Fracture Characterization of PVC Foam Core Sandwich Specimen Using the DCB-UBM Test Method

Face/core debond failure in sandwich composites is a critical failure mode. Lack of cohesion between face and core will lead to loss of structural integrity. The estimation of interface fracture toughness especially at the face/core interface is extremely challenging, provided the dissimilarity of material properties across the interface. The crack path and fracture also depend on the loading configuration at the crack tip. Depending on the type of loading applied, a measure of shear deformation at the crack tip is expressed by the mode-mixity phase angle (ψ). A suitable fracture mechanics approach coupled with experimental validation is paramount to determine the fracture resistance of the face/core interface. In this paper, the test-rig exploiting the double cantilever beam with uneven bending moments (DCB-UBM) concept is used to determine the fracture toughness of PVC foam core sandwich composites. The DCB-UBM test enables fracture testing over a large range of mode-mixities as expressed by a phase angle (ψ) which is a measure of the amount of shear loading at the crack tip. A desired phase angle may be achieved by changing the moment-ratio (MR = M_d/M_s).

General information
State: Published
Organisations: Department of Mechanical Engineering, Solid Mechanics, Florida Atlantic University
Contributors: Saseendran, V., Berggreen, C., Carlsson, L. A.
Number of pages: 6
Publication date: 2017
Peer-reviewed: Yes
Event: Paper presented at 21st International Conference on Composite Materials (ICCM-21), Xi’an, China.
Keywords: Sandwich composites, DCB-UBM, CSDE-method, PVC foam core, Moment ratio
Electronic versions:
Full_Paper_FRACUURE_CHARACTERIZATION_OF_PVC_FOAM_CORE_SANDWICH_SPECIMEN_USING_THE_DCB_UBM_TEST_METHOD_.pdf
Research output: Research - peer-review › Paper – Annual report year: 2017