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**Abstract.** Composite stiffened panels, widely used in the aerospace sector, are exposed to low-velocity impacts (LVI) during operation, maintenance, and transport [1]. Computational methods help predict deformation and the extent of damage under dynamic loading, reducing the need for an extensive testing campaign [2]. In this work, structural theories based on the Carrera Unified Formulation (CUF) are proposed for the analysis of low-velocity impacts on stiffened composite panels [3]. The dynamic response of both the skin and the stiffeners is described through refined 1D/2D elements with higher-order kinematic expansions, enabling an accurate evaluation of local deformation effects and stress concentrations, especially at the skin-stiffener interface. Continuum damage and delamination models are used to handle nonlinearities. The proposed approach is assessed on representative composite stiffened panels subjected to LVI, as shown in Fig. 1. The results are compared with those obtained from commercial finite element models based on full 3D discretization. The comparison shows that the CUF-based models provide accurate predictions of the structural response while reducing the computational cost in terms of Degrees of Freedom (DOFs). These features make the proposed methodology an efficient alternative to conventional 3D modelling strategies for the design and analysis of lightweight composite stiffened structures.

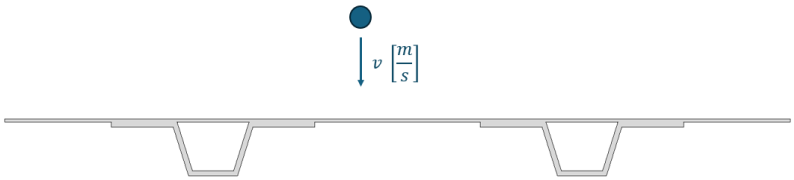


Figure 1: Schematic representation of the impact on a stiffened composite plate.

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