RADON - THE SILENT NATURAL MENACE.

By
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Radon is a natural radioactive gas that escapes into the atmosphere from rocks in the earth. When we breathe, the radioactivity enters our lungs and can lodge there, irradiating the tissue at close quarters. This irradiation carries a low level risk of causing lung cancer. In some houses radon levels can build up to an extent that carries an unacceptable risk. It is a straightforward matter to measure the radon level in your home and, if it is unacceptably high, you can take steps to lower the level without incurring too much expense.

Radon is present everywhere in the air. It is no more possible to completely avoid breathing radon than it is to avoid breathing air. Radon contributes over 50 per cent of the total radiation dose received by the Irish public every year. It is therefore, easily, the single biggest source of exposure to radiation encountered by the public. (The average Irish person receives at least 1,500 times more radiation from radon each year than he/she receives from Sellafield). On the other hand, radon is the only form of natural radiation over which we have any control and we certainly can take steps to ensure that we do not breath excessive amounts of radon in indoor situations.

Uranium is a radioactive element naturally present in rocks. Rocks of igneous origin such as granite have greater amounts than sedimentary rocks such as limestone. Uranium breaks down into radioactive daughter products, one of which is the gas radon. Radon levels are expressed in terms of becquerels per cubic meter (Bq/m3) [3 is superscript]. The gas escapes from rocks into the air where it is massively diluted to low background level - 4 to 10 Bq/m3.

Radon enters our houses mainly from the soil underneath the foundations. Small amounts can enter the house from the construction materials in the house itself and some can also be carried in by the water supply. Having entered the house, radon does not find it easy to escape back to the outside because of restricted ventilation. Restriction of ventilation is exacerbated in the modern home. When the oil-crisis hit the West in the 1970s a big drive was initiated to conserve energy. Measures such as double glazing, draught-proofing, attic insulation, etc. are effective in reducing heat loss but they also reduce ventilation rates. In such a modern house, there is a greater probability that radon will reach high levels than in the old traditional draughty house, with 'rattley' windows and a fireplace in every bedroom.

In the mid-1980s a nationwide study of indoor radon, carried out by Dr. Jim McLaughlin of U.C.D., found that the average indoor radon concentration in Ireland was 60 Bq/m3 and that 4 per cent of the housing stock had radon levels that exceeded 200 Bq/m3. An indoor radon level of 200 Bq/m3 has been adopted by the Government as a reference level, i.e. a level at or above which remedial action is recommended to reduce radon levels. The average lifetime risk of contracting lung cancer in Ireland is 3 per cent. An indoor radon level of 200 Bq/m3 almost doubles this risk. This is considered to be unacceptable in view of the fact that effective measures for radon remediation are available.

The U.C.D. survey showed the highest levels of radon in the West, principally in Galway and in parts of Mayo. Higher levels were also found in Cork City and in parts of Clare. In 1989, the Radiological Protection Institute of Ireland (RPII) began a programme of detailed radon surveys. The first surveys were carried out in areas shown by the U.C.D. study to have higher radon

levels. The first detailed survey was carried out in the West and in 1991 a detailed survey was carried out in Cork City. The RPII continued from there to carry out radon surveys around the entire country, a project which is now essentially completed. Some of the results give cause for concern.
The RPII has estimated the percentage of housing stock that exceeds the reference radon level in each 10km square of the country. Calculations have been made for 679 10km square and in 73 of these squares (10.8%) over 20 per cent of housing stock is estimated to exceed the reference radon level. Generally, higher indoor radon levels have been noted in counties Galway, Mayo, Clare, Sligo, Wicklow, Carlow, Kilkenny and Wexford. For example, 30 per cent of houses surveyed across Galway City have radon levels that exceed the reference value. In Cork between 10 and 20 per cent of the housing stock in a 10km square centred on the southeast part of the city and suburbs has radon levels greater than the reference level.

