Escape routes	b		
	Evacuation	b		
	Fire service time of response	a	Time of the incident and control or stop time	
	Occupant fire response	b		



AUSTRALIA DEFINITIONS 3/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE FINANCIAL COSTS</b>	Dollar loss	a	The estimated monetary value of the damage to property and contents caused by fire and firefighting operations. Do not include land value.	Australian Incident Reporting System (AIRP).
	Property	a	The reporting officer's estimation of the value of the property. Do not include the value of the contents. Property includes buildings, structures and mobile property. The contents within structures, material stored in yards, the payloads of mobile property and crops and plantations are recorded in Item H3 Estimated Value of Contents	
	Contents	a	The reporting officer's estimation of the value of the contents (includes crops).	
	Insurance	a	Whether the contents or structure or both were insured.	
	Indirect financial costs	b		
<b>FIRE PREVENTION</b>	Fire regulations	b		
	Fire prevention	b		

CANADA DEFINITIONS 1/1					
GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE		
Fire incident	a	Any instance of destructive or uncontrolled burning, including explosion of combustible solids, liquids , or gases.	<p>Statistics Canada. National Fire Incident Database (NFID). Data Dictionary (v2.0), February 2017 <a href="http://nfidcanada.ca/wp-content/uploads/2017/09/NFID-Data-Dictionary_final.pdf">http://nfidcanada.ca/wp-content/uploads/2017/09/NFID-Data-Dictionary_final.pdf</a></p>		
Damage	a	<b>Extent of Damage</b> is the total extent of damage caused by actual burning or charring and includes damage caused by heat (browning, blistering, etc.), smoke, water and other extinguishing agents. <b>Codes:</b> Confined to room of origin, Confined to object of origin, Confined to part of room/area of origin, Confined to floor of origin, Confined to building of origin, Beyond building of origin, Confined to roof, Unclassified, Unknown.			
		<b>Automatic Fire Detection System:</b> Automatic Fire Detection System may be installed throughout the buildings in which case the system is classified as "complete", or in parts of the building only, such as in storage areas or air handling systems, in which case the system is classified as "partial". Automatic Fire Detection System may also be central station supervised or directly connected to fire alarm headquarters or provided with local alarms only, which fact should be indicated by using the appropriate classification. In addition, Automatic Fire Detection System may operate on the heat detection principle, either fixed temperature or rate-of-rise, or on the detection of products of combustion or smoke principle, which fact is indicated by using the appropriate classification. Note: Installation of smoke alarms in a dwelling unit is not a fire alarm system.			
		Sprinkler Protection may be installed throughout the building in which case the system should be classified as "complete", or in part of the building only. If there are less than 10 sprinklers, the building is considered to be not sprinklered (exception: some properties may be completely protected by a sprinkler system with less than 10 sprinkler heads). Where a structure has been sprinklered in conformance with NFPA 13 it will be considered to be fully protected by a sprinkler system.			
		Compartmentation		b	
		Fire barriers		b	
Safe areas	b				
Smoke extractors	b				
Fire brigades on site	a	Yes			
Escape routes	b				
Evacuation	b				
Fatalities	a	<b>Civilian:</b> A person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained, providing the person was not a member of a fire department. When there is doubt about a suicide or murder, the person has been classified as a fire death. <b>Fire Service:</b> A member of a fire department killed accidentally while in the process of fighting a fire or who died from a fire action injury within one year following the date on which the injury was sustained.			
Casualties	a	<b>Civilian:</b> A person accidentally injured as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained, unless this person was a member of a fire department. When there is doubt about a suicide or murder, the person has been classified as a fire death. <b>Fire Service:</b> A member of a fire department accidentally injured while in the process of fighting a fire or who died from a fire action injury within one year following the date on which the injury was sustained. A firefighter accidentally injured while en-route to or returning from the scene of an actual fire is considered a fire action injury.			

NEW ZEALAND DEFINITIONS 1/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	a	Fires where the proven cause does not involve an intentional human act to ignite or spread fire into an area where the fire should not be.	NZPF 921
	Deliberate fire	a	Incendiary - An unlawful, deliberately-lit fire where, given the known information the fire is likely to be a result of malicious intent or reckless disregard of others and property, to cause unlawful damage	FENZ P3
	False alarm	a	False alarm: good intent; accidental operation; defective apparatus; malicious; alarm agent in attendance; nothing on indicator panel; undetermined.	FENZ SMS
<b>BUILDING DESCRIPTION</b>	Building fire	a	Referred to as a 'structure fire', either with or without damage	
	Residential buildings	a	A building where a person or persons normally live. Does not include hotels, temporary accommodation or hostels	FENZ SMS
	Non-residential buildings	a	Nil - field breaks down into general property use. 'General Property Use' is defined as 'the board use of the location where the emergency has occurred.	FENZ SMS
<b>FIRE CAUSES</b>	Fire causes	a	The circumstances, conditions, or agencies that brought about or resulted in the fire or explosion incident, damage to property resulting from the fire or explosion incident, or bodily injury or loss of life resulting from the fire or explosion incident.	FENZ P3
	Source of ignition	a	The source of heat energy that brought about ignition	FENZ SMS
	Area of fire origin	a	The general location where the fire started	FENZ SMS
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	a	Not defined but extent of damage is recorded.	
	Fire horizontal spread	a	Measured in squared metres	FENZ SMS
	Fire vertical spread	a	captured in square metres and a description of the extent as noted to the right.	FENZ SMS
	Damage	a	Measured by floors affected x Sq metres per floor	FENZ SMS
	Fire	a	See below	FENZ SMS
	Flame	a	The approximate floor area of the structure that was affected by flame	FENZ SMS
	Smoke	a	The approximate floor area of the structure that was affected by smoke	FENZ SMS
	Water	a	The approximate floor area of the structure that was affected by water	FENZ SMS
	Total	a	All damage measured in square metres	FENZ SMS
<b>FATALITIES</b>	Person injured	a	The most serious injury suffered by the injured person	FENZ SMS
	Type of injury	a	Burn; crush; cut, laceration, abrasion; deceased; respiratory – fire related (smoke/heat); respiratory – non fire related (eg asthma); fracture; heart attack, stroke; heat stroke/stress; unconscious; other; bleeding: major; bleeding: minor; shock; sprain, strain	
<b>CASUALTIES</b>	Injured person	a	Our fire reporting captures injuries to non-FENZ staff (see screen shot right) referring to them as 'Casualty'. The term 'Casualty' is not defined.	
	Type of injury	a	In reports, we classify causes of death as: avoidable – where measures such as education programmes, building design, fire safety systems, smoke alarms could have prevented the death; or non-avoidable – for example, self-immolation or murder, where these measures are unlikely to have made any difference.	Fire Investigation technical manual

NEW ZEALAND DEFINITIONS 2/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE SAFETY MEASURES	Alarm	a	'Type of Fire Alarm' described as 'the type of fire alarm system that activated'	
	Type of alarms	a	The report presents a selection of alarm types to choose from - refer right.	
	Automatic extinguishing systems	b	No definition within reporting system but refer to drop down right	
	Type of automatic extinguishing systems	b	No definition within reporting system but refer to drop down right	
	Compartmentation	a	A definition used in our fire engineering and built environment work but do not capture this specifically in incident reporting therefore no definition is contained within our fire reporting	NZ Building Code
	Fire barriers	a	as above	
	Safe areas	a	Place of Safety - a place of safety in the vicinity of a building from which people may safely disperse after escaping the effects of a fire. It may be a place such as a street, open space, public space or an adjacent building	NZ Building Code
	Smoke extractors		as above, the equipment adopted by fire brigade for the extraction of smoke is recorded	
	Fire brigades on site	b	Not provided in our fire statistics definitions.	
	Escape routes	a	Recorded only if occupants could or couldn't escape safely- actual definition in the Fire Safety Procedure and Evac scheme Regs	
	Evacuation	a	The reporting asks for evacuation status and adds 'was the location of the emergency fully evacuated during the emergency'. We also have Fire Safety, Evacuation Procedures and Evacuation Schemes Regulations 2018. These require buildings to have a 'means of escape from fire' either by "The owner of a building must have a procedure in place (evacuation procedure) for the safe, prompt, and efficient evacuation of the building's occupants in the event of a fire emergency requiring evacuation, or an evacuation scheme to enable the safe, prompt and efficient evacuation of the building's occupants in the event of a fire emergency evacuation.	Fire and Emergency Fire Safety, Evacuation Procedures and Evacuation Schemes Regulations 2018.
FIRE RESPONSE	Fire service time of response	a	This is a paraphrase of text taken from an agreement we have with government. The time taken from first becoming aware of an emergency to the time our first resource arrives.	Statement of Performance 2020/21
	Occupant fire response	b	No definition but our report asks "Was the fire out or under control when FENZ arrived?" and then requires a selection from a drop down list what equipment was used to control the emergency.	
FIRE FINANCIAL COSTS	Direct financial costs	b	No definition an 'activity based costing model' is used to seek recovery or provide an indication of a cost of response to an emergency.	
	Indirect financial costs	b	as above, no content loss and business interruption considered	

