

Simulation Of Radon Diffusion From Soil Into Buildings Considering Media Lead-through

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Abstract

The appearance of high concentrations of the radioactive noble gas Radon (Rn) in soil requires the installation of protection and mitigation mechanisms to hinder the Rn diffusion into buildings. In the present study, two schemes for the Rn diffusion reduction were explored with numerical methods. Generally, the migration of Rn is studied with the diffusion equation coupled with a sink term related to the radioactive decay of Rn. The partial differential equation was solved for typical geometries apparent in buildings using the finite element method (FEM). Using a cellar with a media lead-through and air inclusions in the concrete layer as the basic geometry, the Rn concentration profile was computed for an increasing altitude from the soil layer. Adding a Rn impermeable adhesive or a diffusion barrier to the basic geometry, the reduction of the Rn migration could be demonstrated with the performed FEM simulations.