

Non-destructive testing

Tim Hutton of Hutton + Rostron, Environmental Investigations Limited, discusses the problems of dry rot in today's difficult market conditions in the United Kingdom.

IN THESE DAYS of financial stringency and a sluggish property market, there are many buildings awaiting renovation or development. In this building equivalent of the 'poverty trap', maintenance programmes are often curtailed at the very time reduced occupancy puts the building at a higher risk of problems such as, water penetration and poor ventilation. These conditions often result in chronic problems of timber decay and especially dry rot, *Serpula lacrymans*. It can be difficult to fund works in these circumstances, as the managers will wish to minimise expenditure on remedial work which might be made irrelevant by further developments. At the same time, it is important to prevent rampant timber decay developing, as this devalues the property and increases the cost of eventual renovation. Examples of this conundrum can be found in every sort of property portfolio from Grade I listed historic building to office and domestic accommodation.

Hard to detect and eradicate

Dry rot is generally perceived to be a special problem in buildings because it can be hard to detect and hard to eradicate. Its preference for growing behind surfaces, or in poorly ventilated cavities means that it is usually not detected until decay is advanced. Similarly dry rot's ability to spread while hidden in cavities, behind surfaces and through masonry make it difficult and expensive to define the extent of an outbreak by traditional means. Harefield House in Middlesex suffered such a fate and developed some dramatic growths of dry rot. The situation was not helped by repeated outbreaks of that common pest of unoccupied buildings, the greater spotted lead nicker, *plumbus*



Harefield House, a Grade II listed building awaiting renovation

larcinus. As the building was Grade II listed, the Property Services Agency, PSA, Conservation Unit was consulted for their advice. The problem described had been occupying the minds of the PSA and ourselves as their consultants for some time. For fifteen years we have been advocating a policy of controlling dry rot and other timber decay by manipulation of the timber moisture content, ventilation and temperature in the building. These techniques had proved highly effective and could be carried out at very low cost. The use of these techniques requires minimal work and loss of materials and reduces the final costs of renovation between 60%-90%. The problem with this approach was that it was necessary to survey the building for all the active dry rot outbreaks, which could be time consuming. If precautionary works were to be minimised it was also desirable to repeat the survey at intervals of three to six months to check for any new problems and to monitor the regression or development of any

dry rot infestations.

The practice were commissioned to carry out a site visit with preliminary recommendations for the control of the dry rot problem in November 1989 at which time the outbreak was reaching epic proportions. We recommended a full survey but in the meantime were able to give instructions for a number of holding measures. However, because of the 'building poverty trap' it was not possible to fund a full survey and remedial works.

At this time we were in the middle of our 'Rothounds' project to train search dogs to find active dry rot in buildings. We had found that Rothounds could detect small samples of dry rot hidden under floors, behind plaster, in ceiling spaces, and when hidden by furnishings and finishes of all sorts. They also worked very quickly covering standard 4-bedroomed houses in five to ten minutes. We were therefore always on the lookout for larger properties to train in, so as to extend the search times. We also needed to train in

buildings with 'natural' outbreaks of dry rot in order to stop the Rothounds becoming bored. The PSA had been supporting the project by identifying suitable properties. It was therefore arranged for Harefield House to be available for training.

Quick detection

During repeated training sessions at Harefield it became obvious that



A Rothound indicates the presence of dry rot activity

the Rothounds could detect changes in the 'health' of the dry rot long before it could be detected in any other way. The dying back of the infestations could be followed month by month, as the environmental control measures recommended after the preliminary visit took effect. Outbreaks that had been previously of interest to the dogs were ignored by them on later visits, even when visually laboratory testing these outbreaks were found to be dead. Similarly, the dogs would suddenly show interest in an area which was thought to be free of dry rot, but on close investigation, new problems of water penetration could be found. It was evident that the dogs could detect early dry rot growth before it was visible to the unaided human eye. In some instances, the dogs were effectively detecting leaks in the roof before they were detected by humans, purely by their producing active but invisible growth of dry rot.

The result of this was that we were able to follow the success of the measures recommended on the preliminary visit and locate further problems as they occurred through the year. This information was passed on to the building managers and PSA who immediately recognised its significance and utility. First, it gave confidence in the techniques being used and showed the residual 'hotspots' of fungal growth which required further measures; secondly, it gave timely indication of critical areas for maintenance work allowing for the conservation of resources as well as conservation of the building. In October 1990 the Rothounds were made available as a service to the building professions for initial survey prior to purchase or development, detailed survey prior to remedial works, routine survey for maintenance and management, and for survey after remedial works to check for completeness and efficiency. As the training project came to an end and the Rothounds became operational, it was decided to formalise the arrangement that had developed at Harefield. A Rothound team of dog handlers and surveyors from H+R would search the property twice a year. They would then report to the property managers on the areas of dry rot activity found and give timely advice on cost effective measures for its control and for the prevention of further timber decay. The use of the Rothounds reduced the time and cost of the surveys required by a factor of 20 making the scheme a very economical proposition. The use of Rothounds in this context brings the problem down to the scale of the wet rots in buildings. These may be easily and cheaply controlled because they are easily seen and confined. Using these techniques it is no longer necessary to carry out blockbuster precautionary treatments in order to try to ensure all possible areas of infection are covered in fungicide. Instead, a step-by-step approach becomes possible because it is so quick and easy to monitor the situation by repeat surveying.

Rothounds

Rothounds are specialist search dogs trained to find dry rot, *serpula lacrymans*, in buildings. Rothounds will indicate areas of active dry rot

even before these are visible to the naked eye. This will occur if the dry rot is just developing, is inside the substance of the timber, between the timber and another surface or within porous masonry. Such indications may be confirmed by comparing them with measurements of the moisture content of the structure or by the use of a core sampler. Rothounds will not indicate the remains of dead dry rot infestations.