NEW ZEALAND DEFINITIONS 3/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE PREVENTION	Fire regulations	a	New Zealand has the Fire and Emergency Act 2017 (FENZ Act) which established Fire and Emergency NZ (the fire service) and sets out its mandate. The FENZ Act uses a term 'Relevant fire safety legislation' and states that this includes the Act itself, any regulations made under this Act, and any provisions of the following Acts (or regulations made under those Acts) under which FENZ has functions: Building Act 2004, Local Government Act 2002, Local Government Act 1974, Hazardous Substances and New Organisms Act 1996, Radiation Safety Act 2016, Sale and Supply of Alcohol Act 2012	Fire and Emergency Act 2017
	Fire prevention	a	The Fire and Emergency Act 2017 states a main function of Fire and Emergency NZ is 'to provide fire prevention' however it doesn't define what fire prevention is.  The following explanation of fire prevention is contained within the National Risk Reduction Strategy 2019-2029. "Reducing risk is the single most effective thing we can do in seeking to protect New Zealand's people, property and environment. As well as preventing incidents occurring in the first place, reducing the frequency of incidents, and mitigating the impacts of an emergency are also core risk reduction interventions. Furthermore, a crucial part of risk reduction is helping individuals and communities prepare or unavoidable emergencies, so that such incidents have less impact and they are able to recover more quickly".	National Risk Reduction Strategy 2019-2029

NORWAY DEFINITIONS 1/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
FIRE INCIDENT	Accidental fire	c	Maybe police has a definition	The Norwegian Directorate for Civil Protection (DSB) <a href="https://www.brannstatistik.no/brus-ui/">https://www.brannstatistik.no/brus-ui/</a>
	Deliberate fire	c	Maybe police has a definition	
	False alarm	a	There are two types of false alarm. "ABA Feil i Bruk" og "ABA teknisk/ukjent" alarm: An alarm which is given accidental or in good faith without fire or risk of a fire or any damage which require or could require the firebrigade. A False alarm "Falsk ABA": An Alarm which is given intentionally and in bad faith without fire or risk of a fire or any damage which requires or could require the firebrigade or where there are no other damage.	
BUILDING DESCRIPTION	Building fire	a	The building description is defined in a "pick list" which specifies which type of building, that is on fire	
	Residential buildings	a	The building description is defined in a "pick list" which specifies which type of building, that is on fire	
	Non-residential buildings	a	The building description is defined in a "pick list" which specifies which type of building, that is on fire	
FIRE CAUSES	Fire causes	a	In the database the fire cause is described in a dropdown menu with suggestions of different fire causes	
	Source of ignition	a	In the database the source of ignition is described in a dropdown menu with suggestions of different sources of ignition. Heat source (open flame, spark, glow, lightning, etc.) Material that was first ignited (paper, cardboard, plastic, textile, wood, etc.). Equipment involved in the ignition (machines, combustion plants, electrical installations, etc.), including make, model and serial number. Object that was subsequently ignited (building construction, furniture, storage, waste storage in container, etc.).	
	Area of fire origin	a	In the database the place of origin is described in a dropdown menu with suggestions of different places. Origin of fire (corridor area, kitchen, barn, etc.) is recorded.	

NORWAY DEFINITIONS 2/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	a	In the database a possible fire spread is described in a dropdown menu with suggestions of different scenarios of fire spread. Evaluation of the extent of fire at arrival (smoke development, visible flames, etc.).	
	Fire horizontal spread	b		
	Fire vertical spread	b		
	Damage	b		
	Fire	b		
	Flame	b		
	Smoke	b		
	Water	b		
Total	b			
<b>FATALITIES</b>	Victims	a	A fatality in a fire is defined as a person which is dead in a fire or within 30 days because of a fire, typically from smoke poison or burns. A "Fatal fire" is a fire where one or more persons is killed in a fire. "Accidental Fatal fire" : when started because of an accidental human act or failure in the electric equipment or an external cause. "Deliberate Fatal fire (dødsbrand)": when deliberately is started either by the victim or another person with the intention to start a fire.	The Norwegian Directorate for Civil Protection (DSB) <a href="https://www.brannstatistik.no/brus-ui/">https://www.brannstatistik.no/brus-ui/</a>
	Type of fatality	c		
<b>CASUALTIES</b>	Injured person	c		
	Type of injury	c		
<b>FIRE SAFETY MEASURES</b>	Alarm	a	Detector number, Detector type, Cause of the alarm (tobacco smoking, steam, craftsman work, technical faults, etc.)	
	Type of alarms	a	ion detector, optical smoke detector, thermodetector, multifunction detector	
	Automatic extinguishing systems	a		
	Type of automatic extinguishing systems	a		
	Compartmentation	a	Fire spread from main spaces, including presumed cause of the fire spread (open standing doors, holes in floor, separation, etc.) Fire technical equipment and functionality (smoke alarm, fire blanket, fire technical installations)	
	Fire barriers	a	Included in compartmentation.	
	Safe areas	b		
	Smoke extractors	a		
	Fire brigades on site	b		
Escape routes	b			
Evacuation	b			

NORWAY DEFINITIONS 3/3				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE RESPONSE</b>	Fire service time of response	a	Alarmed (date and time) Departure (date and time) Promotion at the scene of the accident (date and time) Released from place of injury (date and time) Ready at station (date and time)	The Norwegian Directorate for Civil Protection (DSB) <a href="https://www.brannstatistikk.no/brus-ui/">https://www.brannstatistikk.no/brus-ui/</a>
	Occupant fire response	c		
<b>FIRE FINANCIAL COSTS</b>	Direct financial costs	b		
	Indirect financial costs	b		
<b>FIRE PREVENTION</b>	Fire regulations	a	If it is regulated by Norwegian legislation. Justis- og beredskapsdepartementet LOV-2019-12-20-95 fra 01.11.2020.	
	Fire prevention	c		



RUSSIA DEFINITIONS 1/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Accidental fire	a	Uncontrolled burning, causing material damage, harm to the life and health of citizens, the interests of society and the state	<a href="https://os-info.ru/pozharnaya-bezopasnost/slovar-terminov-pozharnoj-bezopasnosti.html">https://os-info.ru/pozharnaya-bezopasnost/slovar-terminov-pozharnoj-bezopasnosti.html</a>
	Deliberate fire	a	Deliberately or inadvertently setting fire to objects in such a way that the fire is able to spread further spontaneously after removing the ignition means.	
	False alarm	a	False alarm	
<b>BUILDING DESCRIPTION</b>	Building fire	a	Fire in aboveground construction with premises for living and (or) activities of people, location of production facilities, storage of products or keeping animals	
	Residential buildings	a	Apartment buildings for permanent residence of people and dormitories for living during the period of work or study	
	Non-residential buildings	a	Buildings which are not apartment buildings for permanent residence of people and dormitories for living during the period of work or study	
<b>FIRE CAUSES</b>	Fire causes	a	Phenomenon or circumstance directly causing the occurrence of a fire	
	Source of ignition	a	Energy agent that initiates combustion	
	Area of fire origin	a	The place where the fire originated	
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	a	Increase in the combustion zone and / or the likelihood of exposure to hazardous fire factors	
	Fire horizontal spread	c		
	Fire vertical spread	c		
	Damage	a	Direct material damage from a fire is understood as material values estimated in monetary terms, destroyed and (or) damaged as a result of exposure to hazardous fire factors and their associated manifestations.	
	Fire	a	Uncontrolled burning, causing material damage, harm to the life and health of citizens, the interests of society and the state	
	Flame	a	Combustion process accompanied by flame or glow	
	Smoke	a	Aerosol formed by liquid and (or) solid products of incomplete combustion of materials	
	Water	c		
<b>FATALITIES</b>	Total	c		
	Victims	a	A person whose death occurred as a result of exposure to hazardous factors of a fire	
<b>CASUALTIES</b>	Type of fatality	c		
	Injured person		A person who was injured or suffered material losses as a result of exposure to hazardous factors of a fire	
	Type of injury	c		

