

## عنوان مقاله:

Study of the Fracture Behavior under the Effect of Cross-ply and Angle-ply Arrangement of FRP Composite Laminate Subjected to Central Circular Cut-out with Mechanical and Thermal Loading Conditions

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## خلاصه مقاله:

In advance composite material the propagation of crack is a regular failure problem in various engineering applications especially in aircrafts body. The aircraft body components are subjected to various thermal and mechanical loading conditions. It is very difficult, time-consuming and costly process of testing the aircrafts components failure due to various thermal and mechanical conditions. Strain energy release rate (SERR) is the significant parameter for the composite materials and quality of composite materials depends in SERR values. The present investigation is based on ANSYS analysis for finding the strain energy release rate (SERR) value using Virtual Crack Closure Technique (VCCT) to understand the fracture behavior of the composite lamina. The circular crack present in the middle of the composite plate and subjected to Pressure and temperature loading for different angle (cross-ply & angle-ply) composite structure laminas. The angle-ply shows less SERR in mode I & II while cross-ply shows less SERR in mode III under the constant Pressure loading conditions. Mode II shows the maximum SERR in cross-ply compared to mode I and III for temperatures  $30^{\circ}\text{C}$ ,  $80^{\circ}\text{C}$ ,  $130^{\circ}\text{C}$  &  $180^{\circ}\text{C}$ . SERR for mixed-mode was found by considering the total mode of fracture and validation based on published literature for SERR due to the Thermal load of mode I (GI) for different fiber layup configurations of the circular cut-out.

## کلمات کلیدی:

Strain Energy Release Rate (SERR), Virtual Crack Closure Technique (VCCT), Angle-ply, Cross-ply, Circular edge crack, Thermal loading

## لینک ثابت مقاله در پایگاه سیویلیکا:

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