

Analytical Modeling of the Behavior of Composite Structure Subjected to Combined Tensile and Moment Loading

D. ZELMATI, R. Graine, O. Guelloudj, N. Sehab, F. Sehab

Abstract : The present work is a contribution in assessment of the security factor of the structures made from composites materials in order to work within safe conditions. In the first step, a Matlab code is developed in order to develop a mechanical model able to predict the mechanical behavior of the high performance composite material without necessity to the expensive experimental test. In the second step, an analytical modeling is performed for the composite structure subjected to a tensile load in the longitudinal direction and a moment in the transversal direction in order to assess the strain and the stress fields in all layers of the composite material and evaluate the security factor in all plies. Meanwhile, the new mechanical model can be used as a tool decision in design and maintenance in order to check the integrity of the composite structure.

Keywords : composite, laminate, integrity, security factor, moment loading