

**ENHANCED DELAMINATION TOLERANCE LEVELS BY HYBRIDIZING CARBON LAMINATES WITH GLASS
PLIES: PARAMETRIC STUDY**

Savitha N. Nambisan

Department of Aerospace Engineering
International Institute of Aerospace Engineering
and
Management (IIAEM), Jain (Deemed-to-be-
University)
Jain Global Campus, Kanakapura Road
Jakkasandra Post, Bangalore-562 112, India
Email : savithapraveen@gmail.com

B. Dattaguru

Miles Endowment Professorship Chair
Department of Aerospace Engineering
International Institute of Aerospace Engineering
and Management (IIAEM),
Jain (Deemed-to-be-University)
Jain Global Campus, Kanakapura Road
Jakkasandra Post, Bangalore-562 112, India
Email : datgurb@gmail.com

Abstract

Laminated composites are extensively used in the aerospace industry and one of the key issues is delamination tolerance in these configurations during the operational phase. This paper demonstrates that hybridization is an effective strategy to achieve higher delamination tolerance sizes. For the above purpose, this paper presents a method to hybridize two different practical laminated carbon composite panels with glass fibers and also a parametric study to evaluate the influence of various hybrid laminate parameters on the delamination tolerance. Geometrical non-linear finite element analysis is carried out on three-dimensional models of delaminated non-hybrid and hybrid composite laminates. The mode I Strain Energy Release Rate (SERR) is estimated using Modified Virtual Crack Closure Integral (MVCCI). The SERR components are compared for the hybrid and the non-hybrid laminates. It is demonstrated that an appropriate hybridization with glass plies in between a few top and bottom carbon layers enhances delamination tolerance levels without significantly affecting the stiffness of the laminate.

Keywords: Laminated Carbon Composites, Delamination Tolerance Levels, Carbon-Glass Hybrid Configurations