Reverse-Engineering Culture: Recovering Traditional Craft Practices In Malay Housebuilding

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Introduction

UNESCO defines intangible cultural heritage as 'the practices, representations, expressions, knowledge and skills – including the instruments, objects artefacts and cultural spaces associated with them – that communities, groups and individuals recognize as part of their cultural heritage' (Safeguarding of the Intangible Cultural Heritage 2003[1]). This represents a shift from western and museological heritage principles towards an eastern heritage paradigm, which relies significantly on cultural expressions and the role of non-physical heritage. It is by definition people and process oriented rather than artefact or object-centered.

Considering the definition of heritage established by UNESCO, the traditional Malay house could be categorised as a tangible cultural heritage or cultural artefact, while the building process could be described as intangible. Hence, the builder of the traditional Malay house – a Malay Master craftsman or Malay *tukang* – is the bearer of intangible heritage, where indigenous knowledge is passed down from one generation of Malay *tukang* to another.

Knowledge-based heritage such as in the traditional Malay house building is predominant in the built environment within South East Asia and particularly in Malaysia, which is rich in rituals, spiritual beliefs and oral traditions. However as a forgotten trade, Malay *tukang*, along with the skills they have inherited, are few and far between, leaving a significant generation gap in the lineage of Malay craft legacy. This has contributed towards a loss of indigenous understanding, know-how and skill in traditional Malay house building.

This paper discusses the findings and opportunities of an undocumented process within traditional Malay house building – assembly and disassembly – in order to revive, learn from, and pass on the workmanship, techniques and narratives of previous generations for new craft practices to take form.

The traditional Malay house

The intangible cultural heritage of a traditional Malay house lies not only in the knowledge and skills employed in its construction but also includes other Malay doctrines, including magical beliefs, religion, culture and sustainability (Lim, 1987). Rituals play a major part in the process of building the Malay house, from the preliminary search for building materials to the selection of a site and the final occupation of the house in order to please spirits and other powerful forces.

Accordingly, the Malay belief system dominates the construction processes, building rituals and physical forms of the traditional Malay house.

A traditional Malay house is distinguished from other houses throughout South East Asia by features such as its light wooden construction on structural stilts footing and its non-boat-like character. It is identifiable as a typology by its small roofs (Waterson, 1997). The basic characteristic of a traditional Malay house lies in its post and beam structure that is determined by the number of structural timber posts. Timber crossbeams to support the floors and pitch roof structures are slotted into the upright posts by mortise joints secured by timber wedges instead of nails. Non-load bearing walls and openings are placed between the structures, additionally increasing the structural stability and rigidity of the house and thus eliminating the use of diagonal structures.

Figure 1: Example of a traditional Malay house in Terengganu with a regional variation of form and style influenced by Thai architecture. This structure was disassembled, reconstructed and restored as a resort building in Terrapuri heritage village.

These characteristics describe a general overview of the many different indigenous shelters built by Malay people across Malaysia, which often possess regional variances in terms of ornamentation, form and space that represent different dominant regional successions. However, for the purpose of this research, the study focuses on the basic traditional Malay house set within the Malay Peninsula, where concepts and build techniques are commonly shared.

The Malays were among the pioneers in modular construction and prefabrication (Hilton, 1992), as the building system of traditional Malay houses is capable of being extended, disassembled and relocated elsewhere. It is one of the many unique features of the house expressed by the Malays as ‘buka pasang’ or ‘disassembly and assembly’ rather than the term ‘building’. Each of the building components in a traditional

Malay house can be taken apart in a process that was practiced in response to their cultural needs and spiritual beliefs.

