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Impact damage prediction in thin woven composite laminates – Part II: Application to normal and oblique impacts on sandwich structure

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Abstract

This article concerns the Finite Element modeling of impacts on composite sandwich structures. Low velocity normal impacts and medium velocity oblique impacts on sandwich panels made with woven composite skins and a polyurethane foam core are investigated. The ply orientations and materials of the woven composite laminate skin are varied. The woven skin is modeled using a semi-continuous approach, described in the first part of this two parts article, in which the behavior of the bundles of fibers and that of the resin are disconnected. The foam core is represented with solid elements with a continuous material law. This modeling strategy provides results accurate enough to represent the damage scenario observed experimentally with an acceptable calculation time. The numerical results are used to analyze the damage mechanisms leading to the final fracture shape.

Keywords: Woven fabric composite, Foam core, Damage, Impact, Explicit F.E modeling, Sandwich structure

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