STRENGTH PREDICTION OF ADHESIVELY-BONDED JOINTS USING IMPROVED COHESIVE LAW ESTIMATION

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ABSTRACT

Cohesive Zone Models (CZM) are a powerful tool for the design of bonded structures, but they require careful estimation of the cohesive laws. This work experimentally evaluates by the J-integral/direct method the tensile and shear CZM laws of three adhesives with distinct ductility. Additionally, by the direct method, the precise shape of the cohesive law in tension and shear of the adhesives is defined. The Double-Cantilever Beam (DCB) and End-Notched Flexure (ENF) specimens were considered to obtain the tensile and shear CZM laws of the adhesives, respectively. Triangular, exponential and trapezoidal CZM laws were built to reproduce their behaviour. Validation of these CZM laws was undertaken with double-lap joints with varying overlap lengths (L_O). Accurate predictions were found for a given CZM law shape, depending on the adhesive ductility, although all CZM law shapes were moderately accurate.

KEYWORDS: Finite Element Method, Cohesive Zone Models, J-integral, Direct method, Structural adhesive

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