A moisture meter with a deep timber probe shows that despite the 'fresh' appearance of the fungal remains, the moisture content is below 8%. The dry rot is therefore very dead and the Rothound is proved right

Capabilities

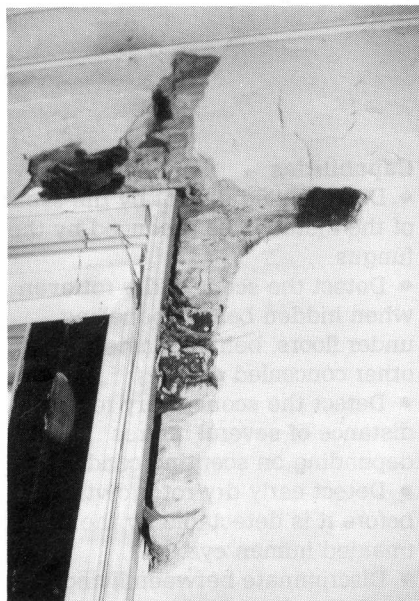
- Detect living dry rot by the scent of the metabolites produced by the fungus
- Detect the scent of dry rot even when hidden behind panelling, under floors, behind plaster or in other concealed cavities
- Detect the scent of dry rot at a distance of several metres depending on scenting conditions.
- Detect early dry rot growth before it is detectable by the unaided human eye.
- Discriminate between living or dead dry rot and between dry rot and other fungi instantly.
- Actively search for dry rot in buildings at high speed, covering 20 to 50 rooms in an hour.
- May indicate extent and spread of dry rot infestation.
- Search small inaccessible areas and roof spaces.

- Work in furnished and inhabited buildings.
- Totally non-destructive.
- Work 2-4 hours per day.

Limitations

They are trained only to indicate living dry rot, not wet rot, or dead dry rot and will not indicate fruiting bodies on old dead outbreaks of dry rot. They will indicate the scent of dry rot and the point of maximum scent. This may need interpretation as scent can occasionally be moved by air currents from the point of origin. For example, scent will not travel through impermeable surfaces such as neoprene. However, it may be detected at the edge of an impermeable barrier, e.g. around the edge of a room with a rubber-backed carpet covering an infected floor.

Rothounds will indicate dry rot infection, not decay. Therefore heavily decayed by inactive outbreaks will give a weaker indication than a recent highly active outbreak that has not yet caused significant decay. They may not work if there is a corrosive or choking dust or vapour. However Rothounds are not put off by smells and will detect even small amounts of dry rot in the presence of other strong scents.

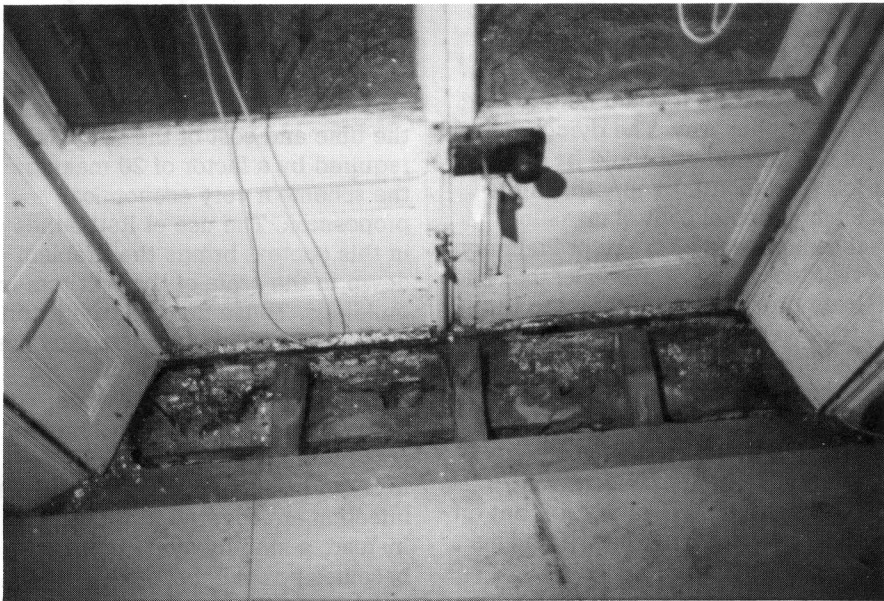


Plaster has been removed over an infected lintel to allow the timber to dry out. This has killed the dry rot which has produced fruiting bodies as it died off

Uses

They can be used to survey properties prior to purchase, renovation, change of occupancy and so on, to quickly check for hidden problems. Rothounds can take part in a preliminary survey of properties with suspected decay problems to determine the existence and extent of dry rot infestation.

Also they are used to survey properties with known dry rot problems to determine the activity and extent of infestation. After remedial works Rothounds can check for the efficiency of treatment. A routine survey of properties with past problems thought to be at risk in order to detect recurrence of infestation at an early stage before significant decay can occur, is another situation in which they can be used. Periodic survey of properties with known problems awaiting renovation, to detect 'hot spots' of dry rot activity, is a further example of their use. These problems can then be dealt with by 'reactive maintenance' allowing outbreaks to be controlled by minor exposure works and environmental controls. This avoids expensive building or remedial works. Further decay is prevented and infection controlled with significant savings on eventual renovation.



Floorboards removed to allow ventilation of the sub floor space which has become infected with dry rot due to a combination of water penetration and an impermeable floor covering

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Further information

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