RUSSIA DEFINITIONS 2/2				
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE SAFETY MEASURES</b>	Alarm	a	Fire detector that responds to factors accompanying a fire	<a href="https://os-info.ru/pozharnaya-bezopasnost/slovar-terminov-pozharnoj-bezopasnosti.html">https://os-info.ru/pozharnaya-bezopasnost/slovar-terminov-pozharnoj-bezopasnosti.html</a>
	Type of alarms	c		
	Automatic extinguishing systems	a	Fire extinguishing installation, automatically triggered when the controlled factor (s) of the fire exceed the set threshold values in the protected area	
	Type of automatic extinguishing systems	c		
	Compartmentation	c		
	Fire barriers	a	A building structure with a standardized fire resistance limit and a structural fire hazard class of a structure, a volumetric element of a building or other engineering solution designed to prevent the spread of fire from one part of a building, structure, structure to another or between buildings, structures, structures, green spaces	
	Safe areas	a	An area where people are protected from the effects of fire hazards or where there are no fire hazards	
	Smoke extractors	a	The smoke exhaust system is a specialized complex of ventilation equipment designed for the prompt removal of combustion products from the premises, for removing smoke from the evacuation routes of people and contributing to the correct organization of measures to eliminate the fire.	
	Fire brigades on site	c		
	Escape routes	a	An exit leading to the escape route directly outside or into a safe area	
<b>FIRE RESPONSE</b>	Evacuation	a	The process of organized independent movement of people directly outside or into a safe area from premises where there is a possibility of exposure of people to dangerous fire factors	
	Fire service time of response	a	Time from the moment of the alarm signal until the moment of arrival of the first fire brigade	
<b>FIRE FINANCIAL COSTS</b>	Occupant fire response	c		
	Direct financial costs	a	Direct material damage from a fire is understood as material values estimated in monetary terms, destroyed and (or) damaged as a result of exposure to hazardous fire factors and their associated manifestations.	
<b>FIRE PREVENTION</b>	Indirect financial costs		Material losses due to violation of economic plans in the economy, i.e. a decline in production, a decline in trade and banking operations, a decrease in income, losses due to delays in the transport of goods ...	
	Fire regulations	a	A set of provisions establishing the procedure for compliance with fire safety requirements and standards during the construction and operation of the facility	
	Fire prevention	a	A set of organizational and technical measures aimed at ensuring the safety of people, preventing a fire, limiting its spread, as well as creating conditions for successful fire extinguishing	

SWITZERLAND DEFINITIONS 1/1			
	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	REFERENCE
FIRE INCIDENT	Accidental fire	a	Erfassungsbogen Brandschutz
	Deliberate fire	a (arson)	
	False alarm	b	
BUILDING DESCRIPTION	Building fire	a	
	Residential buildings	a	
	Non-residential buildings	a	
FIRE CAUSES	Fire causes	a	
	Source of ignition	a	
	Area of fire origin	a	
FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES	Fire spread	a	
	Fire horizontal spread	a	
	Fire vertical spread	a	
	Damage	a	
	Fire	a	
	Flame	b	
	Smoke	a	
	Water	a	
	Total		
FATALITIES	Victims	a	
	Type of fatality	b	
CASUALTIES	Injure person	a	
	Type of injury	b	
FIRE SAFETY MEASURES	Alarm	a	
	Type of alarms	a	
	Automatic extinguishing systems	a	
	Type of automatic extinguishing systems	a	
	Compartmentation	a	
	Fire barriers	a	
	Safe areas	a	
	Smoke extractors	a	
	Fire brigades on site	a	
	Escape routes	a	
Evacuation	a		
FIRE RESPONSE	Fire service time of response	a	
	Occupant fire response	a	
FIRE FINANCIAL COSTS	Direct financial costs	a	
	Indirect financial costs	a	
FIRE PREVENTION	Fire regulations	a	
	Fire prevention	a	

UK DEFINITIONS 1/3

	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE INCIDENT</b>	Primary	a	Primary fires are generally more serious fires that harm people or cause damage to property. Primary fires are defined as fires that cause damage by fire/heat/smoke and meet at least one of the following conditions: any fire that occurred in a (non-derelect) building, vehicle or (some) outdoor structures; any fire involving fatalities, casualties or rescues; any fire attended by five or more pumping appliances.	Fire statistics definitions, Home Office
	Secondary	a	Secondary fires are generally small outdoor fires, not involving people or property. These include refuse fires, grassland fires and fires in derelict buildings or vehicles, unless these fires involved casualties or rescues, or five or more pumping appliances attended, in which case they become primary other outdoor fires.	
	Chimney	a	Chimney fires are fires in buildings where the flame was contained within the chimney structure and did not involve casualties, rescues or attendance by five or more pumping appliances. Chimneys in industrial buildings are not included.	
	Accidental fire	a	Accidental fires include those where the motive for the fire was presumed to be either accidental or not known (or unspecified).	
	Deliberate fire	a	Deliberate fires include those where the motive for the fire was 'thought to be' or 'suspected to be' deliberate. This includes fires to an individual's own property, others' property or property of an unknown owner. Despite deliberate fire records including arson, deliberate fires are not the same as arson. Arson is defined under the Criminal Damage Act of 1971 as 'an act of attempting to destroy or damage property, and/or in doing so, to endanger life'.	
	Late fire	a	Late fire calls are fires attended by a FRS which were known to be extinguished when the call was made (or to which no call was made) and the fire came to the attention of the FRS by other means (e.g. press report or inquest). Such fires are reported if an attendance is made (even if for inspection only) but are not reported if no attendance is made.	
	False alarm	a		
<b>BUILDING DESCRIPTION</b>	Building fire		Building characteristics are reported: number of floors below and above the ground level.	Incident Recording System (Home Office)
	Residential buildings	a	Dwellings (residential homes and HMOs) and Other residential (hostel, B&Bs, Nursing homes, Students halls of residence, etc.)	
	Non-residential buildings	a	Offices, shops, factories, warehouses, restaurants, cinemas, public buildings, religious buildings, agricultural buildings, railway stations, sheds, etc.	

UK DEFINITIONS 2/3

	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE CAUSES</b>	Fire causes	a	Several causes of fire are listed.	Incident Recording System (Home Office)
	Source of ignition	a	Several sources of ignition are listed. The item/material damaged first is recorded.	
	Area of fire origin	a	Room/compartment of origin is recorded.	
<b>FIRE CONSEQUENCES IN TERMS OF UNIT MEASURES</b>	Fire spread	a	Evaluation of the extent of flame and heat damage at arrival and at stop.	Incident Recording System (Home Office)
	Fire horizontal spread	a	Horizontal area damage in m2 by flame and heat is recorded.	
	Fire vertical spread			
	Damage			
	Fire	a	The total horizontal area damaged by the flame and/or heat (in square metres) at the stop of the fire.	
	Flame	a	A question of the IRS is if there is a presence of heat and smoke damage only	
	Smoke			
Water				
	Total	a	The total horizontal area damaged by the flame, heat, smoke and/or water (in square metres) at the stop of the fire.	
<b>FATALITIES</b>	Victims	a	Fire-related fatalities are, in general, those that would not have otherwise occurred had there not been a fire. i.e. 'no fire = no death'. This includes any fatal casualty which is the direct or indirect result of injuries caused by a fire incident. Even if the fatal casualty dies subsequently, any fatality whose cause is attributed to a fire is included, sometimes following road traffic collisions. For the purpose of publications, published figures include the number of fatal casualties which were either recorded as 'fire related' or 'don't know', grouped together as fire-related deaths; thus excluding only those that were recorded as 'not fire-related'. In the iRS, there is a question about if the casualty been reconciled against the appropriate death certificate.	Fire statistics definitions, Home Office
	Type of fatality	a	Cause and nature of fatality is specified in the IRS.	
<b>CASUALTIES</b>	Injured person	a	Non-fatal casualties have, since the introduction of the IRS, been split into four sub-categories, defined as: · Hospital severe – at least an overnight stay in hospital as an in-patient · Hospital slight – attending hospital as an outpatient (not a precautionary check) · First Aid given – first aid given at scene (by anyone), including after a precautionary check · Precautionary check – a precautionary check (to attend hospital or to see a doctor) was recommended (by anyone)	Fire statistics definitions, Home Office
	Type of injury	a	Cause and nature of injury is specified in the IRS.	

