

Effect of elevated temperature to radiation shielding of ultra-high performance concrete with silica sand or magnetite

ABSTRACT

The high density and strength of ultra-high performance concrete (UHPC) makes it suitable for radiation shielding, however, the deterioration of radiation shielding properties due to exposure to elevated temperature is a major concern. Hence this paper presents a study on the radiation shielding properties of UHPC after exposure to elevated temperature. It was found that the half-value layer and tenth value layer of both types of UHPC tested had increased by 76–82%, which was attributed to the excessive spalling and cracking that occurred. Magnetite was found to be slightly better than silica sand for radiation shielding.

Keyword: Elevated temperature; Magnetite; Radiation; Radiation shielding; Silica sand; Ultra-high performance concrete