

عنوان مقاله:

New Approach to characterize low-velocity impact behavior of sandwich-structured composite reinforced with weft-knitted spacer fabric

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خلاصه مقاله:

In the present study, a new approach was developed to characterize the low-velocity impact behavior of sandwich-structured composites reinforced with weft-knitted spacer fabric. This approach is to define various indexes to describe impact resistance of spacer fabric composites. Experimental results of drop-weight impact test was used to define different approaches in order to investigate different aspects of impact behavior of sandwich composites. Novel indexes i.e. Relative Displacement Index (RDI), Energy Per Pile Index (EPI), Damaged Volume Index (DVI), Damaged Pile Index (DPI) and Damaged Area Index (DAI) were introduced to explain different features of impact behavior of composites reinforced with ۱×۱-Rib gaiting, ۳×۳-Rib gaiting and ۵×۵-Rib gaiting weft-knitted fabrics. As conclusion, pile orientation has significant effect on the impact resistance of sandwich composites. Rib۳ sample has the maximum impact stiffness due to the low RDI value, and also it has the minimum value of DVI value, which describes both the area and the depth of the damage. In addition to the regular damage pattern of Rib۳ sample, it has minimum damage based on the DPI value. Rib۵ sample has the maximum impact toughness because of maximum values of AEI value. Also, the highest damaged area belongs to Rib۵ sample based on the DAI value.

کلمات کلیدی:

low-velocity impact, sandwich-structure, weft-knitted spacer fabric, new indexes, drop weight test, Absorbed Energy, damaged area

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