UK DEFINITIONS 3/3

	GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
<b>FIRE SAFETY MEASURES</b>	Alarm	a	Alarm presence, type, location, operation and reason for failure are recorded.	Incident Recording System (Home Office)
	Type of alarms	a	Smoke alarm – 1 year battery; Smoke alarm - long life battery; Smoke alarm – mains; Smoke alarm - mains and battery; Smoke alarm - Battery type not known; Mains security system including smoke alarm; Other; Not known	
	Automatic extinguishing systems	a		
	Type of automatic extinguishing systems	a	Sprinklers; Water mist; Gaseous system - halon; Gaseous system - other; Pressurisation; Smoke ventilation; Drencher; Foam; Powder; Other	
	Compartmentation	a	The approximate size of the compartment is recorded. The compartment classification is the following: Stopped/checked spread; Breached - current building work; Breached - previous building work; Breached - fire doors left open or incorrectly fitted; Damage to compartmentation; Fire spread through gaps or voids in construction; No compartmentation in building; Not applicable; Other	
	Fire barriers	a	Included in compartmentation.	
	Safe areas			
	Smoke extractors			
	Fire brigades on site			
<b>FIRE RESPONSE</b>	Escape routes	a	OK – no visible concerns; Exits locked; Exits blocked (e.g. Materials stored blocking exit); Exit route blocked by smoke/flames; Poor implementation e.g. doors swing the wrong way; Contents contributing to abnormal fire spread /smoke production; Not applicable; Other	Incident Recording System (Home Office)
	Evacuation	a	Yes, data on people evacuated with or without assistance. No, escape routes.	
<b>FIRE FINANCIAL COSTS</b>	Fire service time of response	a	Time when the appliance is mobilised and when it arrives at the fire scene are recorded in the IRS.	Incident Recording System (Home Office)
	Occupant fire response	a	The time between ignition and discovery and between discovery and call are recorded.	
<b>FIRE PREVENTION</b>	Direct financial costs	b		Incident Recording System (Home Office)
	Indirect financial costs	b		
<b>FIRE PREVENTION</b>	Fire regulations	a	In the IRS, there is a question if the fire safety regulations apply.	Incident Recording System (Home Office)
	Fire prevention	c		

**Useful links for the UK:**

Fire statistics definitions, Home Office:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/858045/fire-statistics-definitions-160120.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/858045/fire-statistics-definitions-160120.pdf)

Incident Recording System (Home Office):

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/716887/incident-recording-system-questions-and-lists-version-1.6-XML-Schemas-v1-0p-from-April-2012.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716887/incident-recording-system-questions-and-lists-version-1.6-XML-Schemas-v1-0p-from-April-2012.pdf)

USA DEFINITIONS 1/1			
GENERIC GROUPS	a. Yes, the definition exists b. No, the definition not available c. Term not specified or unclear	DEFINITIONS	REFERENCE
Fire incident	a	<b>Incident Types:</b> Structure fire, Fire in Mobile Property Used as Fixed Structure;; Building fire; Confined fire (Cooking fire without extension beyond cooking vessel, Chimney or Flue Fire confined to chimney or flue, Incinerator overload but no flame damage outside incinerator, Fuel burner; boiler without flame damage outside fire box, Commercial compactor confined to contents, Trash or rubbish fire in structure but no damage to structure of contents).	National Fire Incident Reporting System 5.0 Complete Reference Guide, January 2015; NFPA 901 Standard Classifications for Incident Reporting and Fire Protection Data.
Damage	a	<b>Fire Spread:</b> Confined to room of origin, Confined to floor of origin, Confined to building of origin, Beyond building of origin.	
		<b>Number of stories:</b> minor damage, significant damage, heavy damage, extreme damage	
		<b>Estimated Dollar Losses:</b> Property; Contents	
Alarm	a	Type <b>Detector Type:</b> Smoke, Heat, Combination Smoke and Heat, Sprinkler Water Flow Detection, More than One Type, Other	
Automatic extinguish system	a	Type <b>Type of Automatic Extinguishing System:</b> Wet pipe, Dry pipe, Other, Dry Chemical, Foam, Halogen-Type, Carbon Dioxide, Other Special Hazard System	
Compartmentation	b		
Fire barriers	b		
Safe areas	b		
Smoke extractors	b		
Fire brigades on site	a	Yes	
Escape routes	b		
Evacuation	b		
Fatalities	a	<b>Civilian:</b> Within 1 year. Gender, Age, Race, Severity, Cause, Human Factors Contributing to Injury, Factors Contributing to Injury, Activity When Injured, Location at Time of Incident, General Location at Time of Incident, Story at Start of Incident, Story when Injury Occurred, Specific Location at Time of Injury, Primary Apparent Symptom, Primary Area of Body Injured. <b>Fire Service:</b> Gender, Age, Career/Volunteer, Date and Time, Usual Assignment, Physical Condition Immediately Prior, Severity, Activity at Time of Injury, Primary Symptom, Cause, Object Involved, Primary Body Part, Factor Contributing, Where Injury Occurred, Specific Location, Vehicle Type, Protective Equipment and Type, Protective Equipment Problem,	
Casualties	a	Civilian and Fire Service. Note that NFIRS refers to "casualties," which can either be fatal or non-fatal. Fatalities are captured under "Severity of Injury" field. "Severity of Injury" classifications:	

**Useful links for the USA:**

NFIRS: [https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS\\_Complete\\_Reference\\_Guide\\_2015.pdf](https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS_Complete_Reference_Guide_2015.pdf)

NFPA 901: <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=901>



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## **PROGRESS REPORT 1**

### **TASK 2: DATA NEEDED FOR DECISION MAKING**

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EUFireStat - Closing data gaps and paving the way for pan-European Fire Safety Efforts

**Contractor** European Commission  
Directorate General For Internal Market, Industry, Entrepreneurship  
and SMEs

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## **1. INTRODUCTION**

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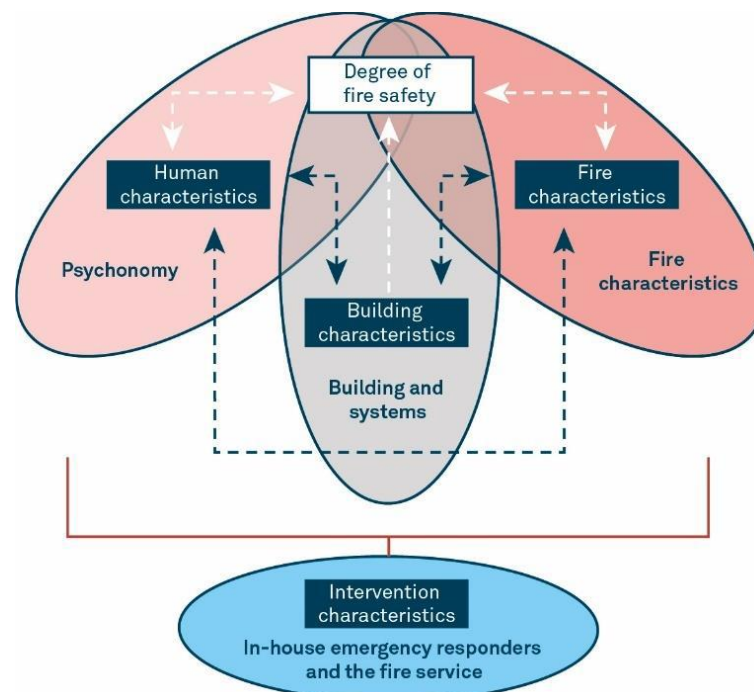
The purpose of task 2 is to develop a questionnaire for the approval of the Commission for consulting regulators and other stakeholders about the fire data they need for decision-making. Once the questionnaire is filled by the different stakeholders, the received replies are evaluated in a way to determine data required by the Member States in order to carry out a fire safety policy that is substantiated and responsible. This policy includes the process of law making, implementation and enforcement of fire safety and prevention. Finally, a proposal will be prepared about which fire data would need to be collected in all EU Member States to provide meaningful datasets for allowing legislative and other policy decisions on fire safety at Member States and at EU level.