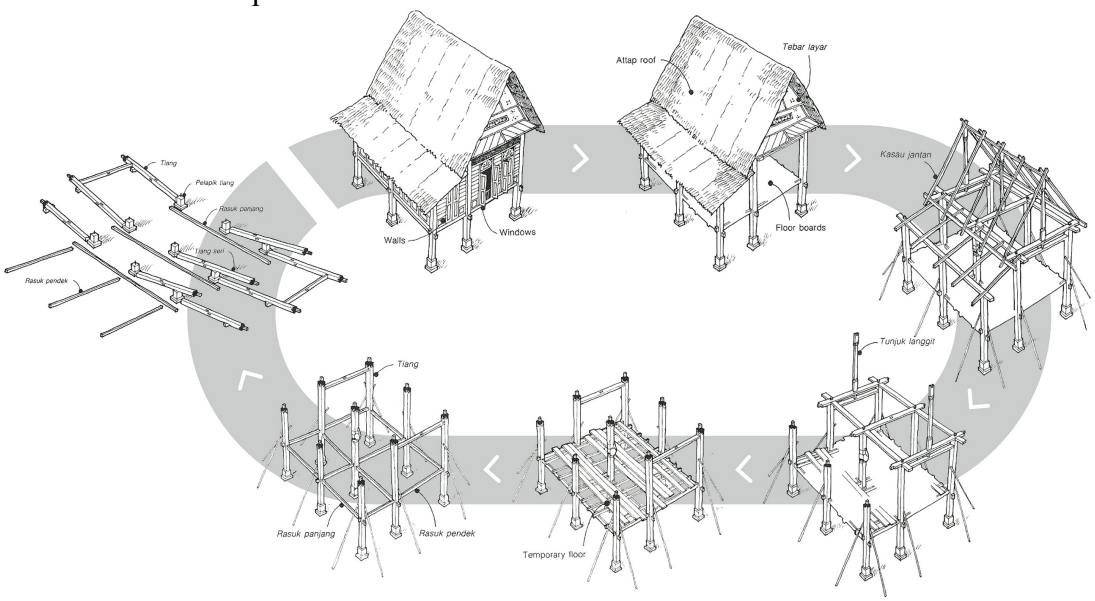

Figure 2: The disassembly and assembly process of a basic traditional Malay house, figure reproduced and edited from Lim (1987).

The basic form has been perfected in its building system, characterised by structural integrity as well as its spatial function, a result of many developments in material and construction techniques throughout the centuries. However, the traditional building system allows new adaptations and has endured several different stages in the amalgamation of form, evolving through Portuguese, Dutch and British periods of colonisation. This is a manifestation of a type of building that is fundamental to the Malay society but malleable and adopted throughout different generations and influences.

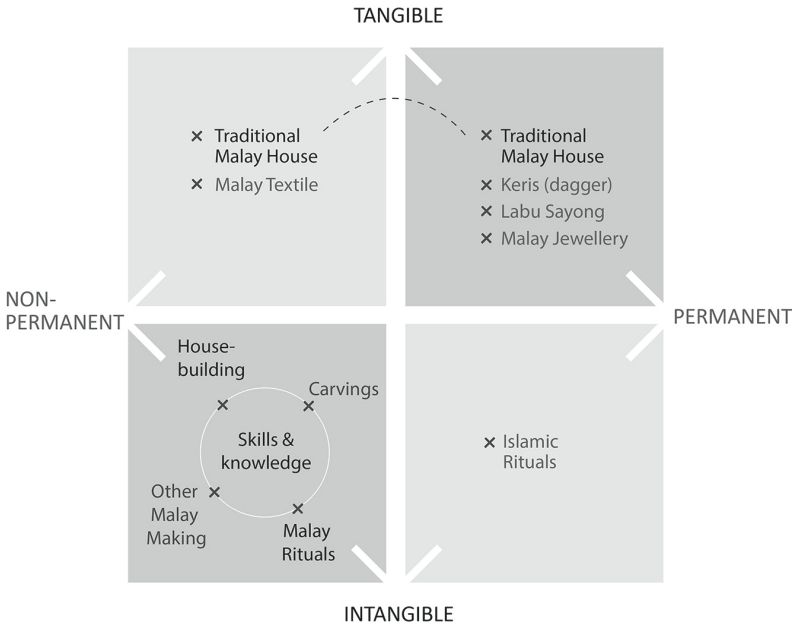

Figure 3 Tangibility, intangibility and permanency of traditional Malay houses compared with other examples of cultural heritage in Malaysia.

Despite the sophistication of traditional Malay houses, the house as an example of tangible heritage is arguably short-lived as they are currently 'neglected and deteriorate' rapidly (Harun, 2011). Compared to the tangible heritage of buildings in a western context, generally constructed out of bricks and stones and surviving for decades, the traditional Malay house is vulnerable, mainly due to its use of timber as a structural material, the harsh tropical climatic conditions, and pressures from urbanisation. Inevitably, this example of architectural heritage is declining and is likely to disappear altogether, but perhaps more disturbingly, the process of building the house is also becoming a dying craft. For this reason, this study will probe into and identify the intangible cultural heritage of the building practices of the Malay *tukang* themselves.

The study approach – recording intangible cultural heritage

Existing scholarship focusing on the subject of Malay *tukang* and the construction of traditional Malay houses has examined both *tukang* culture and the houses as finished buildings. Rahman (1999) outlines the required attributes of a Malay *tukang* in order to qualify themselves as true master builders. He believes that in the past all Malay *tukang* were dogmatic and like any member of Malay society, conformed to the traditions of Malay doctrines. Furthermore, he concluded that the Malay *tukang* played a significant role in Malay architectural practice although always in harmony with the collective spirit of Malay society.

