

How to evaluate reuse pathways for NORM in building materials in the framework of COST action NORM4Building

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Abstract

Introduction: Various factors complicate the dosimetric assessment of building materials containing NORM residues: (1) Lack of secular equilibrium among natural radionuclides from decay series or state of transient equilibrium only is very common among NORM residues originating from different industrial processes. Therefore additional information is required on the changes of natural radionuclides composition and activity concentration in building materials made from NORM residues in the course of time and their effect on usefulness of particular NORM residues. (2) Radon exhalation is a key process influencing quality of the construction materials. (3) The radiation attenuation factor for different kind of construction materials is a key parameter for modelling of exposure to external radiation inside. (4) In addition when modelling the indoor air quality the co-existence of radiological and toxic substances, such as by example heavy metals, needs to be considered.

Objectives NORM4BUILDING: By bringing together experts on all (chemical, physical, ecological, economical and radiological) aspects of materials, the COST Action 'NORM4BUILDING' aims to evaluate the reuse of NORM residues in new tailor-made sustainable building materials considering the impact on both external gamma exposure of building occupants and indoor air quality. By improving radiological impact assessment models for the reuse of NORM residues in building materials the new COST Action aims to further stimulate justified uses of NORM residues in different types of newly developed building materials.

Evaluation of practices: Instead of trying to build one model for gamma and radon dose modelling, two separate models are being developed by Working Group 4 of the NORM4Building network. Working group 4 uses experimentally determinable parameters, such as the activity concentration of the naturally occurring radionuclides and Rn exhalation, of the NORM containing building blocks as input for dosimetric modelling. In a next step the models are further developed to account for the actual structure of the dwellings and important influencing parameters such as the ventilation rate. The approach is to consider the end of life related aspects of these building materials by modelling the influence of real life circumstances (decomposition, crack generation, porosity,...) on radon exhalation and to separately evaluate the potential radiological and chemical leachability of the NORM containing

building material/s. Working Group 3 develops and evaluates measurement protocols and pre-standards to provide reliable, standardized input for the gamma and radon dose modelling. Working group 1 and 2 of the COST action combine technical, chemical and radiological parameters of the NORM containing building materials in a database that can then be used as input for the models build by WG 4 in order to evaluate the use of the NORM containing building materials.