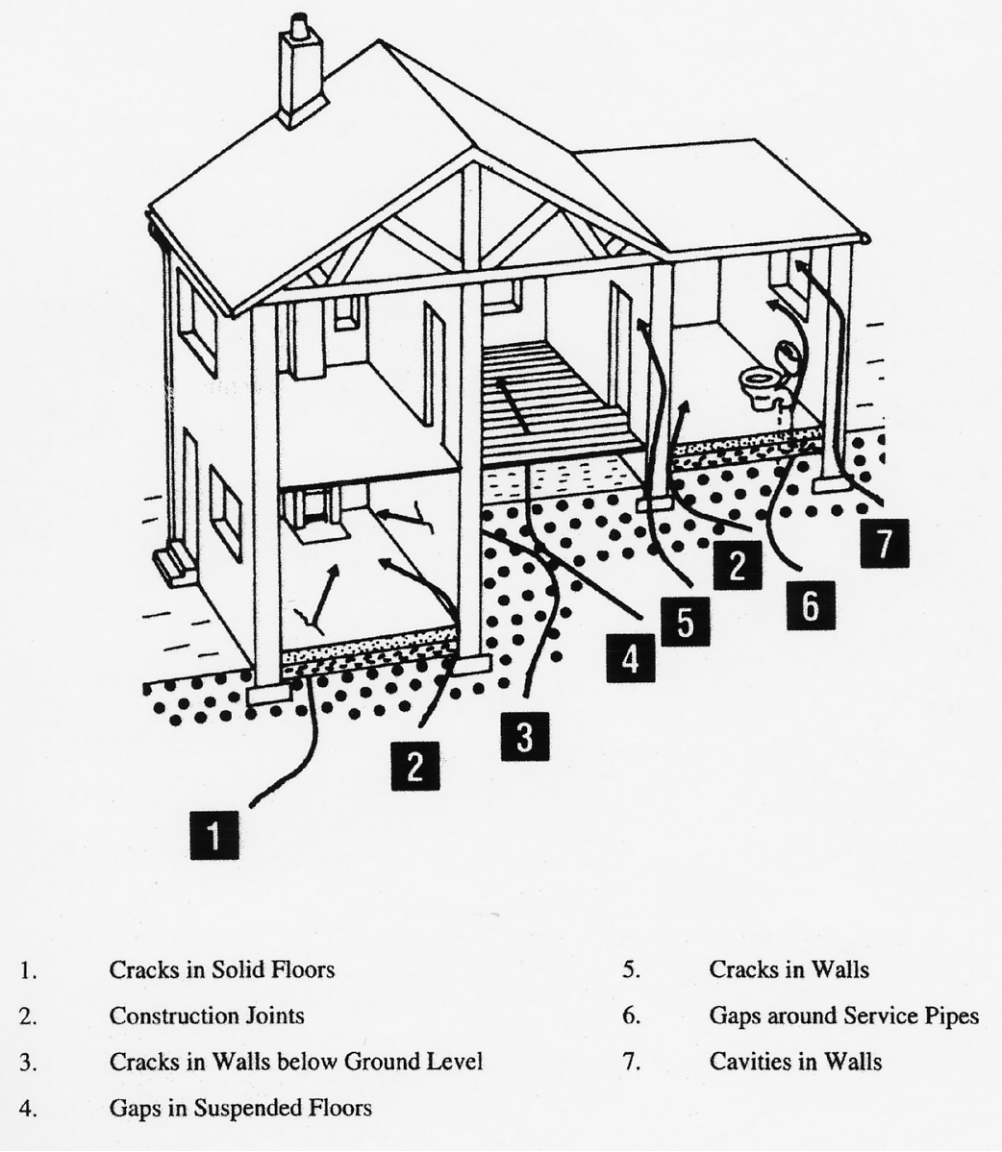
It is certainly advisable to have your home checked for radon levels. You can do this by applying to the Radiological Protection Institute of Ireland, 3 Clonskeagh Square, Clonskeagh Road, Dublin 14, (Tel. No. 01-2697766). The RPII also operates a Radon Free Phone (1-800-300600). If the radon measurement results indicate that you have higher radon levels, you can get advice on radon remediation from the Department of the Environment. You can also get easy-to-understand information on both radioactivity and radon by writing to ENFO, 17 St. Andrew Street, Dublin 2, and asking them for Briefing Sheet No. 15 on Radon and No. 7 on Radioactivity.

It is more complicated to reduce radon levels in an existing house than it is to build in radon protection as a new house is being built. In the latter case it is a straightforward matter, involving the positioning of sumps under the foundation and venting these to the outside through PVC pipes. Also a continuous thick plastic sheeting is laid down to prevent radon from getting into the house. This work costs several hundred pounds. It costs several times more than this to treat a radon problem in an existing house.

The building regulations in Ireland now require that all new houses under construction in high radon areas must be fitted with in-built protection against radon. This involves installing sumps and plastic barriers. A high radon area is an area in which the probability is 10 per cent or more that an untreated house will exceed the radon reference level. New houses under construction in areas not classified as high-radon areas must have sumps fitted.

Finally, studies indicate that smokers are more susceptible to radon than non-smokers: - another reason to stop the habit if you are a smoker.

(See illustration below.)



1. Cracks in Solid Floors
2. Construction Joints
3. Cracks in Walls below Ground Level
4. Gaps in Suspended Floors
5. Cracks in Walls
6. Gaps around Service Pipes
7. Cavities in Walls

The various ways in which radon enters the typical home.

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