عنوان مقاله:

Analysis and Construction of Serpentine-Galena Mixed Concrete as a Replacement of Barium Sulfate Concrete for the Shield of beam centers

محل انتشار:

اولین کنفرانس بین المللی تبادل اطلاعات علمی در زمینه مصالح و سازه های بتنی (سال: 1403)

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خلاصه مقاله:

In this research, the analysis and construction of Serpentine-Galena mixed concrete as a replacement ofBarium Sulfate concrete for the shield of beam centers. The analysis consists of various parameters ofconcrete shield, such as structural and nuclear parameters. The structural parameters include compressiveand tensile strength, which are experimentally determined. However, the nuclear parameters, includesmass attenuation coefficients, which are specified both via MCNP code and experimental methods.Firstly, neutron beam source and shield in wall concrete are simulated in MCNP code. Serpentine-Galenaconcrete is modeled in three various geometries, and the comparison has been performed amongst theirrelevant nuclear parameters. Finally, the most efficient geometry is specified, and the samples of thehomogeneous mixed concrete are constructed, regarding the ASTM standards. The so-called structuraland nuclear parameters are measured, practically. The mass attenuation coefficient is measured for athree-centimeter-width and sixteen-centimeter-diameter sample of Serpentine Galena and Barium SulfateConcrete, through both simulation and experimental results. The comparison of the results indicates ۱۴%increase and ۱۶% decrease for the case of Serpentine Galena sample, respectively. The results of standardtests of compressive strength revealed ۶.۵% higher compressive strength for Serpentine Galena concretein comparison with the same barium sulfate concrete, for the two test periods of ۷ and ۲۸ days. It isconcluded that the homogeneous Serpentine-Galena concrete could be an appropriate alternative forBarium Sulfate shields of .beam centres. The conclusions are beneficial in the shielding studies oftemporary waste management and the walls of beam centres

کلمات کلیدی:

mixed concrete, Nuclear Shield, Sulfate Barium Concrete, SerpentineGalena Concrete