Radon situation in workplaces in Romania

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Radon in workplaces

- Systematic measurements of indoor radon only in workplaces from buildings were not performed in Romania.

- At present, comprehensive indoor radon studies exist without specification of the type of buildings.

- The published results were not directly related to the concentration of radon in workplaces, but refer to radon inside of buildings (homes, workplaces, etc).
Radon – Results in buildings

- Several regional campaigns of indoor radon measurements were conducted at this date.

- One example is a study performed of "Babeș - Bolyai" University of Cluj Napoca in the period 2013 - 2016 in approximately 7000 buildings in 16 counties from Transylvania (central, west and north-west part of Romania) totalizing 41% of Romanian territory.

- The maps were plotted on a reference grid with the resolution of 10 km x 10 km. In each grid were performed, on average, 5-10 indoor radon measurements.

- The indoor radon concentrations for Romania range from 10 to 3370 Bq/m$^3$ with an updated preliminary arithmetic mean of 142 Bq/m$^3$.

- About 25 % of the investigated dwellings exceed the threshold of 300 Bq/m$^3$. 

PN II Nr.73/2013 Project:
*Radon map (residential, soil, water) in 16 districts from Center, West and North-Western Romania (2013-2016)*
Radon concentration in some kindergartens and schools

- The measurements were conducted in 48 schools located in central part of Romania (Sibiu, Cluj and Alba counties).
- The measurements were carried out between August 2006 and February 2008, during summer and winter.
- Over 80% of the schools buildings, where measurements were done, were built after the sixties. Their construction plan presents a concrete structure with walls of clay or tuff bricks.
- The remaining 20% of the investigated schools are older buildings that were completely built using bricks of clay or bricks of tuff.
- The number of rooms per building ranged from a few units to many tens and the number of floors from two to four. Usually air conditioning systems are not installed in schools.
- Data range between 15 and 860 Bq/m³, showing an annual mean of 134 Bq/m³.
Radon – Results in caves

- There are some studies performed in 7 touristic caves in the western half of Romania’s most significant karst regions and also in Turda Salt Mine.

- These papers report elevated radon levels in caves and an increased associated risk for guides and workers, with radon concentrations ranging from 63 to 2946 Bq/m$^3$.

- Instead, radon levels in Turda Salt Mine were found to be at the limit of detection.

- Since there is no specific legislation in Romania about radiation dose in caves, it is needless to say that none of caves has not yet implemented any protocols for monitoring indoor air quality.
Residential radon map in Romania

- Map contains radon measurement results obtained until November 2015 (a no. of 2745 measurements performed in 640 cell from a total number of 1862 cell, from these 16 counties).
- Arithmetic mean – 140 Bq/m$^3$
  Max. – 2592 Bq/m$^3$
- At the end of 2016 a radon map will be ready for 16 counties (41% from Romanian territory).
- At the end of this project (2016) we will have results of the radon evels for both residential spaces and for workplaces.
- In March 2016 the nuclear and radiological regulatory authority (CNCAN) established a Working Group for Radon which together with other authorities (Ministry of Health, Ministry of Environment, etc.) and other institutions (universities, institutes and research centers), will perform a radon map for the rest of Romania (Surface: 238391 km$^2$; 4620 (10 X10km) total cell)
Thanks you!

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