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## Tensile and fatigue properties of single lap joints of aluminium alloy/glass fibre reinforced composites fabricated with different joining methods

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### Abstract

The tensile and fatigue properties of single similar and dissimilar lap joints of aluminium alloy (AA7075) and glass fibre reinforced epoxy (GRE) composite were investigated. Three joining methods were employed: mechanically fastened Huck bolted joints, Araldite epoxy adhesive bonded joints and hybrid joints comprising adhesive and Huck bolts. Tensile-shear fatigue tests were performed using single lap joint specimens at the stress ratio  $R=0.1$  to determine the fatigue behaviour of the joints. Subsequently, S–N curves were drawn for different levels of stress amplitude (30%, 40%, 50%, 60%, 70%, 80% and 90%). The micro structures of the fractured surfaces were examined by field emission scanning electron microscopy. The experimental results show that the hybrid joints with dissimilar adherends exhibit the highest strength and stiffness, with predominantly mix-mode failure and shear-out tension of the Huck bolt. These two failure mechanisms were detected as primary and secondary failures in the hybrid joint.

### Keywords:

Fatigue; glass fibre-reinforced epoxy (GRE); Huck bolt;

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