Meanwhile, Ariffin (2001) investigated the characteristics of the houses in order to uncover the underlying rules of the building system, and principles repeated and accepted as norms for generations. Ariffin examined the 'hidden record' in the physical and spiritual qualities of traditional Malay houses derived from cultural aspects, as well as their architectural characteristics, and concluded that they represented a complex integration of ordering principles centered on Malay anthropomorphism rather than one single dominant philosophy. Ariffin provides a fundamental explanation of the embodied knowledge that is present in vernacular architecture and analyses the causes and nature of its existence, which is beneficial to this study.

However, little research has been done to record the skills, practices and rituals of the *tukang* during the process of construction of the Malay house. The author of this study set out to document these attributes of Malay *tukang* as an example of intangible cultural heritage in order to arrive at a more holistic appreciation of the houses themselves and the role their construction played in shaping local society. The aim is to understand the implicit knowledge that is embedded in the houses and to examines the potential of the process of knowledge transfer within this declining trade. Therefore, the study adopts an ethnographic approach where the relationship between Malay *tukang* and the process of Malay house building becomes the focal subject.

Figure 4: Modern Malay *tukang* with his young apprentice installing the timber component in the assembly of a roof structure prior to construction on-site.

While conducting fieldwork in 2014, the author discovered a phenomenon within a group of modern Malay *tukang*, who had exploited the disassembly and assembly process of the traditional Malay house as a means to reveal evidence of rituals, indigenous and tacit knowledge embedded in each house as it was dismantled. This subconscious process of discovery undertaken by Malay *tukang* provided a valuable opportunity for interpreting and understanding implicit information from traditional artefacts, forming an alternative mechanism of knowledge transfer.

The course of action experienced by the Malay *tukang* is remarkably similar to the reverse engineering techniques practiced in product design and software engineering. Chikofsky and Cross (1990) define reverse engineering as a process of 'analysing a subject to identify the system's components and their inter-relationships' in order to 'create representations of the system in another form or at higher levels of abstraction'. Although this definition refers to software engineering, it can also serve as a general description within the context of this study of a method to recover values embodied in traditional Malay houses for the preservation and dissemination of its intangible cultural heritage.

The study gathers empirical evidence from fieldwork conducted in Malaysia to expand on current literature, which does not fully describe the aspect of knowledge transfer and intangible qualities in the work of Malay *tukang*. The fieldwork documents and evaluates the individual attributes of modern Malay *tukang* whom still practice the craft of building traditional Malay houses. This is achieved by conducting semi-structured interviews, examining the personal traits of the modern Malay *tukang* as well as their dexterity in the disassembly and assembly building process. Accordingly, observation of the construction process was also used to document the

physical skills of modern Malay *tukang* with visual support in the form of photographs.

A significant challenge to this study was to record the qualities of intangible knowledge and the tacit skills of a Malay *tukang*. Wood (2009) recognises this obstacle when trying to persuade craftsman to describe the rationale in their actions to others. She illustrates the issues as 'skills involved in undertaking such craft practice involv[ing] a high degree of tacit knowledge which is internalised' and hence, the author acknowledges a similar difficulty for the Malay *tukang* to describe their actions verbally.

Nevertheless, by adopting learning theories such as situated learning, constructionism, and others, the interviews conducted and the actions of Malay *tukang* observed could be justified theoretically. For example, constructionism theory advocates person-centered discovery learning where a learner uses the information they already know to acquire more knowledge, which happens most effectively as the learner is actively making tangible objects in the real world. As such, the theory resonates with the hands-on activity of modern Malay *tukang* in the process of disassembly and assembly.

Malay *tukang* and the disassembly and assembly process

The Malay word *tukang* is translated into English as 'craftsman' or 'artisan', but such a literal and limited description does not express its deeper meaning. The Malay apprentices are not only taught by the Malay *tukang* to be equipped with technical skills but also the moral and social consciousness that Malay society upholds. This obligation leads to a deeper understanding of both the material and spiritual aspects of building the traditional Malay house where strict rituals are considered to be a necessary procedure in the building process. Hence, the word *tukang* is more appropriate to connote the quality of Malay Master craftsman.

In a western context, the concept of apprenticeship is bounded by Sennet's (2009) description of the hierarchy of labour between a Master craftsman and their apprentices thus, it requires a physical relationship. Similarly, in the craft of building traditional Malay houses, the apprentice was subject to *tukang* doctrines and ways of making, passed down through rituals and technical know-how, based on an oral culture that was eventually lost through time. This study challenges this notion of apprenticeship in contemporary culture by suggesting that tangible artefacts such as the traditional Malay house can serve as an alternative mechanism for new Malay apprentices to learn the traditional knowledge that is embodied within them. The process of disassembly and assembly is central to this phenomenon.

