

Effect of Fibre Weight Fraction on Mechanical Properties of Woven Sisal Fabric Reinforced Epoxy Composites

ABSTRACT

In this work, woven sisal fabric reinforced epoxy composites were fabricated using hand lay-up technique. To investigate the effect of fibre weight fraction on the mechanical properties of the resultant composites, the fraction of sisal fibres in the composites was varied at 30, 40, 45, 50 and 60%. Specimens for mechanical testing were prepared based on ASTM D638, ASTM D3410, ISO 179:1997 and ASTM D790 standards. From the test results, the mechanical properties of the resultant composites increased with increasing fibre weight fraction (Vwf). The tensile and compressive strengths increased from 22.63MPa to 30.91MPa and 15.32MPa to 23.91MPa respectively as fibre loading increased from 30%Vwf to 50%Vwf; flexural strengths increased from 19.17MPa at 30% Vwf to 27.16MPa at 60% Vwf; impact strength increased from 17.89KJ/m² at 30% Vwf to 24.58KJ/m² at 45% Vwf. This shows that increasing fibre weight fraction improves the mechanical properties of the resultant composites due to increased amount of loading bearing elements, fibres, thus the composites showed increased ability to withstand mechanical loading at higher fibre loadings.