

Tracking Damage in Carbon Fibre Components using Infrared Imaging

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Tracking Damage in Carbon Fibre Components using Infrared Imaging

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Abstract

This work demonstrates a non-contact technique that uses infrared imaging for tracking damage within carbon fibre composites under cyclic loading. The technique has been successfully applied to a range of coupon geometries, including 45-degree slot and hole in the plate specimens. The approach provides a methodology to monitor damage within composites components as it develops in the form of delaminations and surface cracking.

The complexity of composite materials creates a challenge when it comes to monitoring and predicting the remnant life of damaged structures. The data collected in this work is being used to develop empirical models that have the potential to provide predictions of damage propagation and residual strength. Such techniques applied to complex structures could improve our understanding of how large structures degrade and predict their future performance. This work demonstrates a potential route to combining thermal imaging with existing NDE techniques to make prognoses on composite structures.

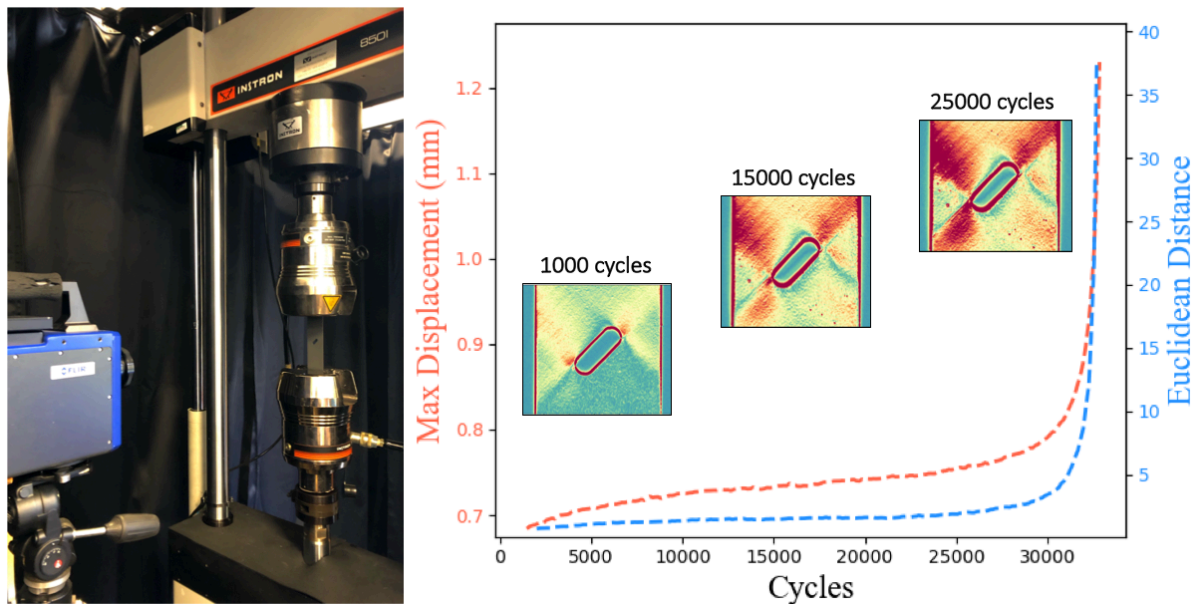


Figure 1 - Experimental setup (left) and graph showing the Euclidean distance of decomposed thermal maps against cycles and the corresponding specimen displacement (right).