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Thermal behaviour of concretes with micro silica addition

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A comparative study of several concrete composites with different quantities of micro silica was conducted. The effect that micro silica addition has on the behavior of concrete was discussed. The experimental program implied production of "referent" concrete composite based on Portland cement and river sand, and concretes with 5, 10, and 15 wt.% addition of micro silica. Micro silica was used as micro filler in the concrete mass. The influence of this additive on the concrete mechanical properties and on its thermal behavior was investigated. This research highlighted the role that fine micro silica particles have in improvement of composite microstructure packing, the decrease of the porosities values and enhancement in the compressive strength due to the decrease in pore size. The thermal behavior of the concretes was studied at temperatures ranging from ambient to 1100°C as adopted maximum. Mechanisms of thermally induced processes were observed by differential thermal analysis, at 10°C·min⁻¹ heating rates, and by thermo gravimetric analysis. The variations in concretes performances were discussed with support of scanning electron microscope imagining and *X-ray diffraction* results. The composites with addition of micro silica exhibited properties that met the requirements for the concretes suitable for use in severe conditions and environments.