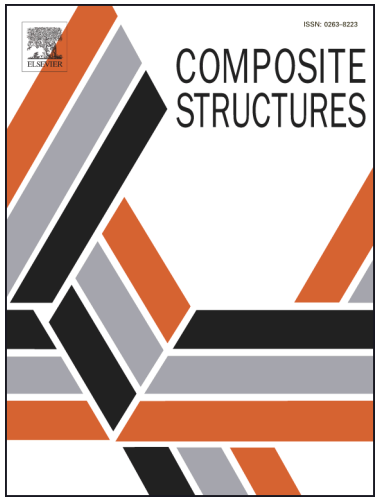

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Bending failure mechanism and flexural properties of GLARE laminates with different stacking sequences

Huaguan Li[1, 2], Yiwei Xu[2], Xiaoge Hua[2], Cheng Liu[2], Jie Tao[2*]

[1]Jiangsu Key Laboratory of Advanced Structural Materials and Application Technology, Nanjing Institute of Technology, Nanjing 211167, China

[2] College of Material Science & Technology, Nanjing University of Aeronautics and Astronautics, Nanjing 211100, P.R. China

ABSTRACT

Failure mechanisms of GLARE laminates with different structure were investigated by the combination of experiment and numerical simulation methods to predict the damage behaviors of GLARE in practical applications. In this study, bending properties were obtained under varied experiment parameters. Results indicated that the value of span-to-thickness ratio (L/h ratio), which could change the failure mode of laminates, had the most significant impact on bending properties. Effective bending failure occurred when L/h ratio ranged from 14 to 24. Moreover, the bending properties of GLARE laminates with different structures such as 3/2 (3 aluminum sheets and 2 glass/epoxy plies), 4/3, 5/4 and 6/5 were measured and compared. The data revealed that bending modulus decreased with structural expansion. However, the bending strength of unidirectional laminates increased with structural expansion, while the bending strength of cross-ply laminates decreased. SEM observation showed that the failure of GLARE laminates consisted of elastic stage, plastic stage, local fracture of fiber layer and delamination stage.

*Corresponding author. Tel.: +86-25-5211-2911
E-mail addresses: taojie@nuaa.edu.cn (Jie TAO).