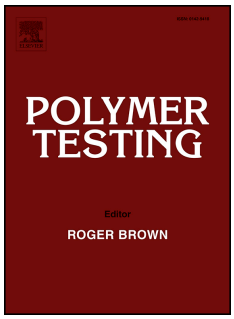

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HYBRID GLASS FIBRE REINFORCED COMPOSITES CONTAINING SILICA AND CEMENT MICROPARTICLES BASED ON A DESIGN OF EXPERIMENT

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Abstract

Hybrid Glass Fibre Reinforced Composites (HGRFCs) made with unidirectional glass fibres and silica or cement microparticles inclusions were investigated in order to improve their performance under flexural and impact loadings. Two full factorial designs were conducted to evaluate (i) the effect of the particle weight fraction on the compressive modulus of epoxy polymer ($2^1 3^1$) and (ii) the effect of the number of layers and type of particle (3^2) on the apparent density, flexural modulus and strength of HGFRCs. Composites with higher flexural properties were evaluated under impact loading via one-way analysis. TGA and FTIR analyses were used to verify the effect of ceramic particles within the polymeric phase. A microstructural analysis (SEM) was performed to verify the fracture mode and better assess the mechanical performance of HGFRCs.

Key words: hybrid composite; silica particle; Portland cement; glass fibre; three-point bending test; impact resistance.