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## Reliability Assessment of Glass Epoxy Composite Plates due to Low Velocity Impact

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### ABSTRACT

Probability of failure estimation of an offshore composite structure under low velocity impact is an essential requirement to incorporate the uncertainties associated with material properties and load due to an impact. The likelihood of this hazard causing a chain of failure events plays an imperative role in risk assessment. The material properties of composites mostly exhibit a scatter due to their in-homogeneity and anisotropic characteristics, brittleness of the matrix and fibre and manufacturing defects. In reality, the possibility of incidence of such a situation is due to large randomness arising in the structure. Stochastic finite element analysis of fibre reinforced plastic plates under low velocity impact is performed to account for the uncertainties of material properties and initial impact velocity. Impact induced failure of fibre reinforced plastic structures are a stochastic process due to scatter arising in material and impact behaviour, since individual faults in the ply are not easy to track. The continuum damage model is implemented in the finite element code by a user-defined material subroutine to overcome these problems. The Gaussian process response surface method is presently adopted to determine the probability of failure. Comparative study is also carried out for different combination of impactor velocities and mass.

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