

NEUTRON SHIELDING PARAMETERS OF SELECTED TYPES OF CONCRETE

Ksenija Janković^{1*}, Srboljub Stanković²

¹ IMS Institute, Belgrade, Serbia

² Vinca Institute of Nuclear Sciences, National Institute of the Republic of Serbia, University of Belgrade, Belgrade, Serbia

* corresponding author: ksenija.jankovic@institutims.rs

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ABSTRACT

In this scientific research, the definition of appropriate neutron shielding parameters is presented and the results of calculations or measurements of these parameters are presented for four selected types of concrete that are used in protection against neutron radiation. A method for calculating the fast neutron effective removal cross section is considered, which has its own specificities because it takes into account different types of interactions of fast neutrons with the materials from which the selected types of concrete are made. In addition, the values of macroscopic neutron absorption cross section for thermal neutrons, macroscopic neutron scattering cross section and total macroscopic neutron attenuation cross section, which includes scattering of fast neutrons and absorption of thermal neutrons, are presented for the selected types of concrete. Based on the analysis of neutron shielding parameters, type of concrete with coarse-fine aggregate limonite-limonite has a higher level of ability to protect against neutron radiation compared to concrete with coarse-fine aggregate magnetite-limonite and concrete with barite-barite.

KEYWORDS:

NEUTRON SHIELDING, CONCRETE, ATTENUATION, ABSORPTION, REMOVAL CROSS SECTION