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Experimental and numerical studies of impact on filament-wound composite cylinder

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ABSTRACT

This study focused on the impact behavior of carbon-fiber-wrapped composite cylinders subjected to impact from flat-ended, hemispherical-nosed and conical-nosed impactors. Damage morphologies of the cylinders and mechanisms of the damage were analyzed. Change laws of the maximum impact forces, durations of impact processes and energies absorbed by the cylinders after impact with different impactors and impact energies were obtained. A finite element model was developed and the simulation results were in reasonable agreement with the tests. Finally, taking the flat-ended impactor as an example, stress distributions of the cylinders under pressurization and impact were discussed.

Keywords: composite cylinder; impact testing; numerical simulation; damage behavior; impact curve

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