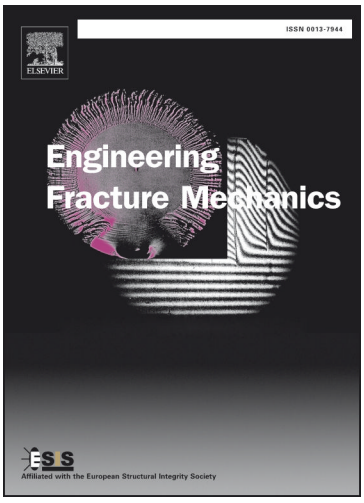

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Effect of milled glass fibers on quasi-static indentation and tensile behavior of tapered laminates under acoustic emission monitoring

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Abstract

The present work investigates on quasi-static indentation (QSI) behavior and post-indent tensile response of tapered glass/epoxy laminates. The tapered laminates were fabricated with a cross-ply [0º/90º] stacking sequence and subjected to quasi-static indentation (QSI) for different indentation depth. The residual loading bearing capacity of the post indented samples was evaluated by performing the tensile test. The online acoustic emission (AE) technique was employed to monitor the evolution of damages and their corresponding damage mechanisms during loading. Furthermore, the milled glass fibers were used as fillers into the epoxy matrix to improve the delamination resistance of tapered glass/epoxy laminates. The influence of milled glass fibers on the indentation resistance and residual load-bearing capacity was experimentally investigated. The results show that incorporation of milled glass fibers into the epoxy matrix have significantly improved the peak load, damage onset load and contact stiffness by an average of 20%, 66%, and 59% respectively. Also, the residual load-bearing capacity of filler loaded samples increased by an average of 20% compared to baseline samples. It was observed that the transverse matrix cracking triggered the delamination damage at the tapered region, resulting in critical failure through fiber breakage.

Keywords: Ply-drop, Delamination, Milled Glass Fibers, Quasi-Static Indentation, Acoustic Emission, Damage Monitoring.

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