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Analysis of thick laminated composites

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Abstract-

This work focused on the analysis of laminated composite structures with a thick cross section. This investigation involved both analytical and experimental work. An efficient finite element analysis was proposed for analyzing thick laminated composite structures. The major feature of the analysis was that each element in the analysis can ac commodate several layers having different ply orientations. A three-dimensional finite ele ment program was developed during the investigation for calculating the stresses, strains, and deformations of thick laminated composite bends. In order to verify the analysis and the numerical calculations, experiments were also performed. Thick composite bends, made from 120 layers of T300/976 graphite/epoxy prepregs, were fabricated and tested during the experiments. Numerical solutions generated from the program were compared with the experimental data. Excellent agreements were found between the analytical solu tions and the results of the tests. Accordingly, the proposed analysis yields an efficient and effective finite element method for calculating stresses, strains, and deformations of thick composite structures.

Index Terms- Composite Materials, Finite Elements, Thick Laminates, Analysis

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