

THEORETICAL ANALYSIS OF COMPOSITE BLADE IN STATIC CONDITION TO FIND MATERIAL UNCERTAINTY AND VALIDATION WITH COMSOL SOFTWARE

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ABSTRACT

The importance use of composite materials has been increasing consistently in different industries like civil engineering, mechanical engineering, aerospace engineering due to their advantageous characteristics. This paper aims at analytical or theoretical analysis of composite blade to estimate the material uncertainty. The deflection parameter has considered for analyzing the uncertainties present in material. The composite blade is like a cantilever beam, where one end is fixed and at free end load is applied. Due to applied load at free end deflection carried out at free end. So, theoretical analysis is carried out for different loads and deflection is calculated to checks it material uncertainty presents. To validate those theoretical results, simulation of composite blade is carried out using COMSOL Multiphysics software for same deflection parameters. Then, theoretical & COMSOL results are compared with each other to find % error and after comparison of both results it is observed there is no any material uncertainty presents in blade.

Keywords: Composite Blade, Cantilever Beam, Deflection, Material Uncertainty, COMSOL.

