EVALUATION OF THE MECHANICAL PROPERTIES OF SELF-COMPACTING CONCRETE CONTAINING NANO-PARTICLES IN ELEVATED TEMPERATURES

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Nanotechnology has become one of the most active research areas that encompass a number of disciplines including civil engineering and construction materials. If concrete with nano-participles can be manufactured and processed, it will elevate the status of concrete to a high tech material, despite of its current status which is widely used as a popular construction material. The main goal of this paper is to represent the performance of self-compacting concrete containing three different nano-particles in elevated temperatures. In this research, a comprehensive experimental study was conducted to investigate the effect of elevated temperatures (110 0C, 200 0C, 400 0C and 600 0C) on physical and mechanical properties such as density, compressive strength, tensile strength and elastic modulus of Self-Compacting-Concrete containing Nano-particles including copper, Iron and Silica particles. Cubic samples of 100mm in dimension were prepared and cured for 28 days for self-compacting concrete with and without nano-particle and physical and mechanical properties of the samples were determined and compared.

Test results clearly show that there is a significant improvement in compressive strength, but, on the other hand, there is a reduction in compressive strengths when the percentages of Nano-particles is increased in the specimens, with the compressive strength increasing from 8% to 12%, 26% to 37% and 22% to 56% for nano-copper, nano-irons and nano-silica, respectively. As for tensile strength, it can be easily seen from the results that in comparison with the specimens without nano-particles, the tensile strength has increased by 48%, 38% and 30% for Nano-iron, nano-copper and nano-silica, respectively. When the percentages of nano particles is increased, the elastic module increases by 16%, 11% and 4% for Nano-iron, nano-copper and nano silica, respectively while in the higher temperatures the value of elastic module decreases. The details of findings will presented during presentation.

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