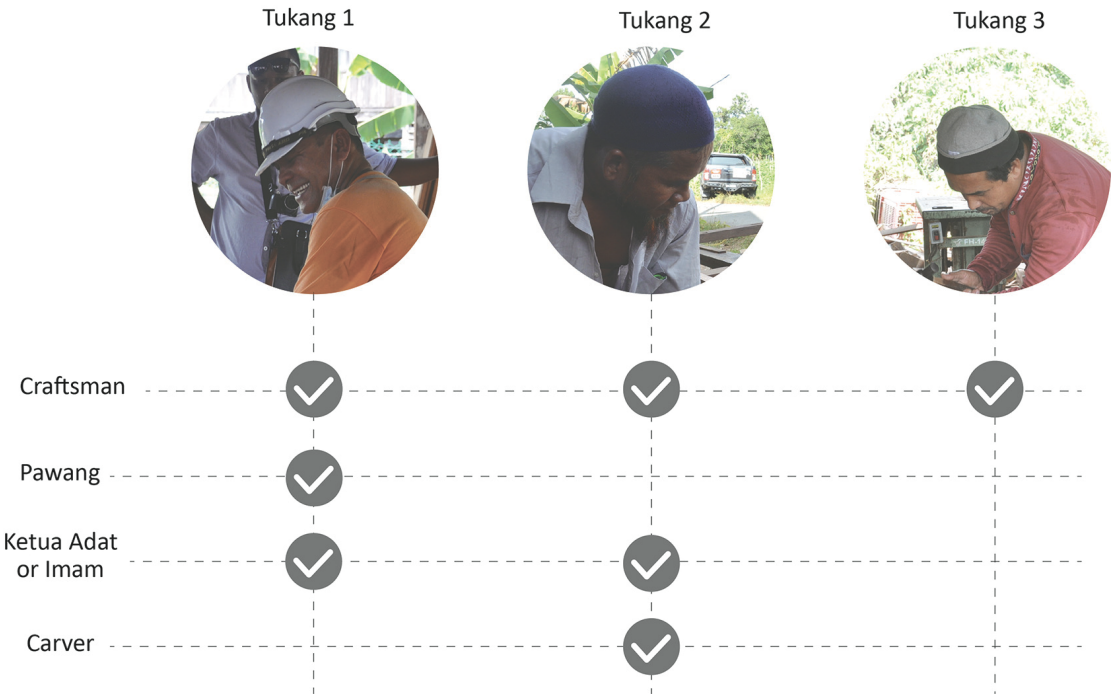

Figure 5: Modern Malay *tukang* in correspondence to the attributes mentioned by Rahman (1999)

Rahman (1999) describes at least four key attributes of great Malay *tukang*; they must be a good craftsman, a shaman who can please the spirits, an *Imam* or one that can lead a cultural or religious congregation, and finally a skilled carver. While all of the modern Malay *tukang* interviewed were considered to be good craftsmen, at least two of them fulfilled the three other attributes mentioned. They were never apprentices to a master but are similarly proficient in the traditional trade, for example possessing the ability to specify building component quantities and sizes, make interlocking mortise joints and understand the procedural process required. This includes the skills implicit in marking and identifying each building component to correspond with the disassembly and assembly system used in the past.

