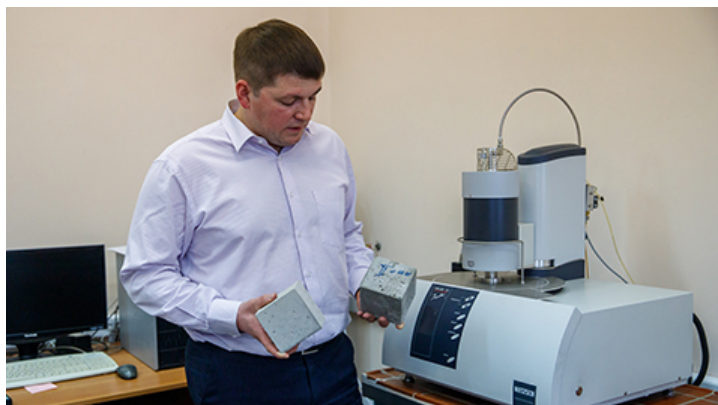



A Safer House

Scientists of the School of Engineering and Construction of Siberian Federal University have found out how to improve the protection of buildings from the penetration of soil radon and make them safer. They proposed a technology for reducing the radon permeability of cement concretes and mortars that are used in floors.



Based on the known effect of gypsum on hydration (cementation) of cement, the specialists conducted special studies and evaluated how the radon permeability of a cement-sand mortar changes after an additional layer of gypsum paste is applied to it. Cake, which is gypsum-containing industrial waste, was also used as a material for the extra layer.

The team carried out comparative tests in the laboratory of physical and chemical methods of the School. It was found that samples coated with gypsum-containing materials have a reduced radon diffusion coefficient. On average, the effective diffusion coefficient of mortars treated with gypsum or cake is almost 45% less than that of cement concretes, and nearly 69% less than that of cement-sand mortars.

“This is because an additional amount of calcium hydrosulfoaluminate forms at the interface between gypsum and cement-sand mortar. CHSA has a significant water content in its crystal lattice and, thus, its density is much lower than that of the main products of cement hydration (hydrosilicate and hydroaluminate). Forming in the pore space of the cement stone, CHSA fills the pores, which causes a significant decrease in radon permeability,” says **Igor Tarasov**, the author of the research and assistant professor of the School of Engineering and Construction, SibFU. 

The thickness of the additional layer of gypsum paste and cake does not increase its radon resistance. In order to achieve a sharp decrease in radon permeability, it is sufficient to ensure the conditions when a cement mixture forms a contact zone with a gypsum coating.

This technology can be used for flooring in basements. An additional layer can be applied both on and under the cement screed. This will help reduce the amount of soil radon, a radioactive gas that enters buildings, high concentrations of which are harmful.

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