

Residual Modulus of Elasticity of Self-Compacting Concrete Incorporated Unprocessed Waste Fly Ash after Expose to the Elevated Temperature

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Abstract : The present study experimentally investigated the impact of incorporating unprocessed waste fly ash (UWFA) on the residual mechanical properties of self-compacting concrete (SCC) after exposure to elevated temperature. Three mixtures of SCC have been produced by replacing the cement mass by 0%, 15% and 30% of UWFA. Generally, the fire resistance of SCC has been enhanced by replacing the cement up to 15% of UWFA, especially in case of residual modulus of elasticity which considers more sensitive than other mechanical properties at elevated temperature. However, a strong linear relationship has been observed between the residual flexural strength and modulus of elasticity, where both of them affected significantly by the cracks appearance and propagation as a result of elevated temperature. Sustainable products could be produced by incorporating unprocessed waste powder materials in the production of concrete, where the waste materials, CO₂ emissions, and the energy needed for processing are reduced.

Keywords : self-compacting high-performance concrete, unprocessed waste fly ash, fire resistance, residual modulus of elasticity

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