

NUMERICAL AND EXPERIMENTAL ANALYSIS OF THE BENDING DEFLECTION OF THE COMPOSITE BEAM

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Abstract

This work studies the numerical and experimental bending deflection of 3-point test of the composite beam made from epoxy reinforced by glass fibers and carbon fibers at different volume fractions. The results show that the deflection decrease in nonlinear relationship with increase volume fraction for both glass fibers and carbon fibers. In this research the experimental results was higher than the finite element results were the maximum difference was (0.24 mm) at load (=20 N) and volume fraction ($V_f= 10\%$) for glass fibers reinforcement. Also the results indicated that the maximum deflection was (1.65mm) when reinforced by glass fibers at ($V_f=10\%$) and at load (= 20 N) experimentally, while the minimum value of deflection was (0.05mm) when reinforced by carbon fiber at load (= 4 N) and ($V_f=30\%$).

Keywords: bending, composite beam, epoxy, deflection, fibers

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