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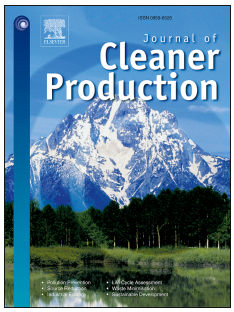


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# An investigation of high-volume fly ash concrete blended with slag subjected to elevated temperatures

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**Abstract:** The current study aims to investigate the behavior of high-volume fly ash (HVFA) concrete blended with ground granulated blast-furnace slag (shortened as slag) under the effect of elevated temperatures. For this reason, cement has been partially replaced with a Class F fly ash (FA) at a level of 70% to produce HVFA concrete (F70). F70 was modified by partially replacing FA with slag at levels of 10% (F60G10) and 20% (F50G20), by weight. All HVFA concrete types were compared to the neat Portland cement (PC) concrete (F0). After curing, the specimens were exposed to elevated temperatures ranging from 400 $^{o}$C to 1000 $^{o}$C with an interval of 200 $^{o}$C. Weight and compressive strength before and after being exposed to elevated temperatures have been thoroughly explored. The various decomposition phases formed were identified using X-ray diffraction (XRD) and scanning electron microscopy (SEM). The results indicated higher relative strength of all HVFA concrete types. F70 exhibited the highest relative strength among all studied mixtures. The incorporation of slag showed negative effect on HVFA concrete before and after different heat treatments. The inclusion of slag caused a reduction in the residual compressive strength of F70 approximately ranging from 14% to 21%.

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