

Simulation du comportement et de l'endommagement mécanique d'un matériau composite sandwich

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Abstract: This work is dedicated to the study of an advanced approach based on the modeling of the behavior and damage of the glass/epoxy sandwich composite in polyether imide core under tensile and shear loading. In particular, we are interested in the study of the damage coupled to the rupture of this sandwich composite. These sandwich composites are used in fields such as aeronautics and automotive. Their uses call for the development of reliable constituent models to predict their responses under complex loading conditions. This model considers all damage in the plane: damage caused by cracking of the epoxy matrix as well as damage due to the rupture of the glass fabrics in the longitudinal and transverse directions. For this study a model has been designed as two layers plus one PEI layer $[0^\circ/90^\circ]$. For this purpose various experimental results were established in order to develop a model for damage analysis, whose composite response is governed by a coupling between damage and failure. In order to develop this study, we used finite element software (ABAQUS/Standard), by which we proceeded to obtain simulation results presented in this work and thus, correctly predict the static response obtained by the experimental measurements.

Keywords : modeling, thermo set matrix sandwich composite, mechanical behavior, tensile test, Stress, Strain, deformation, damage, breakage.