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RADIATION EXPOURE FROM NATURALLY OCCURING RADIOACTIVE MATERIALS IN SOME BUILDING MATERIALS IN THAILAND

Building materials become an important factor for living condition of Thai people in an accommodation such as high temperature and monsoon resistance. The industrials nonstop attempt to improve climate change tolerant and more ecological-friendly materials which promise to reduce energy consumption and carbon dioxide emission. The producers attempt to incorporate more supplementary cementitious materials such as industrial fly ash and ground granulated blast furnace slag into their final products. However, the fly ash could replace cement with partial and provide eco-friendly construction material. The use of fly ash may increase the potential risk of exposure to radiation. Due to gamma and Radon exposure, the important radionuclides for building materials are 226Ra, ^{232}Th and 40K. However, the regulation for natural radioactivity in building materials currently is not enforced in Thailand.

This paper presents preliminary results of a study on radiological characterization of seven building material samples including cement, lightweight concrete, gypsum plates, plywood, fine sand, coarse sand and stone flake. The natural radionuclides content was determined using γ-ray spectrometry with HPGe detectors. The samples were stored in hermetically containers for 30 days, the measurement for each sample was 50 h. These obtained results were used for calculation of the radiologically qualification parameters (F1 and F2) according with the Instructions NO.234 and NO.234/95 of the Polish Institute of Building Technology (Recommendations for investigating the natural radioactivity of building raw and materials). The results showed that ^{226}Ra, ^{232}Th and ^{40}K concentrations varied from 2.19 to 57.47 Bq·kg-1, 0.08 to 29.21 Bq·kg-1 and 22.27 to 801.01 Bq·kg-1, respectively. The calculated values of F1 in the building samples ranged from 0.01 to 0.48 and F2 (^{226}Ra concentration) from 2.19 to 57.47 Bq·kg-1. In the study building material samples, both F1 and F2 were significantly lower than recommended values from the Institute of Building Technology (≤ 1 and ≤ 185 Bq·kg-1, respectively). These building materials were safe and can be used for construction.

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