

Influence of Fly Ash Unburned Matter Contents on the Fire Resistance Characteristics of Mortars Manufactured Thereof

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ABSTRACT

In this paper the thermal and mechanical behaviors of mortars mainly composed of coal fly ashes are studied with the aim of analyzing the influence of the unburned matter (LOI) of the ash on the fire resistance and mechanical strength characteristics of mortars potentially used for passive protection against fire.

Mortar compositions were prepared using an ash/ binder (gypsum) weight proportion of 80/20, and a water/solids ratio of 40/100. All the properties have been evaluated after 28 days of setting time, comparing the properties of mortars containing ashes with different LOI contents and studying the behavior of mortars in which fly ash has been submitted to a pre-treatment aimed at removing the unburned matter.

The water content and the insulating properties of the mortars have been analyzed by means of gravimetric and thermal analysis (DSC, DTA and TG) techniques respectively; also the standard fire resistance test has been reproduced on 200 mm-height, 50 mm-diameter cylindrical test probes. Different mechanical properties such as compressive and flexural strength of the probes (before and after the fire resistance test), superficial hardness and dynamic elasticity modulus have been measured. The results obtained show a significant influence of the unburned matter content on the insulating capacity and mechanical properties of the mortars.

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