

Is there a killer in your midst?

Martin Freeman, Managing Director of ProTen Services Ltd, explains the methods that can be used to reduce high concentrations of radon gas and the dangers of employing non-specialists

Radon, the naturally occurring radioactive gas, is fast becoming a major concern for local authorities, and is particularly relevant to building control departments, who must ensure that both new builds and renovation projects adhere to Building Regulations.

The gas is formed during the decay of uranium in the ground. When it permeates into open air, it is quickly diluted to harmless concentrations, but if it rises into a building, high concentrations can accumulate which pose a serious threat to the occupants.

Each year in the UK approximately 2500 people die from lung cancer, developed as a direct result of exposure to radon. The gas accounts for the second greatest number of lung cancer cases in the UK, after smoking.

Given the deadly consequences that could result should an individual be exposed to high levels of radon, Building Regulations contain guidance on providing protection for new builds. It must also be recognised that any alterations to existing buildings, such as the construction of an extension or works in the basement, can affect radon passage into the property.

Radon is drawn into buildings through a process called advection; the pressure inside a building is normally lower than outside, so gases from the soil are literally sucked in. Any modifications

made to the structure or use of a property, no matter how small, are likely to change the pressure inside it, and thus have the potential to increase the rate at which radon is drawn in.

When such an alteration is made to a building, it is advisable that a radon test be carried out to assess whether the property contains elevated levels of the killer gas. The only way to assess the level of radon in a building is to use a specialist detector. To take seasonal variations into account, this should ideally be left in place for a three month period before being sent to a laboratory for analysis. Tests are relatively inexpensive, and if there is an urgent need for an early indication of radon levels, 10 day tests can also be carried out.

The Health Protection Agency (HPA) publishes maps of radon Affected Areas, which are those areas where it is more likely that properties with high levels of radon will be found. This does not mean that a property elsewhere will not be affected by radon, and the HPA has recently advised that all basements should be tested, regardless of the property's geographic location.

Should high levels of the gas be found (over 200 bq/m³ in the home or over 400 bq/m³ in a workplace) actions should be taken to reduce the concentration.

In the absence of a proper understanding of the science of radon, well-intentioned but uninformed measures can make the problem worse, rather than better. In the early days of radon mitigation,



ProTen Services' unique basement solution provides protection from radon and moisture ingress

“THE ONLY WAY TO ASSESS THE LEVEL OF RADON IN A BUILDING IS TO USE A SPECIALIST DETECTOR”

techniques such as attempting to seal all cracks and gaps in the building and altering ventilation were advocated. Today it is recognised that these methods are unreliable and not practicable, and more sophisticated remedial action must be taken.

Increasing ventilation, particularly through the use of extraction fans, can in fact lower the pressure inside the building further, thus escalating the rate at which radon is drawn in and increasing its concentration.

The two most effective methods of radon mitigation in existing buildings are positive pressurisation and retrofit radon sump systems. A positive pressure machine can be installed in a property to raise the air pressure inside the building. Not only does this force out the radon currently trapped inside the building through the structure's weak points, but a pressure buffer is formed, preventing any further gas from infiltrating.

An alternative or complimentary course of action is to retrofit a sump underneath the property. A void is created beneath the building, and a pipe leading from the sump and away from the property is fitted with an inline fan. This void becomes the lowest point of pressure, so any gas in the soil automatically accumulates here and is then diverted away from the building through the pipe.

It should be remembered that any new extension to a building will be subject to



Radon detectors are discreet and simple to fit in position

Why radon should always be handled by specialists...

The owners of a domestic property in Oxfordshire recently called in ProTen Services when they wanted to convert their double-vaulted cellar into a playroom and workshop.

Already aware that their property contained high levels of radon, they had initially employed a local contractor to deal with the issue. He had installed an extract fan in the basement, however when the concentration failed to lower, and his next suggestion involved £80,000 worth of disruptive works to their Listed building, the homeowners contacted ProTen.

Suspecting that the extract fan was in fact worsening the problem and

accelerating the rate at which radon was being drawn into the cellar, ProTen switched off the system. The radon concentration of more than 2,000 bq/m³ subsequently halved. ProTen then designed a specialist solution, combining positive pressurisation and a cavity drainage membrane system, which would not only bring the radon concentration down to an acceptable level, but also ensure the cellar remained protected from moisture ingress.

The total cost of works was less than a quarter of the non-specialist's design, and when complete, the radon level was just 63 bq/m³. The owners were left

with valuable extra space, safe in the knowledge that their family would not be put in danger by using it.



The wrong method of ventilation can worsen a radon problem

Building Regulations and may require radon protection to be installed, in addition to potential remedial works in the original property.

Radon mitigation is a specialist and potentially life-saving area of construction, where training and sophisticated accuracy are imperative to its success. It would be unwise to place this responsibility in the hands of a

general contractor.

ProTen Services Ltd have developed a CPD presentation on the topic, available free of charge to all local authorities. Evening seminars have been arranged at the following locations: Sunderland – 8 July 2008; Northampton – 9 July 2008; Bristol – 23 September 2008.

ProTen Services would also be happy to arrange in-house

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sessions at your convenience.

Those interested in attending should contact rebecca.kench@protenservices.co.uk for further information.