This task was initially scheduled to start on 24 September 2020 and to end on 24 February 2021. However, the preparations for task 2 started on the 1<sup>st</sup> September 2020 which led to preparing a plan of action, including a timetable. On the 1<sup>st</sup> of October 2020, the plan of action was implemented and on the 6<sup>th</sup> of November, a first draft of the questionnaire was submitted to the European Commission. After the approval on November 27<sup>th</sup>, the questionnaire was sent out to all the stakeholders. While Task 2 is ongoing, the following report presents the progress that has been made to this day.

## 2. DRAFTING THE QUESTIONNAIRE

As the first step of this task, a questionnaire for the Member States was drafted. To ask the stakeholders of the Member States and some other non-EU countries about their vision, opinion and experiences regarding the required data for creating and implementing fire safety policy. The questionnaire is constructed on the platform Qualtrics, as an online questionnaire.

The questionnaire is built on the so called characteristics scheme. The figure below shows the model, based on scientific research<sup>1</sup>, that describes four factors that influence fire safety. These factors are related to human characteristics, building characteristics, fire characteristics and intervention characteristics. The model has a strong resemblance to the Haddon matrix, which is the most commonly used paradigm in the field of injury prevention. The model reflects the most important groups of factors that influence occurrence, development and consequences of fires. It is a simplified representation of reality and helps with the inventory of parameters, related to the distinguishing characteristics so that the risk of oversight is minimised.



**Figure 1: Model of influencing factors regarding the degree of fire safety**

Working with this characteristics scheme makes it easier to identify the so-called cross-links. These are important for the ability to form and carry out a policy on fire safety. A cross-link is formed by combining and relating data. Main characteristics, such as the resident being self-reliant or not and the presence/absence of a smoke detector, do not directly provide enough input to conduct a policy. When combining these characteristics and identify a possible relationship between them, a cross-link can be made. If the data on self-reliance of the resident and the functioning of a smoke detector are linked, this cross-link provides valuable information when making a policy.

The questionnaire consists of questions that are both complete and necessary but also as limited as possible. From our experience, extensive questionnaires lead to hesitation to fill in the questionnaire and therefore low response rates. The experts from the consortium partners have based the construction of the questionnaire upon their own experience with other research and conducting questionnaires.

During the process of drafting the questionnaire, the requirement was made that the questions must lead to reliable answers. If that was not the case, these questions were not introduced.

<sup>1</sup> Kobes, M., Helsloot, I., de Vries, B., Post, J.G. (2010). Building safety and human behaviour in fire: A literature review. *Fire Safety Journal*, 45 (1), 1-11. <https://doi.org/10.1016/j.firesaf.2009.08.005>

The topics in the questionnaire are, when possible and necessary, adapted from the terminology used in task 1 by the Member States.

First of all, the stakeholders were asked what types of buildings and what types of consequences should be included in the future when collecting fire statistics. The stakeholders were also asked about whether or not fire statistics are already used for policy decisions in their country and what should be the objective of fire statistics.

The following questions are included in the questionnaire:

- Q1 *What types of buildings should be included in a harmonized data collection?*
- Q2. *In your opinion, what should be the ultimate objective of harmonised European fire statistics?*
- Q3. *In your country, are fire statistics used for policy decisions on fire safety?*
- Q4. *If we focus only on the consequences of building fires, which items below (a list of items is proposed below the question) are needed to provide meaningful datasets for allowing legislative and other policy decisions in your country?*

Secondly, according to the characteristics scheme, the stakeholders were asked what parameters should be included in a dataset of fire statistics and how important is the parameter. The stakeholders were able to allocate the parameters to the field they believe corresponds with its importance. The fields reflecting the importance are labelled as 'must', 'should' and 'could'. Under each of the questions, a list of parameters was provided that the stakeholders could drag into its corresponding field of importance. Also, the option of 'other, namely...' was added where they could write multiple parameters that were missing from the list of parameters in their opinion.

The following questions are included in the questionnaire:

- Q5. *Related to human characteristics, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?*
- Q6. *Related to building characteristics, which parameters are needed to provide meaningful datasets for allowing legislative and other policy decisions on fire safety in your country?*
- Q7. *Related to fire characteristics, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?*
- Q8. *Related to intervention characteristics, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?*

Finally, the stakeholders were asked the following questions:

- Q9. *Which fields of interest should harmonised European fire statistics cover?*
- Q10. *Do you feel there are any additional statistical parameters that are not covered within the previously mentioned characteristics which are needed for policymaking and/or decisions? If so, what are they?*

The questionnaire is presented in Annex I.

### **3. QUESTIONNAIRE DISTRIBUTION**

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The second step in Task 2 is compiling the mailing list consisting of stakeholders that will receive the request of filling in the questionnaire. A list of stakeholders from the Member States and some other countries was prepared. The stakeholders are subdivided as followed:

1. The government (for example from the Ministry of Interior or Ministry of Housing)
2. Fire Services
3. National Statistic Institutes or Centre of Statistics
4. Insurance companies
5. Relevant professionals who can fill in the questionnaire based on their experience.

Starting from the 5<sup>th</sup> of November 2020, the stakeholders from the list were asked if they have the knowledge and the mandate to fill in the questionnaire on behalf of their organization. They were also asked to propose other institutes or organizations that could fill in the questionnaire. Based upon their responses, the final mailing list of stakeholders was finalised.

Starting from the 1<sup>st</sup> December, the stakeholders were requested to fill in the questionnaire before December the 18<sup>th</sup>. Attached to this email was the *Letter of Support* signed by the European Commission.

On December the 9<sup>th</sup>, a gentle reminder was sent to stakeholders whom had not yet completed the questionnaire. In addition, as it was requested by some of the stakeholders, the questionnaire in pdf-format was included in order to facilitate the internal discussions of addressed organisations before submitting the final answers.

It has been agreed that first the questionnaire will solely be distributed to the identified stakeholders. If it turns out that an insufficient number of responses is received, the questionnaire will be made publically available on the project's website.



#### **4. ANALYSING THE RESULTS OF THE QUESTIONNAIRE**

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The third step of this task is analysing the collected answers on the questionnaire. At the time of writing this progress report (24/12/2020), we have received 61 completed answers from 23 Member States.

The remaining Member States that did not fill in the questionnaire yet are:

1. Ireland
2. Latvia
3. Portugal
4. Spain

We also received three completed answers from non-EU countries (Switzerland, New Zealand and the United Kingdom).

In order to increase the response rate, other reminders are scheduled. We expect receiving more answers after the end of the year.

## **5. NEXT STEPS**

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Data from all completed questionnaires will be put into overview tables both in SPSS and Excel format in the beginning of January 2021, which will allow for analysis of the results. Between mid-January until mid March 2021, analysis of the responses will be made, and the report of task 2 will be completed with a proposal about which fire data would need to be collected in all EU Member States to provide meaningful datasets for allowing legislative and other policy decisions on fire safety at Member States and at EU level.

## ANNEX I – EUFIRESTAT QUESTIONNAIRE

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### Introduction

Welcome and thank you for agreeing to fill in this questionnaire.

Please read the following information carefully before proceeding.

**Objective:** The project *EU FireStat* aims at mapping the existing data on fire safety at EU Member States and at EU level. It further aims at developing a proposal on how the potential lack of common data could be solved to provide meaningful data sets to allow for informed policy making at the EU and/or Member State levels. This questionnaire is developed to assess the needs and views of the EU Member States on the collection of fire statistics. We are especially interested in needs and views on fire safety data in the context of policy making in your Member State/country.

