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Effect of Elevated Temperature of Hybrid Fiber Cement Mortar

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Abstract

Concrete structures often subjected to damages such from fire and it can severely affect the stability of a concrete structure where cement is used as binding material. Hence, the aim of this experimental study is to investigate the effect of elevated temperature towards basalt fibre, bamboo fibre and combined fibres of bamboo and basalt fibres cement mortar, and to determine mechanical performance of different percentage of hybrid fibre concrete in terms compressive strength and flexural tensile strength. Cement mortar blocks (50 mm x 50 mm) and prisms (40 mm x 40 mm x 160 mm) with and without fibres are prepared. Basalt fibres of 0.1%, 0.25% and 0.5% and 0.5% of bamboo fibres by cement weight were added. The strength of the mortar exposed to various temperatures, 400 °C, 800 °C and 1000 °C for 2 hours was determined after curing for 28 days. The test result indicates that the optimum hybrid fibres was specimen th t contained 0.10% basalt fibre and 0.50% bamboo fibres. Even after being heated to 1000°C, the mortar that is produced with this mix showed the highest compressive strength. Overall, the combination of basalt and bamboo fibres can be seen to exhibit higher strength compared to single fibre specimens after elevated temperature.

Keywords: Cement mortar; Hybrid fibres; Bamboo fibre; Basalt fibre; Furnace; Elevated temperature.