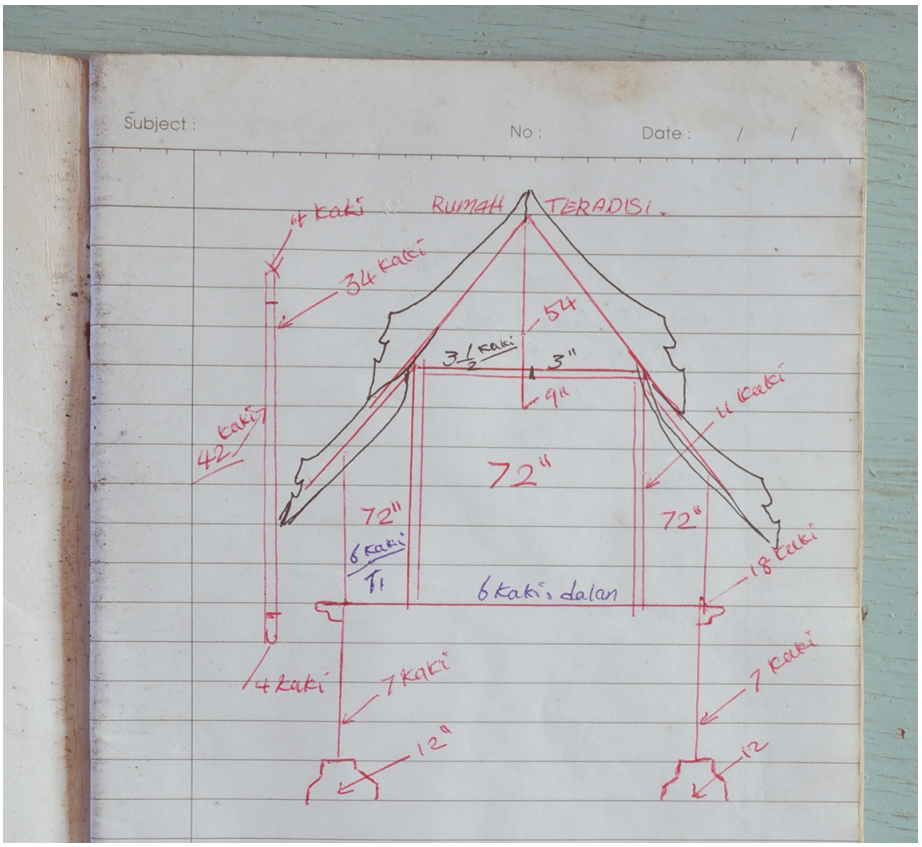

Figure 6: Sketch by the modern Malay *tukang,* outlining the dimension of each building component during the design stage in order to specify material quantity.

The author's survey revealed that all modern Malay *tukang* agreed that their involvement in the disassembly and assembly process contributes to their understanding of traditional building techniques. As a result, these modern Malay *tukang* are constantly referencing their experiences and objects they have encountered in building traditional Malay houses when describing their techniques. This demonstrates that direct communication with tangible heritage artefacts during the disassembly and assembly is possible, as 'building components will talk back to you through [the] emotion, sense and memory it has preserved' (Harun, 2011).

The Disassembly and Assembly process of building traditional Malay houses first occurs at an early stage of traditional construction. Some of the building components such as the roof structure were first built on the ground before being dismantled and re-assembled once the main structural posts are in place. The disassembly and assembly process involves the *tukang*, apprentices, as well as participation from the village community at key moments through participation in cultural ceremonies. However, at present, traditional Malay houses are dismantled and salvaged into other objects such as furniture, which does not contribute to the preservation of tangible as well as intangible cultural heritage.

