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Natural Radioactivity and Radon Emanation of Concrete Containing

Fly Ash

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Abstract

The advantages of utilization of coal fly ash in concrete construction, as well as the technological and environmental problems caused by an elevated content of radioactive contaminants, are demonstrated. Radiological aspects and legislation issues are analyzed. The principles of the standardization approach to regulate natural radioactivity of building materials, which takes into account the radon emanation, are presented. As an example, an experience with the development and implementation of the Israeli Standard 5098 regulating radioactivity in building products is reported. The principles of this standard are analyzed and compared to the Radiological Protection Principles Concerning the Natural Radioactivity of Building Materials Principles of Radiation (RP-112) and other existing national standards and guidelines.

A special attention is given to the issue of natural radioactivity and radon emanation of concrete. It is shown that studies have reached different conclusions regarding the influence of fly ash on concrete exhalation rates; some claim that fly ash causes radon exhalation rates to increase, some others – decrease, or make no significant difference. It is difficult to draw any decisive conclusions from these individual studies, given the disparity in observations. Drawing direct comparisons between results presented in different papers is challenging because of varying methodologies, sample sizes, and experimental goals. The need in the systematic comprehensive study to consider different factors, which can influence the radon release from concrete, is emphasized.