

ABSTRACT

The potential use of electric arc furnace (EAF) steel slag as a raw material for structural units was investigated. Volumetrically stabilised steel slag powder was combined with sodium silicate solution and hydrostatically compacted into coherent test specimens. Compressive strength, flexural strength and fracture toughness evaluations were conducted and variations in mechanical and physical properties as functions of fabrication pressure, sodium silicate content and curing time were investigated.

Four formulations, containing 7.50%, 8.75%, 10.00%, and 11.25% sodium silicate by mass, were separately compacted at pressures of 10MPa, 20MPa, and 30MPa respectively. Specimens were cured at a relative humidity of ~75% and a temperature of ~30°C for periods of 15, 30, 45 and 60 days.

Results indicate that after 60 days of curing, compressive and flexural strengths of up to 8MPa and 23MPa are possible. In general, the mechanical and physical properties obtained have demonstrated the feasibility of the material for use as above grade, non-load bearing structural units.