**Content and duration of the questionnaire:** We would like to ask you to answer the following several questions regarding the needs of statistical parameters. At the start of the questionnaire, we would also like to ask you to provide some background information in order to help us in the analysis of the responses received. Please keep in mind that the scope of the questions regards all types of building fires. There are nine questions and completing the questionnaire will take approximately 15-20 minutes. Please note that we highly recommend using a PC/laptop (no mobile phone or tablet).

**Confidentiality of your data:** All of your answers will be kept strictly confidential and your participation in this survey is voluntary. Even after starting the study, you are free to stop at any time and for any reason. You are also allowed to go back to previously given answers and revise them. We would like to welcome you to forward the questionnaire as you see relevant.

Thank you in advance for your time and participation.

**Users profile**

On behalf of **which country** are you filling in this questionnaire?

\_\_\_\_\_

**Which organisation** do you represent?

\_\_\_\_\_

What is **your function** at this organisation?

\_\_\_\_\_

Would you be willing to be contacted by the project team for possible follow-up questions? If so, you are kindly asked to fill in your contact details below.

Name \_\_\_\_\_

Email address \_\_\_\_\_

**Policy and fields of interest**

We would like to ask you about possible limitations in the scope of statistics collection that could make it more efficient and reducing the burden of collecting fire statistics.

**Q1. In practice, what types of buildings should be included in a harmonized data collection?**

- All types of buildings
  - Residential
  - Health care
  - Accommodation
  - Leisure
  - Meeting
  - Industrial
  - (Animal) farming
  - Office
  - Shop
  - Sport
  - Educational
  - Detention building
  - Other, namely \_\_\_\_\_
-

**Q2. In your opinion, what should be the ultimate objective of harmonised European fire statistics?**

Please select the 4 (or less) options you feel are the most important.

- Formulation/implementation of policy
- Evaluation of existing policy
- Formulation/implementation of legislation
- Evaluation of existing legislation
- Supporting the education of and information for citizens
- Supporting the management of fire service organisations
- Identifying fire risks of products, phenomena or events
- Research
- Cost-benefit analysis of fire safety measurements and activities
- Other, namely \_\_\_\_\_

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You have selected the option 'formulation/implementation of policy'. Should the harmonised European fire statistics preferably support the formulation/implementation of policy at national or EU level?

- At EU level
- At national level
- At EU and national levels

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You have selected the option 'evaluation of existing policy'. Should the harmonised European fire statistics preferably support the evaluation of existing policy at national or EU level?

- At EU level
- At national level
- At EU and national levels

You have selected the option 'formulation/implementation of legislation'. Should the harmonised European fire statistics preferably support the formulation/implementation of legislation at national or EU level?

- At EU level
  - At national level
  - At EU and national levels
- 

You have selected the option 'evaluation of existing legislation'. Should the harmonised European fire statistics preferably support the evaluation of existing legislation at national or EU level?

- At EU level
- At national level
- At EU and national levels

**Using statistics for policy making**

**In your country, are fire statistics used for policy decisions on fire safety?**

- Yes, systematically
- Yes, sometimes on "ad hoc" basis
- No
- I don't know

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(If the answer is yes)  
Please explain how statistics are used. Could you give an example of policymaking or a decision based on fire statistics from your country?

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(If the answer is no)  
If not upon fire statistics, what are the current policymaking and/or decisions based upon?

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Data for policy decision making

Q4. If we focus only on the consequences of building fires, which items below are needed to provide meaningful datasets for allowing legislative and other policy decisions in your country?

Please drag the parameters (the items below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

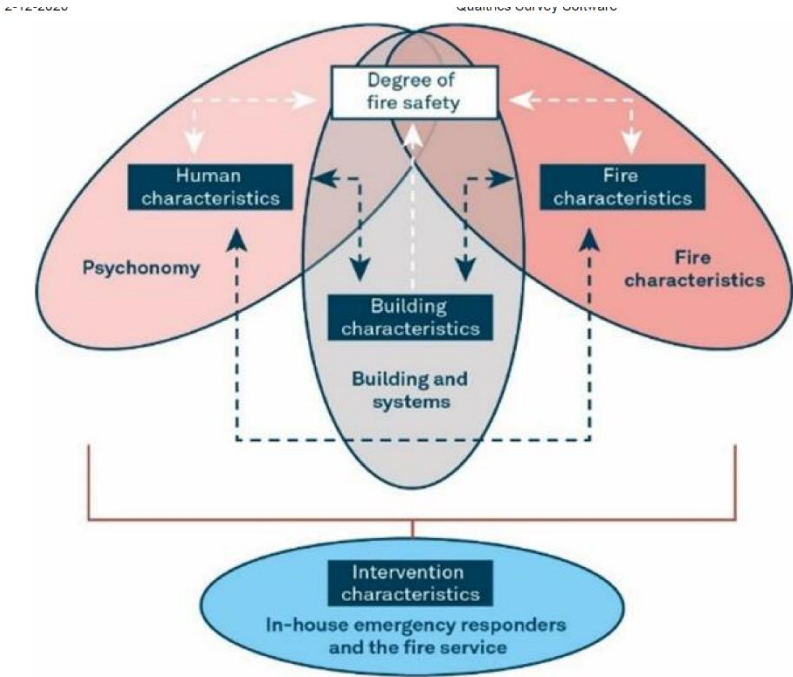
After allocating parameters to their respective fields you can change their order of priority within the field.

- Type of property damage (e.g. flame, heat, smoke and water damage)
- Quantification of property damage (e.g. square meters, percentage)
- Direct fire costs (e.g. property loss, medical care)
- Indirect costs (e.g. temporary shelter, loss of business)
- Type of insurance of losses (e.g. insured or uninsured)
- Cost incurred to insurance companies
- Environmental consequences (e.g. pollution of open water, air pollution, damage to nature reserve)
- Social consequences (e.g. traffic jam, evacuation of local residents, smoke nuisance)
- Effectiveness of fire safety measures in reducing the fire (e.g. alarm system, automatic extinguishing systems)
- Reasons for failure of fire safety measures (e.g. alarm system)
- Fire spread at fire brigade arrival
- Fire spread at final situation
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

**Introduction on characteristics of fire safety**

The figure below shows a model, based on scientific research, that describes four factors that influence fire safety. These factors are related to human characteristics, building characteristics, fire characteristics and intervention characteristics. The following four questions (Q5-Q8) are based upon this model.



**Q5. Related to *human characteristics*, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Please drag the parameters (the items below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Type of casualty (e.g. fatality or injury)
- Number of victims
- Number of occupants present in the building
- Role (e.g. occupant or firefighter)
- Age
- Gender
- Ethnicity
- Sleep/awake
- Smoker/non-smoker
- Drug or alcohol usage
- Disability
- Profession
- Type of household
- Income category
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)



**Q6. Related to *building characteristics***, which parameters are needed to provide meaningful datasets for allowing legislative and other policy decisions on fire safety in your country?

Please drag the parameters (the items below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Type of building (e.g. residential or non-residential)
- Construction type (e.g. reinforced concrete, steel)
- Construction characteristics (e.g. façade, claddings)
- Number of floors
- Building dimension
- Floor measurement (m2)
- Fire safety measures present (e.g. alarm system, compartmentation)
- Position of inner doors (open or closed)
- Ownership situation (rental or private property)
- Year of construction
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

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**Q7. Related to *fire characteristics***, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?

Please drag the parameters (the items below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Fire cause
- Room of origin
- Source of ignition
- Item first ignited
- Material first ignited
- Material mainly responsible for the fire development
- Speed of fire growth
- Size of fire spread
- Size of smoke spread
- Direction of fire spread (horizontally or vertically)
- Time of day/night
- Date
- Weather
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

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**Q8. Related to intervention characteristics, which parameters are needed to provide meaningful datasets of building fires for allowing legislative and other policy decisions on fire safety in your country?**

Please drag the parameters (the items below) to the field you believe corresponds to its importance by completing the following sentence: "With regards to fire statistics, [parameter] must/should/could be collected".

If you prefer adding one or more parameters not indicated in the list, you may do so by adding them into the parameter "Other, namely".

After allocating parameters to their respective fields you can change their order of priority within the field.

