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Numerical stress analysis of epoxy adhesively bonded dissimilar joint

Abstract

A two-dimensional adhesively bonded dissimilar single lap joint model was analyzed under tension. An explicit closed-form solution was formulated by using MATLAB tool for analysis of shear and peel stresses distribution along the bondline under effect of variation of overlap length, adherend thickness ratio and adherend Youngs modulus ratio. The solution was formulated based on analysis of Bo Zhao et al. [2]. The bending moment at the edge joint of the Bo Zhaos solution was replaced by the bending moment at the edge joint that have been proposed by X. Zhao et al. [5] to compare the accuracy of solutions. The least stress intensities in dissimilar joint could be achieved with a suitable ratio of thickness and Youngs modulus of adherends.

Keywords; Adhesive, Closed-Form, Dissimilar Joint, Finite Element Method (FEM), Single Lap