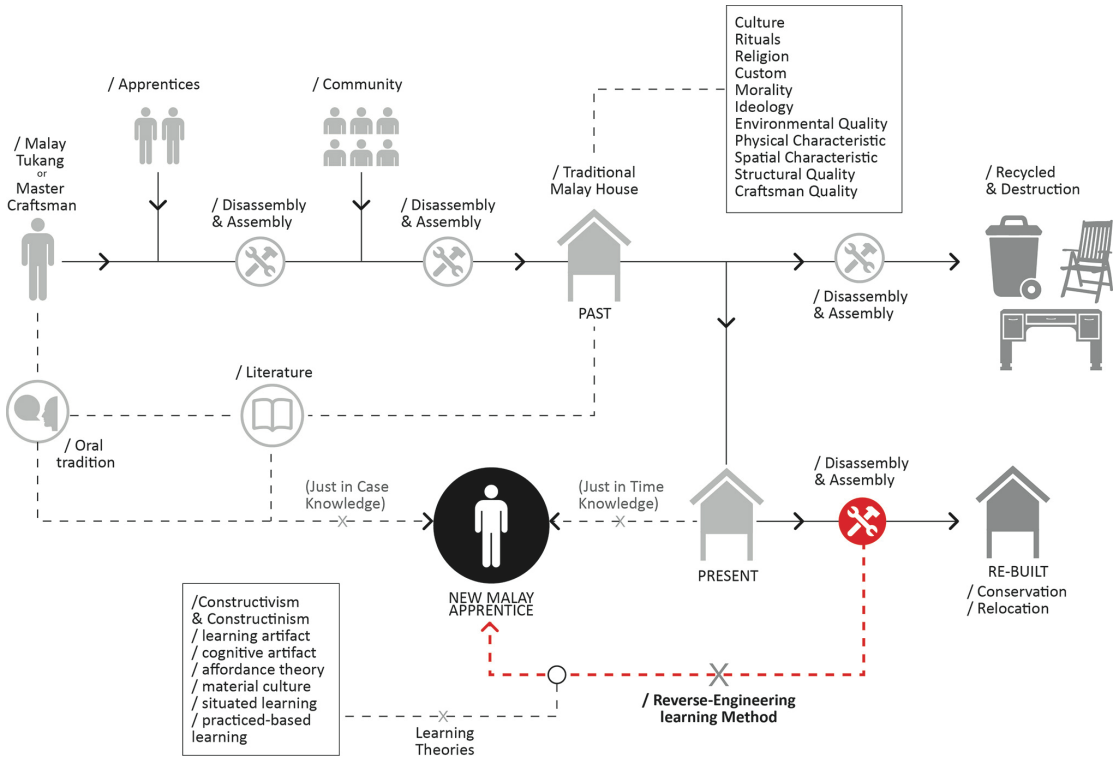

Figure 7: Overall framework of the study to narrate the process of knowledge transfer and the practice of the disassembly and assembly at key moments in the lifetime of a traditional Malay house.

The contemporary disassembly and assembly process relies on heritage building conservation practices conducted by individuals or governmental bodies. Building conservation practices involve various procedures that include preservation, reconstruction, restoration and rehabilitation, benefitting the Malay *tukang* as they come into direct physical contact with the unfolding material and ritual evidence embodied within the structures. The modern Malay *tukang* find that they are often surprised by new discoveries, requiring modification of their personal interpretation that may challenge their own ideas and beliefs concerning Malay house building.

Knowledge transfer through reverse engineering

Unlike other examples of tangible cultural heritage throughout the world, the traditional Malay house allows the process of disassembly and assembly, as it is traditionally part of the construction technique that uses timber wedges to secure a timber framed structural system. The Malay's belief system, encompassing spiritual judgment, influences the way houses were made and the constant need for relocation and reorientation of the house to fulfill different cultural and religious requirements. The disassembly and assembly process, therefore, provides a platform for reverse engineering method to take place.

Figure 8: This ninety year old traditional house was disassembled from Pahang and re-assembled in The University Putra Malaysia, Selangor, as a conservation exercise coordinated by the Malay Heritage Museum. The reconstruction includes the use of modern day material as part of the roofing element.

Reverse engineering, normally associated with product designs and software engineering, is practically experienced by modern Malay *tukang* during their involvement with conservation practices. Each modern Malay *tukang* interviewed by the author had worked on at least ten houses that were dismantled and reconstructed. Taking apart traditional Malay house is an intricate and complex procedure. The modern *Tukang* have learned to expect the unexpected from hidden jointing and unconventional features, and thus, the element of exploration and discovery here suggests a learning process that is constantly probed within each stage of disassembly and for much of the experience gained, manifests embodied knowledge from the past.

Figure 9: The disassembly and assembly process requires the understanding of procedural techniques as each building components are assembled based on sequential order.

Embodied knowledge not only relates to the building system, techniques and craftsmanship but also includes historical rituals related to the construction. One ritual conducted during traditional Malay house assembly was to place a coin or a tin ore underneath each of the main timber posts for prosperity (Lim, 1987), and hence the year the house was built will only be known if the house is dismantled as the information is hidden from plain sight. Although the *tukang* for a house cannot usually be identified, the consistency and level of perfection in the intricacy of internal jointing that is sometimes hidden by the apparent simplicity of the appearance speculates the mastery skills of a *tukang* and other traits symbolised through structural detailing. These signs and many others will only be uncovered during the disassembly and assembly process, however, in order to understand the traditional Malay house, one requires "reasoning, observations, attention and tactile senses"[2].

