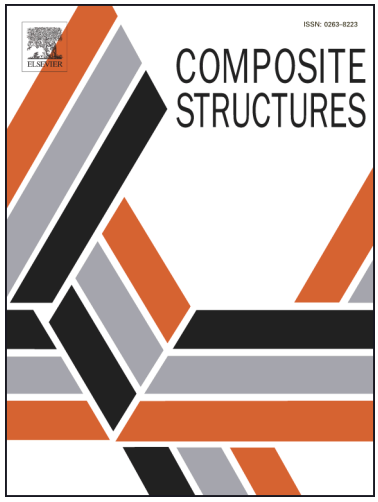

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Filler Materials in Composite Out-of-Plane Joints - A Review

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Abstract

Out-of-plane joints, such as joints between T, I, Z, L and hat (omega) stiffeners and skin panels are essential part of composite structures. To ensure the integrity of these assemblies, the inclusion of a filler material in the junction region between the skin, flanges and web is necessary. The conventional filler is a rolled unidirectional fibre bundle or resin filling, but there are many other proposed methods in the literature. This paper reviews the state-of-the-art work available in the topic and summarises the proceedings of the past 40 years, in terms of different types of fillers, manufacturing and simulation methods and their effect on joint performance. Possible future areas of interest are additive manufacturing, thermoplastic materials and interleaving, but the biggest challenge is to increase the production rate and manufacturability without reduction in strength and damage tolerance. Moreover, high fidelity finite element analyses and accurate failure prediction methods are needed to exploit the structural role of fillers.

Keywords

Noodle, T-joint, Stiffened panel, Stiffener, Deltoid

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