Abstract

Fibre reinforced concrete (FRC) has been experimented and used for many years. However, its usage is still not popular among local builders due to a lack of adequate knowledge of its properties. Moreover, when the volume fractions of fibres used in the mix are large, it creates mixing problems and conventional mixing techniques cannot be used.

This dissertation is an account of experiments conducted to examine and compare the effect of polypropylene, glass and carbon fibres on the properties of concrete. A small volume fraction of 0.5% of short fibres is used so as to avoid severe problems due to mixing.

Results of the present study showed that short fibres can affect the workability up to 60%. The compressive strength of FRC fell by approximately 5-12% with carbon fibre reinforced concrete (CFRC) faring the poorest. There were slight reductions in the flexural strengths of FRC though higher early strengths were detected. The addition of polypropylene fibres did not affect the permeability of concrete, whereas there was an average of 30% reduction in water absorption for CFRC and glass fibre reinforced concrete (GFRC). Generally, the incorporation of fibres effectively reduced its drying shrinkage. In fire resistance tests, plain concrete disintegrated at a temperature of 900°C which maintained for 30 minutes whilst FRC tended to maintain some residual strength and integrity.