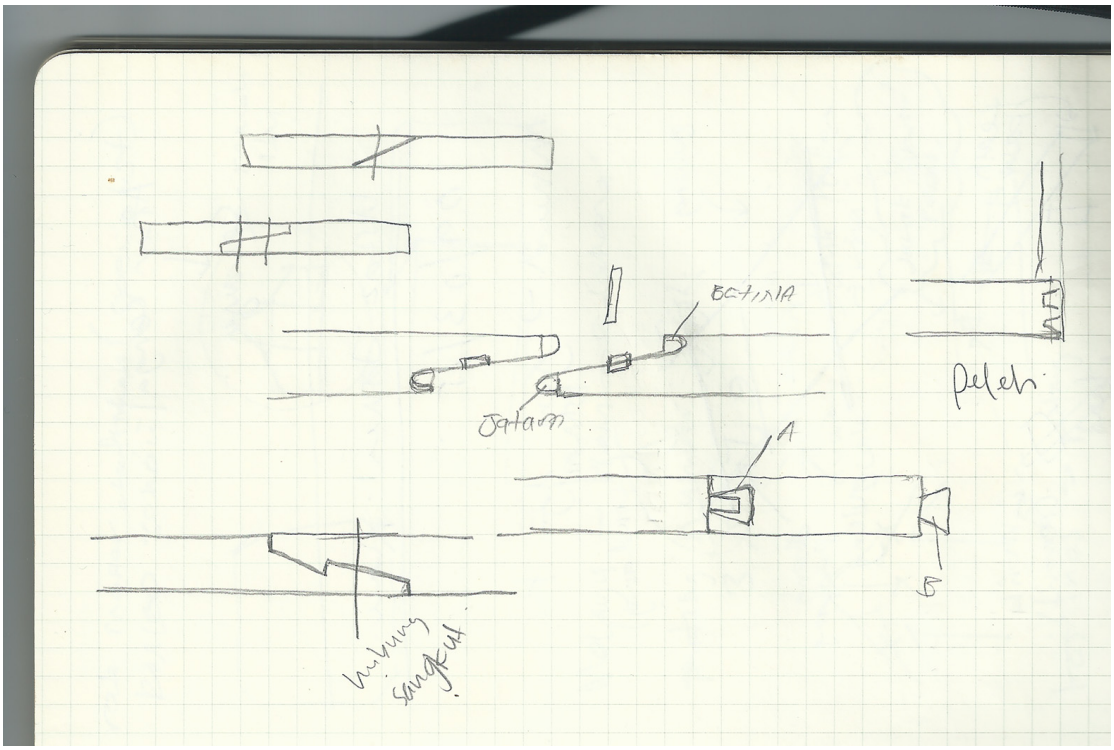

Figure 10: Sketch by modern Malay *tukang* demonstrating a splicing joint found during disassembly and assembly, to increase the timber's length. The joint depicts the concept of male and female elements that utilise draw pins to secure the timber pieces together.

The traditional Malay house can therefore foster the discovery of intangible knowledge heuristically through the disassembly and assembly process. It promotes reflective learning of Malay house building by new apprentices. The simplicity of the construction process of the house, its capacity to be replicated, its flexibility to adapt, its promotion of cooperative values, and its embodiment of local rituals and practices reflecting the lifestyle and belief of Malays; are all qualities which enrich the knowledge passed down from one generation to the next. These traits are summarised below.

Simplicity

The techniques of building the Malay house, employing timber wedges and the *tanggam*[3] joinery system, are straightforward and repetitive. The building concepts are only limited to horizontal and vertical planes and thus reduce the amount of technical structural knowledge required. New Malay apprentices can employ their understanding of the fundamental techniques of Malay house building in the disassembly process although it takes years to master new construction. Unlike the complexity of Japanese traditional architecture, which also often includes the practice of reconstruction[4], the traditional Malay house allows for constant sporadic improvements to be made, requiring fewer craftsmen to undertake. Therefore the simplicity of the house makes it easy for new Malay apprentices to efficiently manage the building process, recording and learning the elaborate construction procedures.

Flexibility

Another characteristic of the traditional Malay house is the flexibility of its form and building detail. Since *tanggam* joinery system is well established in Malay house building, the house can be adapted to meets the household's physical needs and

spatial requirements. Using the same construction technique, the traditional Malay house can be constructed as a nine, twelve or sixteen - post house (Hilton, 1992), or even developed into much larger forms such as palaces. The traditional Malay *tukang* adopted their own measurement systems using parts of their hand and body, and accordingly, the proportions of a traditional Malay house were derived from anthropometric measurements of the housewife – a key ritual (Lim, 1987). This provides historical evidence of the inhabitant's cultural distinctiveness as well as the building principles (Ariffin, 2001) adopted by past Malay *tukang*.

Reproducibility

The flexibility and adaptability of traditional building systems promotes regional expressions of the traditional Malay house in terms of style and cultural necessity. Construction techniques are adopted throughout different regional houses with variations in ornamentation and configurations of building elements. While the traditional Malay houses in the west coast of the Malay Peninsula are derived from Thai influences, houses in the south region have influences from an ethnic group derived mainly from West Sumatra in Indonesia. New Malay apprentices can exploit the different styles of traditional Malay houses to express cultural differences, transformations and narratives, describing the development of Malay society from different regional contexts.

Cooperative values

The process of building a traditional Malay house requires participation between a Malay *tukang*, his apprentices, as well as the involvement of the village community with various roles and tasks undertaken at different stages. In the past, almost all able-bodied males were likely to be *tukang* in one form or another (Rahman, 1999). This is because the initial stage of erecting structural timber posts is laborious and requires manpower from village communities coming together in a construction ceremony of erecting the main structural posts. Such a tradition of community involvement manifests a building culture that was intentionally bequeathed to the next generation, providing them with a foundation in applied knowledge and other means of sharing skills in traditional building. Therefore, a traditional Malay house is readily accessible for new Malay apprentices to exploit and acquire knowledge from.

