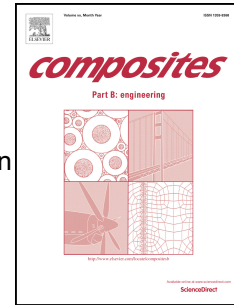


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Bearing fatigue of composite laminates: damage monitoring and fatigue life prediction

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Abstract

In hybrid composite/metallic structures, loads can be transmitted from one part to the other through localized contact pressures, i.e., bearing. Such structures may be rotating structures, which can accumulate as many as 10^9 load cycles during their service life. Designing safe hybrid rotating structures thus requires a sound understanding of how composite joints degrade under bearing fatigue. Pin-bearing fatigue tests were run under load-control. Damage mechanisms were investigated using computed tomography, and the pin displacement was closely monitored thanks to a green-LED micrometer. Building upon the gathered experimental evidences, several damage indicators were then analysed. In particular, hysteresis losses were found to give interesting insights into the fatigue phenomenon, suggesting the existence of a fatigue limit in the very high cycle fatigue (VHCF) regime.

Keywords: A. Carbon fibre A. Fabrics/textile B. Fatigue D. Mechanical testing D. Computed tomography

The bearing behaviour of composite joints has been the object of a large

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