

Finite Element Analysis of Low-Velocity Impact Damage on Stiffened Composite Panels

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Abstract : To understand the factors which affect impact damage on composite structures, particularly the effects of impact position and ribs. In this paper, a finite element model (FEM) of low-velocity impact damage on the composite structure was established via the nonlinear finite element method, combined with the user-defined materials subroutine (VUMAT) of the ABAQUS software. The structural elements chosen for the investigation comprised a series of stiffened composite panels, representative of real aircraft structure. By impacting the panels at different positions relative to the ribs, the effect of relative position of ribs was found out. Then the simulation results and the experiments data were compared. Finally, the factors which affect impact damage on the structures were discussed. The paper was helpful for the design of stiffened composite structures.

Keywords : stiffened, low-velocity impact, Abaqus, impact energy

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