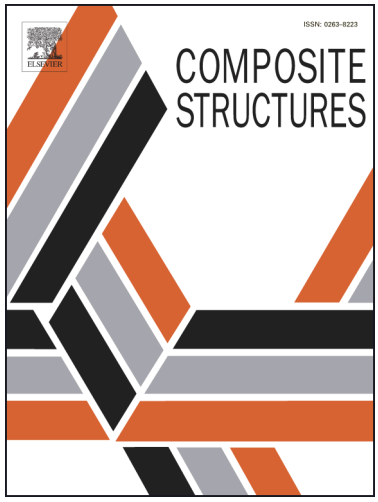

Modeling, Simulation, and Experiments of High Velocity Impact on Laminated Composites

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Modeling, Simulation, and Experiments of High Velocity Impact on Laminated Composites

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Abstract

High velocity impact on laminated composite panels is investigated by modeling, simulation, and experiments. Impact velocities of 100, 200, and 300m/s are considered and normal as well as oblique impacts are studied. FEM simulations are conducted to design three different laminate configurations to achieve the cases of a reflecting, almost stucking, and fully perforating impactor, respectively. Within a domain where material nonlinarities are expected the shell-based ply-scale approach is used. Every ply is modeled by a layer of shell elements which are connected via cohesive zone elements. Both element types are assigned nonlinear constitutive laws to capture their mechanical behavior appropriately. Outside this domain, a single layer of composite shell elements is used. Corresponding laminated plates are produced and tested using a gas gun setup, where energy absorption and damage patterns are assessed.

The comparison of simulations and experiments shows excellent agree-

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