

A novel method for detecting and characterizing low velocity impact (LVI) in commercial composite

ABSTRACT

This paper presents low velocity impact testing on fibreglass reinforced polymer. The materials used in this experiment are Type C-glass/Epoxy 600 g/m² and Type E-glass/Epoxy 800 g/m². The materials were fabricated into 10 layer laminates. The drop weight low velocity impact tests were performed on 101.6 mm × 152.4 mm (4 in × 6 in) laminated plates using Imatek IM10 ITS Drop Weight Impact Tester in accordance with the Boeing Specification Support Standard Boeing BSS 7260 with variation in incident impact energy. As incident impact energy increases, the damage area also increases. Several damage modes occurred from delamination to matrix cracking. The 10-ply Type C-glass/Epoxy 600 g/m² laminate exhibited more severe matrix damage than the 10-ply Type E-glass/Epoxy 800 g/m² laminate at the same impact energy level. From this experiment, 10-ply Type E-glass/Epoxy 800 g/m² is recommended as the material for low velocity impact, as it has a higher impact resistance compared to 10-ply Type C-glass/Epoxy 600 g/m².

Keyword: Drop weight test; Fibre glass reinforced polymer (FGRP); Low velocity impact (LVI); Impact damage; Non-destructive testing (NDT)