Exemplifying Malay-ness

The rootedness of new Malay apprentices in their own culture enables a particular and distinctive approach towards working with traditional structures, allowing them to understand the procedural methods and rituals in Malay house building. The construction practices and the built-form of traditional houses reflect the culture and spiritual belief system of the Malay people. Therefore the process of disassembly and assembly is a familiar process for new Malay apprentices or anyone who understands and practices the Malay culture. This is due to the fact that Malay customs are depicted on key features of the house, such as the orientation towards the Qibla[5], the organisation of space to demarcate the male and female area, and the symbolic meanings of each ritual that resonates with Malay beliefs.

The inseparable association between Malay culture and the house building process suggests that this intellectual endeavor forms a basis for a direct understanding of the phenomenology of Malay building trade practiced in the past. As such, the association

new Malay apprentices have with the history of their own civilisation has transformed the traditional house into a sensible source of past building knowledge.

Rituals as guidelines

Rituals are important entities within the process of building the traditional Malay house and express the strong associations local societies make between their emotional, physical and mental co-existence with other forces of life. This mutual understanding of the perceived relationship between man, nature and the spirits is dominant within the Malay building process, which has evolved from an animistic ideology to incorporate Islamic religious doctrine, albeit most of the physical building procedures have remained the same. Although deemed irrelevant at present, past rituals work in unison with physical practices in order for the whole building process to be completed efficiently.

Each ritual has its purpose, such as the selection of a site, that requires a Malay *tukang* or *pawang*[6] to conduct a spiritual rite to determine whether the soil and environment is fit to live on and suitable to erect a timber framed house. The rituals become important procedural staging posts in a lengthy process requiring precision and strategy, from gathering wood in the forest to the assembly of the roof structure on site. Today, the process of disassembly and assembly of something that was so carefully built becomes part of the learning tool kit for apprentices to rediscover and adapt rituals practiced in the past.

Conclusion

The author of the study attempts to provide an alternative interpretation of intangible knowledge transfer within the process of building the traditional Malay house. Fieldwork revealed that modern Malay *tukang* have exploited the process of disassembly and assembly in the conservation of traditional heritage buildings in order to learn traditional craftsmanship and to become master craftsmen themselves. The disassembly and assembly process is an activity that permits the preservation of intangible cultural heritage – construction practices and cultural artefacts that previously have been taken for granted.

The study questions the criteria for the declaration of National Heritage property under Malaysia's National Heritage Act 2005 section 67, which states that heritage property should pose 'the potential to educate, illustrate or provide further scientific investigation in relation to Malaysian cultural heritage'. While current practice declares selective traditional Malay houses worthy of safeguarding based on their historical significance and association with prominent figures in Malay society, this study suggests a manner in which many if not all traditional Malay houses are treated as important national artefacts for the purpose of knowledge transmission through the process of disassembly and assembly.

Furthermore, the study expands on UNESCO's definition of intangible cultural heritage by providing a mechanism for approaching intangible cultural heritage that is distinct to the Malaysian context. Rather than treating conservation of heritage artefacts as a static process, exploring embodied intangible knowledge through disassembly and assembly is an intervention that constitutes a practice worthy of documentation and protection in itself.

Additionally, the relative cultural value of a given artefact and the values of the practices associated with the alteration of that artefact must co-exist in a state of dynamic flux. Decisions about what actions to priorities must be taken on a case-by-case basis, taking into account the particular circumstances of an example and the practices in question.

Further research will analyse the work of modern Malay *tukang* and document the learning and discovery within an activity that is a dominant part of a traditional building system. Ultimately, the disassembly and assembly of a traditional Malay house suggest an alternative and invaluable approach to knowledge transfer for future generations, enabling them to master old techniques and evolve new craft practices rooted in the present.

Notes

[1] For the complete English text of the Convention, see UNESCO. 2003. International Convention for the Safeguarding of the Intangible Cultural Heritage (Paris, October 17, 2003) http://unesdoc.unesco.org/images/0013/001325/132540e.pdf (retrieved March 20, 2015)
[2] This is a quote by Pok Mang, one of the modern Malay tukang interviewed during the fieldwork.
[3] An interlocking building system used by the Malay which is similar to a mortise and tenon joints.
[4] It was a tradition in some Japanese architecture such as the Ise Grand Shrine to be reconstructed every twenty years to purify the site and renew materials.
[5] Qibla is an Arabic word describing a fixed direction towards Kaaba in Mecca, the holy city for Muslims and the direction faced when they pray.
[6] Pawang is a person who knows the rites and rituals involved in the construction of traditional Malay house in order to placate the spirits.

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