- Incident date
- Incident time
- Incident location
- Fire detection time
- Occupant response time
- Type of call (fire or false alarm)
- Type of incident (deliberate or accidental)
- Fire brigade on site
- Fire brigade response time (notification, dispatch, preparation, travel time)
- Fire brigade set up time
- Occupant rescue time by fire brigade
- Fire extinguishment time by fire brigade
- Time between incident and casualty
- Time between fire brigade arrival and withdrawal
- Number of attended fire brigade vehicles / firefighters
- Firefighting operations (e.g. offensive attack)
- Operation of fire safety measures (e.g. compartmentation, fire barriers, escape routes)
- Occupant extinguishing action
- Evacuation measures
- Other, namely

Must (maximum of 5)	Should (no maximum)	Could (no maximum)

---

**Q9. Which fields of interest should harmonised European fire statistics cover?**

Please select the 4 (or less) fields you feel are the most important.

- Performance of fire service operations
- Fire safety behaviour of occupants/residents (e.g. smoking in bed)
- Protective fire measures in buildings
- Consumer product safety
- Health aspects (e.g. fatal fires, injuries)
- Economic aspect (e.g. fires with high property loss)
- Impact on society (e.g. large-scale evacuations/electricity failure)
- Environmental aspects (e.g. water runoff, the use of extinguishment foam, release of toxic gases and substances)
- Other, namely \_\_\_\_\_

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**Q10. Do you feel there are any additional statistical parameters that are not covered within the previously mentioned characteristics which are needed for policymaking and/or decisions? If so, what are they?**

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You have reached the end of the questionnaire. Thank you very much for your time and your precious support!

Please be aware that at this stage, you are still able to go back to a previously given answers and revise them. If you proceed, **your answers will be processed.**

To follow the progress of our project, please visit our website: <https://eufirestat-efectis.com>  
If you have additional questions, please reach us at: [EU.FireStat@efectis.com](mailto:EU.FireStat@efectis.com)



## **LIST OF CHALLENGES**

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*Updated on 24 December 2020*

### **TASK 0**

Challenges in Task 0 were mainly related to the difficulty to establish connections in countries where the consortium are not present. Once contacts were established, we were able to gain enough information to fulfil the need of Task 0.

### **TASK 1**

The challenges of Task 1 are represented by the difficulties in creating summary tables and gathering the related information about terminology and data collection methodology of the fire statistics for the 27 EU Member States and 8 Non-EU countries.

In particular, the challenges for the collection of the fire statistics are represented by:

- language barriers,
- delay in receiving the response from relevant authorities,
- confidentiality policies, and
- private datasets.

Furthermore, the difficulties and limits in the analysis of the data gathered are due to:

- the lack of available glossary of terms for the fire statistics of specific countries;
- the data fields with very different definitions, and the fact that the same term may have different meanings in different countries; and
- the different level of detail and number of data fields recorded which can vary in the various countries examined. Some fire statistics collect only the fire incident date, time and location while others cover pre and post-conditions of the fire incidents in various property types.

### **TASK 2**

The approval of the questionnaire took more time than expected (3 weeks instead of 1 week) delaying the execution of Task 2.

## RISK ANALYSIS

Updated on 24 December 2020

Risk ID	Task number	Date Raised	Description of Risk	Consequences (resultant effect/impact)	Likelihood (score 1 for lowest - 5 highest)	Impact (score 1 for lowest - 5 highest)	Score (Severity)	Mitigation	Status (open or closed)
R1	0, 1, 2	17/08/2020	There is a risk that some countries do not have fire data	Some EU countries will not be covered in the analysis	1	2	2	Contact representatives and other public institutions	Closed
R2	0, 1, 2	23/09/2020	Language barrier	Some EU countries will not be covered in the analysis	2	1	2	Find a person to translate information or verify if EC can provide translation help in certain languages	Closed
R3	1, 2	23/09/2020	Delay in receiving the response for the summary tables	Some EU, other European and International countries will not be covered in the analysis	3	2	6	Establish direct contacts with the relevant organizations and present the whole project to provide a detailed description of the outputs and benefits generated.	Open
R4	1	23/09/2020	Confidential policies and private datasets	Some EU, other European and International countries will not have public fire statistics datasets	2	2	4	Establish direct contacts with the relevant organizations and kindly ask for their contribution to the project providing the relevant information.	Open
R5	1	23/09/2020	Lack of available glossary of terms for the fire statistics of specific countries	Some EU, other European and International countries will not have definitions or a glossary of terms for the fire statistics	3	2	6	Focus on high level and most important definitions available	Open
R6	1	23/09/2020	The data fields can have very different definitions and the same term may measure different aspects in two or more countries	Some EU, other European and International countries will have different definitions for the same terms	3	2	6	Focus on the semantic analysis of the terms	Open

Risk ID	Task number	Date Raised	Description of Risk	Consequences (resultant effect/impact)	Likelihood (score 1 for lowest - 5 highest)	Impact (score 1 for lowest - 5 highest)	Score (Severity)	Mitigation	Status (open or closed)
R7	1	23/09/2020	Different level of detail and number of fields recorded which could vary in the various countries examined. Some fire statistics collect only the fire incident date, time and location while others cover pre and post-conditions of the fire incidents in various property types.	Some EU, other European and International countries will have different detail for the fire statistics recorded	3	2	6	Group the countries examined based on the level of detail provided for the fire statistics	Open
R8	2	24/09/2020	Little or delayed response from the stakeholders o the questionnaire	Not enough information from the stakeholders	2	3	6	Establish contact as soon as possible, provide support letter from EC, and allow possibility to update the analysis later.	Open
R9	2	24/09/2020	There is a risk that we will receive unclear answers in surveys	Unusable contribution from some EU countries	1	2	2	Make sure questions are explicit and provide example of answers. Send the questionnaire to different stakeholders of the same country. Follow-up unclear answers	Open

## COMMENT HANDLING DOCUMENT

Comments received up to 15 March 2021

In the following table are all written comments received during the project assembled.

An explanation to the columns used are as follows:

Column 1 – No: Numbering of comments

Column 2 – Body Reference: The body who have given the comment

Column 3 – Comment on document: A reference to which document the comment belongs

Column 4 – Paragraph/Figure/Table: A reference to which part of the document the comment belongs

Column 5 – Comment: The received comment

Column 6 – Response and proposed change by the consortium: A short description on how the comment has been handled

No	Body Reference	Comment on document/ procedure...	Paragraph/ Figure/ Table	Comment	Responses / proposed change by consortium
1	MSB - Sweden	Global comment on the project	NA	The project mainly covers definitions and collection methods but is not proposing a common method for analysing the data,	In Task 3, the group will include proposals for methodologies on how to deal with unknowns in the data and incomplete data, which is an essential part of the analysis. The initial discussions and proposals for analysis methods will occur in Task 3 and then again in Task 7. Overall, the group will provide guidance on data analysis and the risks of misinterpretation.
2	BVS - Austria	1st progress report	Task 0 - Annex B	Our feeling is that the efforts concerning harmonization of data collection in Austria is not reflected sufficiently. [...] We provide an updated diagnostic sheet for Austria and the latest publishes fire statistics for Austria	The updated diagnostic sheet for Austria and all the information about Austria was updated throughout the reports for Task 0 and 1.
3	ANEC	1st progress report	NA	The quality of data is extremely important in a project like this and it is suggested that this be undertaken on some of the data on an ad hoc basis to establish how accurate it is together with a Cost/benefit analysis looking at the problem in more depth. Because most of the data is obtained from official sources there is a danger that it is not truly representative of the problem.	Considerations about the quality of the data and how errors and inconsistencies are removed have been stated in the diagnostic sheets created in Task 0 for each country. The importance of data quality is discussed in the conclusions obtained for Task 1. Finally a cost benefit analysis will be made in task 5 of the project.

