Abstract

Inspection of natural radioisotopes in built environments

The author was engaged in his work in the inspection of natural radioisotopes in built environments and rated the dose the population can have received. The measurements were made in Sopron, Hungary; he inspected the background radiation of peripheries as well as living buildings' radiation properties.

The author prepared the background radiation map of Sopron. He worked with a grid of 100m resolution; he made measurements of Gamma-dose-rate at more than 700 locations. Based on these data, the radiation map covering the whole area of the town was made using the DigiTerra software. During his measurements, he found the locations in the town where radiation is high and determined the cause. He ascertained that in the neighbourhood of the old coal power plant there is a remarkable Gamma-dose-rate increment due to spilling of scale and ash.

He inspected furthermore the natural radioisotope concentration of some building materials; he recognised the tight correspondence between the higher ^{226}Ra content of slag and the Gamma-dose-rate of town houses.

In the course of his inspections in town houses he determined that slag from the coal mined in the mountain Bakony was used as isolation also at locations further away from town Ajka. In Sopron, the higher values of Gamma-dose-rate were measured in the town houses where slag originated from thermal power stations.

Besides Gamma-dose-rate measurements, also Ra-concentration was measured with nuclear track-etch detectors. He used the measuring system of RADOSYS Ltd. During his measurements, the author paid special attention to the flats built using slag and those in the Nádor-magaslat in Sopron. Based on his measurements he diagnosed that the some inhabitants in the flats on the northern side of the Nádor-magaslat suffer a dose of over 40mSv. Moreover, he appointed that due to the fully incalculable presence of Ra its concentration cannot be forecast: measurements are necessary to determine it in each case.

Finally, he compared the measured values with the demographic data and allocated the locations and flats where inhabitants face a higher yearly dose.