

RESPONSES TO RADON REMEDIATION ADVICE

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Abstract

It is estimated that around 100,000 homes in the UK exceed the Action Level of 200 Bq m⁻³. About 20,000 of these homes have been identified and the householders have been advised to reduce the radon levels. As part of an initiative to encourage remedial action a short questionnaire was sent to around 10,500 houses with radon at or above the Action Level to obtain data on any remedial action taken and the factors which influenced the decision. The results showed that around 20% of householders who replied had taken some form of effective remedial action and that cost was the major consideration. The best estimate of the overall rate of remediation is about 10%.

1 Introduction

Doses from radon are the largest component of the average radiation exposure in the UK and are estimated to account for about half of the annual dose of 2.6 mSv received by a typical member of the population (1). The majority of the exposure to radon occurs in dwellings as most people spend most of their time at home. Levels in homes can vary, and an extensive survey of the radon levels in UK dwellings has been carried out. The UK Government Action Level for radon in dwellings is set at an annual average whole-house concentration of 200 Bq m⁻³. Householders with measured concentrations at or above this Action Level are advised to reduce the level in their homes and given information on mitigation techniques (2).

To date, measurements have been made in over 200,000 homes in the UK as part of a programme supported by Government Departments (3). One area which has been found to have a higher proportion of homes above the Action Level is the southwest of England and in particular the counties of Cornwall and Devon where it is estimated 36,000 homes are affected. Householders who had measurements of radon at or above the Action Level in these two counties were surveyed by postal questionnaire to obtain information on the types of remediation, if any, that they had undertaken.

2 Survey

Some 10,500 householders were surveyed by questionnaire. Questions included the remedial method used, the costs incurred and also reasons why they had decided not to undertake mitigation. Multiple choice reply was possible for several types of method or reason and householders could add any points that were not covered by the questionnaire. Data were obtained from over 5,000 completed questionnaires and then analysed. Around a third gave data on remedial measures and the remainder gave reasons for not taking advice to remediate.

Information on remedial measures used by the householders indicated that around 20% of those who replied had used an effective remedial measure such as underfloor depressurisation, increased underfloor ventilation, positive pressurisation of the living space or permanent additional ventilation. Multiple methods were employed by many householders, some having used five different types of remediation. The types of effective remedial measure used are shown in Figure 1. The costs of installing each type of remedial measure ranged up to £6000, but over 75% of householders spent less than £1000. The average cost incurred was about £700.

3 Remediation

The methods of remediation usually employed in homes fell into two main categories: those which prevent the radon from entering the living area of the house, for example underfloor depressurisation (sump), increased underfloor ventilation or sealing of cracks or other entry points in the floor and walls; those which reduce the level of radon in the dwelling, for example permanently increasing ventilation by the installation of trickle vents in windows. Sealing alone is not recommended but should be combined with another effective method. Householders are encouraged to choose the most effective methods of remediation. The proportion of householders installing underfloor depressurisation and positive pressurisation is banded by original radon level in Figure 2. This illustrates that the proportion of householders using these effective methods increases with radon level.

