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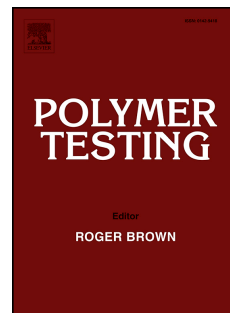
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Investigating structural failure of a filament-wound composite tube subjected to internal pressure: Experimental and theoretical evaluation

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Abstract- This research aims to predict the load bearing capacity of composite tubes subjected to hydrostatic internal pressure using progressive damage modeling. The employed progressive damage modeling consists of four distinct stages as model preparation, stress analysis, failure assessment and material degradation. Finite element modeling is utilized to extract stress components and they are fed into appropriate failure criteria. When a failure criterion is satisfied, damaged ply is replaced with an intact ply with degraded mechanical properties. For material degradation, two different strategies as ply-discount method and continuum damage mechanics (CDM) approach are used. The evolution of damage in terms of increasing internal pressure is analyzed for both methods. The accuracy of each modeling procedure is examined in comparison with experimentally measured failure pressure. The results reveal that ply-discount method underestimates failure pressure while more accurate estimation is achieved using CDM approach.

Keywords: Composite tubes; Failure; Experimental study; Progressive damage modeling; Continuum damage modeling

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