

An Approach to Low Velocity Impact Damage Modelling of Variable Stiffness Curved Composite Plates

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Abstract : In this study, the post impact behavior of curved composite plates subjected to low velocity impact was studied analytically and numerically. Approaches to damage modelling are proposed through the degradation of stiffness in the damaged region by reduction of thickness in the damage region. Spring-mass models were used to model the impact response of the plate and impactor. The study involved designing two damage models to compare and contrast the model best fitted with the numerical results. The theoretical force-time responses were compared with the numerical results obtained through a detailed study carried out in LS-DYNA. The modified damage model established a good prediction with the analytical force-time response for different layups and geometry. This study provides a gateway in selecting the most effective layups for variable stiffness curved composite panels able to withstand a higher impact damage.

Keywords : analytical modelling, composite damage, impact, variable stiffness

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