

Evaluation of rubberized fibre mortar exposed to elevated temperature using destructive and non-destructive testing

ABSTRACT

The mechanical properties of concrete containing crumb rubber (CR) as a replacement for fine aggregate have been studied by many researchers. The consequence of these studies indicates that when CR is used as a substitute for fine aggregates in concrete, the properties in the fresh and hardened states are affected. Although the compressive strength of rubberised concrete decreased as the percentage of CR increased, rubberised concrete had better thermal resistivity. Therefore, this paper presents the results of research on the evaluation of conventional compressive strength (fcu) and non-destructive testing (NDT) at high temperatures for lightweight mortar made with CR and oil palm fruit fibre (OPFF). Sixteen mortar mixtures with 0-30% CR and 1-1.5% OPFF as a replacement ratio by weight of aggregate and cement were tested. All samples were subjected to elevated temperatures (ETs) of 200°C, 400°C and 600°C. The results show that both compressive strength and NDT decreased for all samples, especially samples containing 30% CR and exposed to 600°C. Despite this fact, the compressive strength of more than 97% of the samples fell within the range of moderate to structural lightweight concrete.

Keyword: Rubberised fibre mortar; Crumb rubber; Oil palm fruit fibre; Conventional compressive test; UPV; Elevated temperatures