Building Control and Radon

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What am I going to talk about?

• What is radon and why is it a problem?
• How big is the problem in Ireland?
• What have we achieved to date?
• What is not working?
• What is our vision?
• What impact have the Building Regulations had on radon in Ireland?
• What does the data tell us?
• Where do we go from here?
What is Radon?

• Colourless, odourless, tasteless, radioactive gas
• Comes from uranium which is present in tiny quantities in all rocks and soil
• Radon is everywhere – outdoors radon is not a problem
• Can enter buildings from the ground through cracks and gaps and can build up to very high levels
• Known to be a problem since the 16th Century for miners
• Known to be a problem in homes since the 1980s
How does radon build up in homes?
Why is radon a problem?

- Group 1 carcinogen - same as tobacco smoke and asbestos (WHO)
- Forms particles that can lodge in the lung resulting in a radioactive dose
- 150-200 deaths annually (10-15%)
- 2nd cause of lung cancer after smoking
- Risk 25 times greater for smokers
- 56% of total dose to average Irish
Distribution of Radiation Doses in Ireland

- Radon: 56.5%
- Gamma radiation from soils: 7.6%
- Cosmic radiation: 8.7%
- Radioactivity in food: 6.1%
- Thoron: 7.1%
- Medical: 13.7%
- Artificial: 0.4%
What is the scale of the problem in Ireland?

- 11,319 homes measured 1992-1999
- Percentage of homes above 200 Bq/m³ predicted for each 10 km grid square
- Squares predicted to be above 10% are designated High Radon Areas
How do levels compare internationally (WHO 2009)?

Mean radon concentrations OECD countries

Worldwide average 39 Bq/m³
Results to date

- Almost 45,000 home measurements (RPII)
- National Radon Survey estimated 91,000 homes above 200 Bq/m$^3$
- So far about 5,500 homes above 200 Bq/m$^3$ have been identified
- Leaving 85,500 unidentified homes with a radon problem
What have we achieved to date?

- The National Radon Survey quantified problem since 1997
- Radon addressed in Building Regulations since 1998
- All school tested and remediated
- Significant progress made on testing and remediation of social housing
- Significant public awareness efforts resulting in a growing public awareness
- Progress on including radon in workplace H&S framework
- Large body of guidance documents, research, etc
- Widespread acknowledgement of the problem among key stakeholders (RPII, DEHLG, HSE, HSA, Local Authorities)
What has not happened?

• Testing rates for private housing remain stubbornly low (< 5% problem houses identified)
• Remediation rates for private houses also low (≈ 10 - 20% of identified houses)
• While public awareness of radon is high understanding of the issues is low
• While radon prevention in new build has reduced radon levels, more remains to be done
• Policy on radon not perceived to be Government led
What is our vision?

1. Radon prevention well integrated into mainstream building practice and all houses tested post construction
2. Exchange of information on radon testing happens routinely during conveyancing
3. Clear requirements in place for rental sector
4. Radon integrated into workplace Health and Safety framework
5. Information on radon available to general public
Impact of Building Regulations

Radon in all homes in North Cork High Radon Areas

<table>
<thead>
<tr>
<th>Survey</th>
<th>Homes measured</th>
<th>Geometric mean Bq/m³</th>
<th>Arithmetic mean Bq/m³</th>
<th>Maximum Bq/m³</th>
<th>No homes &gt;200 Bq/m³ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Regs (1999-07)</td>
<td>101</td>
<td>116</td>
<td>158</td>
<td>743</td>
<td>19 (19%)</td>
</tr>
<tr>
<td>Pre Regs (1980-1998)</td>
<td>143</td>
<td>146</td>
<td>306</td>
<td>2133</td>
<td>50 (35%)</td>
</tr>
</tbody>
</table>
Impact of Building Regulations

Radon in a 10 km grid square (near Mitchelstown)

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</tr>
</thead>
<tbody>
<tr>
<td>Post Regs (1999-07)</td>
<td>36</td>
<td>186</td>
<td>223</td>
<td>537</td>
<td>14 (39%)</td>
</tr>
<tr>
<td>Pre Regs (1980-1998)</td>
<td>38</td>
<td>614</td>
<td>739</td>
<td>2133</td>
<td>35 (92%)</td>
</tr>
</tbody>
</table>
## Impact of Building Regulations

### Radon in homes in Tralee (private homes)

<table>
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<tr>
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<th>Geometric mean Bq/m³</th>
<th>Arithmetic mean Bq/m³</th>
<th>Maximum Bq/m³</th>
<th>No homes &gt;200 Bq/m³ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Regs (1999-00)</td>
<td>43</td>
<td>68</td>
<td>144</td>
<td>1,326</td>
<td>9 (21%)</td>
</tr>
<tr>
<td>Pre Regs (1992-97)</td>
<td>29</td>
<td>126</td>
<td>261</td>
<td>926</td>
<td>13 (45%)</td>
</tr>
</tbody>
</table>
What does this (and international) data tell us?

- Prevention is effective – typically 50% reduction and there is evidence that this can be improved
- Comparable to international data (UK, EU)
- Understanding of building regulations (purpose of standby sump) is generally low in Ireland
- As prevention becomes mainstream cost ↓ and effectiveness ↑
- Prevention generally cost effective
Possible Actions

1. Review current policy regarding where radon barriers should be installed (high radon areas or everywhere)
2. Better guidance on radon prevention in new homes
3. Incorporation of workshops for local builders into RPII radon campaigns
What next?

- Work towards establishment of an appropriately constituted group tasked with driving the development of a National Strategy on radon control in Ireland