4	ANEC	1 <sup>st</sup> progress report	NA	<p>“Near misses” are an important aspect to consider when trying to identify future fire safety problems and these may not necessarily be included in official figures. The sprinkler system that operates very quickly and prevents a serious fire may not result in the fire service being called or the incident recorded but could have a significant impact on the future provision of such systems. The small fire that occurs and is prevented from spreading by the provision of flame-retardant furniture and there is no subsequent call to the fire service will not be included in the national figures but again could point the way to go for much more effective fire safety solutions. This aspect of the current work is important to consider “Whatever model of fire data collection system is employed in host countries, available literature suggests that closing the gap between the data needed for drawing comparisons and information that is practically accessible will remain a challenge, but one with substantial public benefits.” If we are to pave the way for future fire safety efforts we need to consider implementing a scheme that allows the public/responsible person to input these occurrences.</p>	<p>As stated in Section 1.1 of Task 1: “Our project has the goal to provide a clear understanding of the fire statistics related to buildings subjected to fire incidents and does not include the evaluation of “near misses” which are usually not collected in the recording systems examined. For instance, in Scandinavia, reports can be created for fire spread in criminal cases, to judge how dangerous it could have been for human beings/property, if accidental circumstances had not prevented fire spread. These evaluations represent a useful field of investigation to identify physical and societal hazards and support the creation of preventive measures. The collection of “near misses” implies, in some cases, a detailed and challenging assessment able to determine benefits for user input. However, such reporting could also result in uncertainty in the data. Furthermore, it would also require a new system able to describe such investigation and could lead to a much higher need for resources to check the correctness and treat the data once a reporting system is in place”. We also added in Section 7 of Task 0 report a short explanation about near misses and that their collection implies a detailed and challenging evaluation, as these are never reported to the fire department and hence are never entered into an official data system. To get this type of information, every household in Europe would be required to record the information and to submit it to a relevant agency or online on a dedicated platform. Alternatively, it could be accomplished as a sample survey every few years to see how many “near misses” occur. This is outside the scope of this project, but we highly encourage pursuing it at European and National levels.</p>
5	ANEC	1 <sup>st</sup> progress report	NA	<p>IDB-FDS data could deliver quite interesting information in this respect. Selection could be</p>	<p>The work of Task 0 and Task 1 is focused on an analysis of the fields recorded in the various fire</p>

				made regarding mechanism 04.14 (contact with fire or flame) or 4.17 (Inhalation of smoke from burning objects) and manifold analyses regarding age of victim, type of injury, time of incidence activity when injured , place of occurrence (e.g. residential fires) and – of course – products involved (from candles to fan heaters). Analyses of the narratives could eventually deliver additionally information on the start of the fire (at least in some cases). A rough estimates for the number of cases in the EU-27 would also be possible. As far as we remember, an analysis of this issue has never been made, which is a shame. As far as we know from the EC JRC-study on injury data systems, data from fire brigades do not deliver such depth of information – aside from the problem, that there are no harmonised European fire damage statistics at all.	statistics to increase awareness of the aspects covered and those missing. In particular, for the evaluation of victims and injured people, various fields such as age, gender and cause of death or injury are investigated to determine the available aspects recorded related to life safety.
6	ANEC	1 <sup>st</sup> progress report	NA	As to the list of national fire service unions, we would expect the federation of Eur. Fire Officer Association (member of the Eur. Fire Safety Alliance) to be in the best position to make such a full inventory of national fire safety unions.	The federation of Eur. Fire Officer Association, who is also in the Steering committee, has been very helpful in providing contacts all over Europe, especially for the distribution of the questionnaire of Task 2.
7	Fire Safe Europe	NA	Task 2	We decided to digitalise the Task 2 questionnaire and circulate it to our Members and to the European Fire Safety Community in an attempt to provide you with more stakeholders feedback on the fire data needed for policy making. We reproduced the original questionnaire as accurately as possible. We have received 12 answers that we hope will be useful for your research.	We thank you for that and we will consider how we can analyse your input and fit them in the context of the project.
8	DG ESTAT	1 <sup>st</sup> progress report	Task 1	The questionnaires/forms used for the registration of data have not been collected, nor the manual or guidelines/instructions for their usage	The research is focused on the analysis of the definitions and fields recorded in the fire statistics of EU, Other European and Non-European countries. For each of them, in the abstracts

					provided, it is specified who collects the fire statistics, the recording system adopted, and the origin of the information gathered. Instead of providing a unique list of reference at the end of the report, the references have been specifically addressed for each country investigated in the tables provided in Appendix I and Appendix II where each definition is related to the specific recording system. Moreover, in the references, where available, links to this information have been provided. Furthermore, analysing the forms in and by themselves is somewhat beyond the scope of this task, particularly given the large number of languages involved. This was added in Task 1 report, Section 1.1.
9	DG ESTAT	1 <sup>st</sup> progress report	Task 1	Another information missing or not well documented is about what is mandatory, according to which legal provisions	A few sentences have been added to the text in Section 1.2 to address this comment and make our choices and considerations more transparent: "From the analysis developed, it appears difficult to evaluate the mandatory and optional fields collected by the various fire statistics. Within a specific country, fire statistics could be a voluntary system, differently managed at a local level or, considering a unique recording system (e.g., UK), only a number of fields are mandatory while others could be filled in only if specific fire conditions appear. In the description provided by the abstracts, such differences have been highlighted to provide a clear overview of current practice in various countries".
10	DG ESTAT	1 <sup>st</sup> progress report	Task 1	There is no clear indication of which data-source the definitions refers to / what if fire service and insurance have a different definition of "accidental" or of "victim" ... all the grids are presented as if there was a unique data-system	The abstract for each country needs to be considered in the context for which the information provided by the table of Appendix I and Appendix II should be referred to. This is now clearly stated in Section 1.3: "The information provided in the abstract of each country needs to be related to the available definitions provided in the tables of Appendix I and Appendix II".

11	DG ESTAT	1 <sup>st</sup> progress report	Task 1	In the fiches by country of task 1, what is the difference between b and c cases?	<p>The analysis developed by Task 1 is mainly focused on the terminology and definitions available. Therefore, the relevant authority of each country has been asked to fill in the table. The consortium was also interested in a clear understanding of the proposed terminology. The possible responses have to be considered as follows:</p> <ul style="list-style-type: none"> <li>- “a”: fields available</li> <li>- “b”: definitions not available</li> <li>- “c”: fields not clear to the relevant authority of the fire statistics.</li> </ul> <p>These considerations have now been addressed in the report in Section 1.2.</p> <p>The analysis of the fields collected in the fire statistics is now included in Section 4 of the final report of Task 1. The revised report of Task 1 includes:</p> <ul style="list-style-type: none"> <li>- Semantic analysis of the definitions available in the fire statistics and comparisons with those provided by the ISO 17755-2</li> <li>- Evaluation of the fields collected by the various fire statistics</li> <li>- Specific and general conclusions about the findings of Task 1.</li> </ul>
12	DG ESTAT	1 <sup>st</sup> progress report	Task 1	There is incomplete usage of the statistical methodology that distinguish between concepts/phenomena, dimensions and positions/code lists. In particular, the latter is not analysed systematically, although could/should be the core of the project / few examples of coding is presented in DK or EE fiche. Too often the coding list is presented as the definition (IE, IT).	The consortium believes that it is important to clarify if specific fields are described by the definitions or covered by a dropdown menu. This is the reason why this, as far as possible, is specified in the tables of the investigated countries. These considerations are now clearly addressed in Section 1.2: “where no definition is available and the specific fields are included in dropdown menu, this is clearly stated”.
13	DG ESTAT	1 <sup>st</sup> progress report	Task 1	There are some contradictory information, for example: CZ says no definition, but the	In Appendix I:



				reference says it exist (RO the opposite). Or DE says a=yes but doesn't provide it nor the reference. Or NL and other that deleted the column for references.	For the Czech Republic, there are specific fields that are determined by laws, government decisions and other internal acts. However, definitions are not publicly available. For Romania and Germany, the tables have been edited as suggested. In Appendix I and II, the references for Austria, Germany and Switzerland have been inserted.
14	DG ESTAT	1 <sup>st</sup> progress report	Task 1	What is meant by "victims" (definition so to count?) and "type of fatalities"? cause of death or as socio-economic characteristics of the victim?	Considering fatalities, in some countries, fire statistics provide a proper definition for fire victims while in others, the number of victims is recorded. The type of fatalities is referred to as the cause of death while the socioeconomic characteristics (e.g. age, gender) and this is described in Section 3.8 of the final report of Task 1.