Effect of nanosilica addition on mechanical properties of shielding concretes subjected to elevated temperature

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Concrete is one of the most popular and relatively cheap material used for radiation shielding in facilities containing radioactive sources and radiation generating equipment. Compared with other construction materials, concrete has a high shielding capacity against nuclear radiation and good long-term durability.

Factor which undoubtedly affects negatively the long-term durability of concretes is exposion to elevated temperature generated by nuclear facilities. The most affected is the inner face of the shielding concrete which is often exposed to direct heat from the reactor core.

In order to provide sufficient shielding properties a high-strength concrete with dense and compacted structure is required.

Additives which can contribute to the improvement of microstructure of cementitious composites are nanomaterials (especially nanosilica). Use of nanosilica as an additive to the cementitious composites is undoubtedly a future of concrete technology. Nanosilica due to its properties significantly improves mechanical properties and microstructure of cement-based composites.

In this study the influence of nanosilica on the mechanical properties of cement mortars subjected to elevated temperatures has been tested. Study has shown that nanosilica can be successfully applied as an admixture to concretes in order to reduce the negative impact of elevated temperature.

Acknowledgments: The research was funded by National Science Centre within 2014/13/B/ST8/03875 (OPUS 7)