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When the mean value does not mean what is really happening: The case of indoor radon concentration measured with track detectors in working places

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Content

The problematic involved with the existence of great values for the indoor radon concentration is regulated by imposing some limits in each country as the values considered as safety levels to preserve human health. In general, large surveys (with a great quantity of samples) for indoor radon concentrations in dwellings are measured exposing passive detectors, such as track detectors, for a given time (for example, three months). The annual average concentration is then estimated taking into consideration the mean value obtained for the exposure time. This value so obtained is then compared with the limits given by the corresponding health authority and, if necessary, some mitigation actions are required to diminish the dose to the affected people. Considering that a typical person could spend during his journey a third part on one day in the working place, measurements of indoor radon concentrations are also necessary. Studies have been performed in this type of sites [1]. In this way, when large surveys are planned to study a great number of samples of population, track detectors are also usually used for the determination of indoor radon concentrations. But when the measurements are performed in working places, other considerations must be taken into account. The problem arises in some working places showing radon concentrations with values above the safety limits. In these cases mitigation actions should be applied. However, studying some of these working places with more detail using continuous radon monitor detectors and determining the hourly concentration, great variations have been found. In these cases only the mean values measured into the time of the normal journey must be considered, because this is really the time spent by the people inside the working dependences. Great differences between both values for concentration have been found in some cases. In order to correctly estimate the real dose received by workers, if the mean value obtained with track detectors is above the safety limits then, studies taking into consideration only the time affecting the real stay of the persons there must be considered. The radon concentration should be monitored with the greatest detail in this case. Passive (and then averaged) track detectors should be avoided or only considered as primary indicators. But the great problem is then the (some orders of magnitude) difference in the price of continuous radon monitor versus track detectors. In a study performed to mitigate radon effects in working places, several examples were found in which ventilation was an adequate action. The average obtained measuring with track detectors indicated high values for the estimated dose received by workers. However, only considering really the time spent by the persons in their working place, as measured with a radon continuous monitor, the estimated dosed were not so high. [1] Martín Sánchez, A., de la Torre Pérez, J., Ruano Sánchez, A.B., Naranjo Correa, F.L. Radon in working places in Extremadura (Spain). J. Environ. Radioact. 107, 86-91 (2012).

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