ACOUSTIC EMISSION ANALYSIS IN WOVEN COMPOSITE BOLTED ASSEMBLY

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Abstract: This work study the damage and fracture evolution of a single lap bolted assembly (fiber / epoxy). Three configurations are studied (0°, 45°, 0°, 45°), (0°, 45°, 0°, 45°)s and (0°, 45°, 0°, 45°, 0°). All material types were tested under tensile loading. An experimental approach was carried out in order to analyze the sequence of damage mechanisms using acoustic emission (A.E.) and measurement of fields by digital image correlation (D.I.C.) techniques simultaneously. Then confirmed by microscopic observations in scanning electron (SEM). The A.E. technique allows the monitoring of the evolution of acoustic activities by taking into account the number of counts, duration, maximum amplitude and energy of the events. The treatment of these four parameters by planar localization allows precise determination of the fracture’s modes of damage are identified: matrix cracking, fibre-matrix debonding or fibre pull-out, delamination, Fibre breaking. The DIC techniques and the fracture surfaces observations permit to confirm the damage scenarios.

Keywords: acoustic emission, bolted assembly, damage