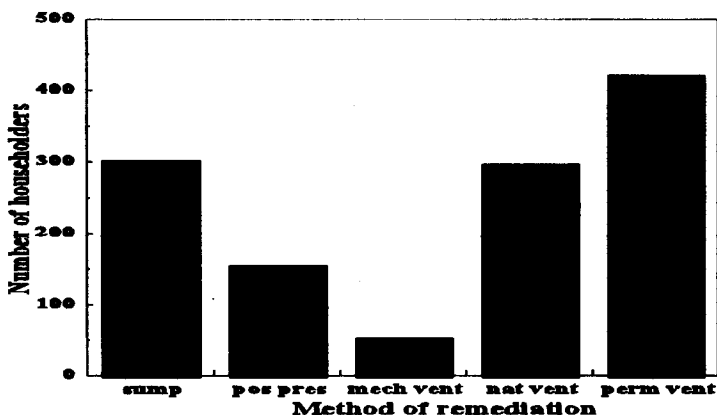


Figure 1 Types of effective remedial measure used

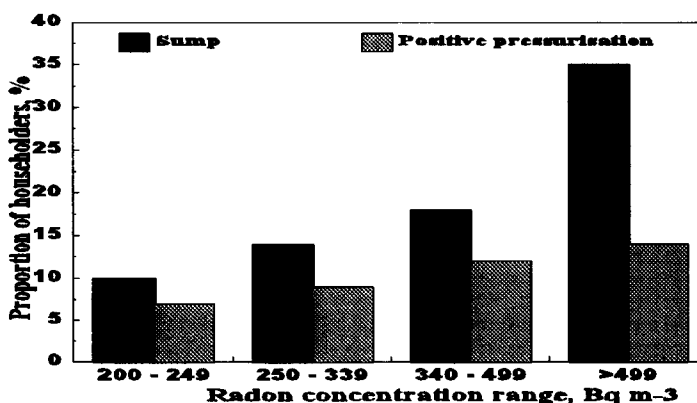


Figure 2 Comparison of the proportion of householders using the most effective remediation methods with radon level

The most effective form of remediation, installation of an underfloor depressurisation system or radon sump, was chosen by over 300 householders, with some of these using additional measures such as sealing. Underfloor depressurisation is estimated to reduce the radon level by about 90% on average (4). The use of this method should reduce the average concentration well below the Action Level, with an estimated reduction in the average level of around 700 Bq m⁻³. The average cost to install this type of system was found to be £950, but for those householders who installed the system themselves the cost reduced to about one third or £300, making it very cost effective.

4 No action

Of the 5,000 householders who provided information, around 4,000 gave reasons why they had not carried out remediation. The main reasons can be divided into four categories: cost; no perceived risk; difficulty in implementing remediation; soon to move house. Some householders felt that the responsibility lay with the landlord or that taking the remedial measures would cause too much upheaval. The majority of householders gave more than one reason for not taking action. The distribution is shown in Figure 3.

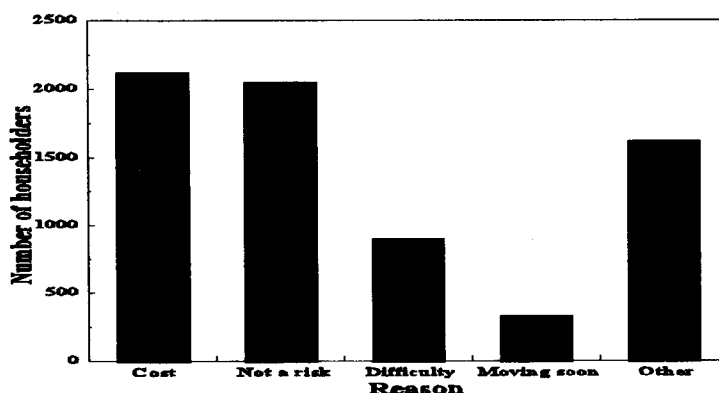


Figure 3 Reasons given for not taking remedial action

Over 50% cited cost as one of the reasons for not remediating and a similar percentage did not perceive there to be a risk. However, around 700 householders, some 17% of those who gave reasons for not remediating, did indicate that they still intended to remediate.

5 Conclusions

Of 10,500 householders with radon above the UK Action Level of 200 Bq m^{-3} who were given advice to reduce their radon levels, around 20% of the half who responded had used at least one method of remediation which would reduce levels by 50%. Thus the overall remediation rate, including householders who did not respond, is around 10%.

The methods chosen by the householders reflect the radon level in their homes, those with higher levels having used more effective methods. This suggests that the provision of clear and firm advice is an important part of any radon programme. Over 300 householders installed the most effective form of mitigation, underfloor depressurisation, with an estimated average reduction in their level of around 700 Bq m^{-3} .

The average cost of mitigation was around £700, with the most effective method of remediation, underfloor depressurisation, costing around £950 on average. Costs are tending to fall as experience is gained. Costs were reduced significantly if remediation was carried out by the householders themselves.

For householders who had not remediated, a major factor was the cost involved, but, radon was not perceived as a risk by many householders despite the clear information provided by Government and NRPB. This phenomenon of denial is well known (5) and indicates the need for more perceptive ways of providing advice and encouragement.

6 Acknowledgement

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