

Geometrically Non-linear Analysis of Composite Laminated Plates Subjected to Low-Velocity Impact

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Summary

ABSTRACT: A B-spline finite strip model is developed in the context of a layer-wise plate theory for analysing the geometrically non-linear transient response of laminated composite plates subjected to transverse low-velocity impact. To simplify the complicated contact analysis, a Hertz-type contact law has been incorporated into the finite strip (FS) model for accounting for the contact behaviour. The model includes the geometrical non-linearity through use of von Karman's non-linear strain-displacement relationship. The resulting non-linear dynamic problem is solved using the Newmark time-stepping scheme together with Newton-Raphson iteration. Several numerical applications are described and a close comparison is found between the results calculated through the present model and the existing analytical and experimental results.

