

International Conference on the Management of Naturally Occurring Radioactive Materials (NORM) in Industry

VIRTUAL EVENT

International Conference on

Management of Naturally Occurring Radioactive Material (NORM) in Industry

19–30 October 2020

#NORM2020



Contribution ID: 89

Type: Poster

INVESTIGATION OF PRIMORDIAL RADIATION EXPOSURE LEVEL IN BUILDING MATERIALS USED IN ETHIOPIA

Abstract

The concentrations of natural radionuclides (^{226}Ra , ^{232}Th and ^{40}K) in commonly used building materials (clay, gypsum, pumice sandstone, limestone brick, clinker and cement), the raw materials of cement collected from all cement producing factory and various manufacturers in Ethiopia were determined by gamma-ray spectrometry using an HPGe detector. The results showed that the mean concentrations of ^{226}Ra , ^{232}Th and ^{40}K in all studied samples comparable to the typical world average values of 50 Bq kg^{-1} , 50 Bq kg^{-1} and 500 Bq kg^{-1} , respectively. To evaluate the potential radiological risk to individuals associated with these building materials, various radiological hazard indicators were calculated. The radium equivalent activity values for all samples were found to be lower than the recommended limit for building materials of 370 Bq kg^{-1} .

For all samples, the values of the alpha index and the radiological hazard (external and internal) indices were found to be within the safe limit of 1. The mean indoor absorbed dose rate was observed to be below the population-weighted world average of 84 nGy h^{-1} , except brick and pumice samples and the corresponding annual effective dose for all samples fall below the recommended upper dose limit of 1 mSv y^{-1} . For most investigated materials, the value of the gamma index were found to be less than 0.5 mSv y^{-1} , indicating that the gamma dose contribution from the studied building materials is comparable with the exemption dose criterion of 0.3 mSv y^{-1} and complies with the upper dose principle of 1 mSv y^{-1} .

Primary author: Mr ZEGE, Eshetu

Presenter: Mr ZEGE, Eshetu

Session Classification: Session IV - Characterization in Industrial Facilities and in the Environment

Track Classification: NORM Characterization, Measurement, Decontamination