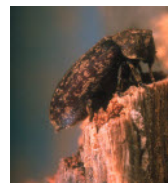


Heat treatment of Death Watch Beetle – Suffolk

Background

The property is a timber frame cottage which had an infestation by death watch beetle (*xestobium rufivillosum*). The property had been spray treated and some timbers injected some years previously by a now defunct company. Beetle emergence and tapping sounds were still being experienced. The death watch beetle is much larger than the common furniture beetle, measuring just over 8mm in length. In colour it is dark greyish brown, with a pattern of patches of yellow scale-like hairs on the pronotum and wing cases.



Surface spraying will only penetrate a few millimetres into heartwood and then only if the surfaces are very thoroughly cleaned down before application. Timber preservative paste, which uses the same contact insecticide but in a thick emulsion carrier, does give a slightly deeper penetration and greater effective concentration of chemical. However this method of application still suffers the same limitations as surface spraying, and can be more difficult to apply where access is restricted. Pressure injection or irrigation using solvent borne fluids through one-way valves inserted into pre-drilled 10mm holes can be more effective in some cases, but there is a lack of control over where the fluid can end up and the risk of a number of potential hazards. First is the increased risk of fire; second, the risk of considerable damage and staining to plaster, decorative paint and other finishes; third is damage to electrical insulation; and fourth is potential damage to the health of those who inhabit the building.

Owing to the previous lack of success by others, the hazards associated with further injection treatment, it was decided to use a heat treatment process, in conjunction with our partner company ThermDry UK.

The Solution

All insects die when subjected to extremes of heat. The death watch beetle & its larvae are no exception; they will die when subjected to temperatures of 54 °C for a minimum of 2 hours. The heat needs to penetrate deep into the fabric of the building, killing the insects and larvae in all stages of their growth, therefore both the time & temperature related to conditions within the matrix of the host materials; they do not refer to air temperature. For this effect to take place, the air temperature has to be raised to at least 70c and in many instances much higher.

The DRYAIR system is a self contained trailer unit containing a generator and boiler to raise the temperature of a water/glycol heat transfer fluid. The heat transfer fluid is pumped to independent portable heat exchangers, (which can be up to 500 feet away from the Trailer Heater Unit) comprising a hydronic coil and fan. Thermostats are used on each individual heat exchanger. The thermostats act as on/off switches for the heat exchangers. By shutting off the fan, heat transfer from fluid to air is interrupted.



The Work Required



ThermDryUK used a 240-EU heater with six PHE 25-EU heat exchangers to generate enough heat to raise the air temperature to 70 °C to ensure that the timber temperature was raised to 54 °C for a minimum of 2 hours to ensure complete eradication of all the beetles. Accurate monitoring and recording was needed to ensure the temperature had been achieved in the coldest areas and in the centre of the thickest timbers. Temperature probes and thermal imaging cameras were used throughout the process to monitor the

temperatures. The windows were covered with a thermal film to reduce heat losses from the buildings and the chimneys temporarily blocked off. The works were carried out in a phased manner to allow the building materials to heat up and cool down slowly to reduce the risk of any distortion.



Externally a hard cement based render had been applied and this was cracking badly and allowing water penetration and subsequent decay of the timber frame to occur. The architect therefore instructed all the cement render to be removed, timbers to be repaired and a new breathable lime render to be applied. Whilst exposed it was agreed to take the opportunity treat the external faces of the timber with ProBor 20 Gel. A ready-for-use wood preservative gel based on boron, a naturally occurring mineral with a long history of use. It is used for the treatment of dry rot and wet rot in larger dimension timbers (up to 25mm x 75mm). It is also effective against wood-boring insects and is particularly useful when treating infestations of Death Watch Beetle.

Conclusion

Whilst not offering any protection against re-infestation a total extermination of the beetle has been achieved this year without adding further chemical residues inside the building and no distortion of the timber components. In durable timber like oak and elm any subsequent re-infestation if at all is likely to be at a very low level over say a thirty year period.

