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Development of Fiber Metal Laminate Composite with Different Glass Fiber GSM

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Abstract

The fiber metal laminates based on aluminum-lithium alloy (FMLs) and glass fiber sheets were investigated to improve the stiffness tolerance. The aluminum-lithium sheets were treated with different techniques for getting the desired thickness and strength. Then, FMLs 4/2 were prepared by the optimized process. The two different types of GSM (gram square meter) glass fiber sheets have been used for the development of FMLs, GSM of the sheet are 300 and 600. Floating roller and tensile strength tests were used to gauge the FMLs' mechanical qualities. The results showed that the T3 doping state was primarily responsible for strengthening the aluminum-lithium alloy. When compared to high GSM, however, FMLs showed a small gain in strength and a clear improvement in elastic modulus regardless of the fibres plies and sampling orientation. However, during various GSMs, FMLs show outstanding interlaminar characteristics despite their dissimilar densities. A new design of composite with a high GSM value was also confirmed to improve FMLs' tensile resistance. Microscopy and morphological analysis have been performed, and the findings provide insight into the rationale for the enhanced properties of fibre metal laminate composites. The epoxy-aluminum alloy sheet interface morphologies were then studied using SEM. In this investigation, apparent surface energy was found to have a major role in enhancing adhesive bonding at the fully wetted stage, while the value of roughness might significantly affect adhesion strength at the partially wetted condition.

Keywords: Fiber metal laminate; Composite Technology; Fiber orientation.