

Influence of curing time on the fire performance of solid reinforced concrete plates

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Abstract

When reinforced concrete elements are subjected to high temperatures, such as in a fire, they are susceptible to physical and chemical changes that cause spalling, thereby undermining their performance under such conditions. It is known that the age and the internal moisture content of concrete are factors that contribute to this event, but the intensity of spalling is not yet a consensus. This study aimed to assess the influence of age and internal moisture on the performance of concrete walls at high temperatures. Therefore, 6 real-scale walls were built with dimensions of 3.15×3.00 m, with the same composition of concrete, for tests in a vertical furnace under the ISO 834 curve, for ages of 7, 14, 28, 56, 84 and 830 days. Moisture was measured as per the [electrical resistivity](#) of concrete. It was noted that walls with ages above 84 days showed no spalling whatsoever, due to the internal moisture of concrete. The most severe spalling took place at 14 days, thus evidencing that pore interconnectivity and hydrated cement [crystallization](#) can contribute as well.

Keywords

Reinforced concrete; Spalling; Fire resistance; Non-load bearing wall system