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Radon levels and indoor air quality after application of thermal retrofit measures—a case study

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Abstract
This study was conducted to evaluate the influence of thermal retrofit on radon levels in workrooms, and to determine whether the radon concentration in the building changes after the application of retrofit measures. In the first survey, digital Airthings Corentium Home radon detector was used for 1-month radon measurements during the heating season 2018/19. The daily averaged radon concentrations varied from 37 to 573 Bq/m^3 for 10 selected workrooms, while hourly averaged radon measurements showed extreme variations from 6 to 1603 Bq/m^3 due to radon fluctuations. In second survey, passive radon technique based on charcoal canister test kit was conducted in all basement workrooms in spring 2021. The averaged radon concentrations grouped according to flooring type in workrooms were 327 Bq/m^3 for parquet, 227 Bq/m^3 for ceramic tiles, 146 Bq/m^3 for vinyl flooring and 71 Bq/m^3 for laminate. Besides thermal insulation and airtight windows, noticeable differences in indoor radon concentration within the renovated building are primarily caused by different types of flooring. It includes various types of insulation from the ground/concrete slab: laminate, parquet (wood blocks), vinyl flooring, and ceramic tiles. Detailed analysis point out that laminate is more efficient way for radon protection than other types of flooring. An efficient ventilation system should be installed to avoid increasing occupational radon exposure and to provide healthy and comfortable indoor environment.

Keywords Building · Flooring type · Indoor radon · Thermal retrofit · Workroom

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