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Damage and failure in carbon/epoxy filament wound composite tubes under external pressure: experimental and numerical approaches

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Abstract

In this work, damage and failure in carbon fiber reinforced epoxy filament wound composite tubes were thoroughly evaluated through a proposed damage model, which is able to identify different failure modes. Moreover, a non-linear finite element model based on the arc length method was developed. The tubes were manufactured via dry-filament winding using T700 towpregs, and subjected to external pressure tests to evaluate computational analyses. Numerical results indicated that the tubes with a diameter-to-thickness ratio (*d/t*) lower than 20:1 fail by buckling, whereas the tube $[90\pm55_{12}/90]$, which has a higher *d/t* ratio presented failure primarily driven by in-plane shear, with

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