Abstract - Dr Jagjit Singh and Steve Bradley (EBS Ltd)

Toxic Mould

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Successfully dealing with toxic mould on site

Introduction

Indoor air quality issues associated with exposure to mould and related substances (e.g. mycotoxin) are becoming of greater importance.

A few governmental agencies have published guidelines on mould assessment and remediation but most are very general in nature for example;

- Minnesota Department of Health: Recommended best practices for mould investigations in Minnesota schools (2001)
- Environmental Health Division, Indoor Air Unit, St. Paul, Mn 55164 and
- New York City Department of Health: Guidelines on assessment and remediation of fungi in indoor environments (2000): Bureau of Environmental and Occupational Disease Epidemiology, New York, NY and Rao *et al* 1996).

These guidelines most focus on Black Mould (*Stachybotrys chartarum*) as the major concern (Chapman 2003). Most of the mould genera encountered are "toxic" and allergenic and can be considered to constitute a serious problem.

The issue of mould has suddenly taken a high profile place into the media headlines following a number of multimillion-dollar lawsuits in the USA. In the United Kingdom Insurance companies (which are covering professional indemnity for the work related to building industry) introduced a clause this year excluding mould and asbestos work.

This presentation will cover aspects of avoiding liability by successfully identifying, preventing and removing mould.

Strategies for Control

There are many considerations to take into account when devising strategies to control and deal with instances of possible mould. As well as the basic considerations such as the health and welfare of the occupants and the ongoing condition of the building, there are other factors that may become just as important, at various times in the project. Details such as;

- How far has the problem spread?

- When can the remediation be safely carried out, without endangering anyone else's health or adversely affecting the function of the building?
- How do we know when the remediation has bee satisfactorily completed? How do we protect the people who are actually carrying out the remediation?

These are just some of the other factors that need to be considered, and an appropriate strategy developed.
A thorough risk assessment should be conducted to consider all these factors and appropriate control measures to prevent or control exposure put in place.

Identification and Isolation of Mould

The first stage is to determine whether there is a problem and if so, the nature and extent of it. A detailed inspection of the premises is vital to determine which areas are affected and which are not. This will assist in identifying the source or sources of the problem. The mould can be sampled by a range of techniques and identified by use of mycological techniques.

In order to seek out the root cause of the problem, rather than merely deal with the symptoms, it is vital to investigate why the mould has formed and what factors are influencing its survival.

Sustainable Holistic Solutions

Fungal and Insect problems in both modern and historic buildings are mainly the result of defects in buildings, lack of maintenance and gross neglect. Rectifying these defects and by ensuring proper maintenance can provide long-term sustainable, holistic solutions to these problems.

Diagnostic Non-destructive Inspection and Identification

Correct identification of the infestation by an independent scientist is the vital key to all such problems, as all infestation is not equally destructive. By employing a range of non-destructive inspection techniques, much of the original fabric can be retained. The environmental approach is beneficial to the building fabric, occupants and to the wider environment.

Remediation Planning

In preparing a strategy to remediate a contaminated area, a risk assessment should be part of the process to consider requirements in a range of issues such as how to carry out the remediation, how to do it without spreading contamination outside the work area and how to protect those involved in the remediation.

Risk assessment involves hazard identification, exposure assessment, dose response assessment and risk characterisation.

The use of an enclosure or segregation of the work area may be sufficient to prevent occupants of the building and those not involved from being affected by the remediation process. In some circumstances, the immediate area and vicinity may need to be vacated to ensure that exposure cannot occur.

The remediators themselves should also be protected, and respiratory protection (RPE) and appropriate skin and eye protection are vital parts of this. In selecting the type of RPE most suited to the activity, it is important to consider all factors such as the type and likely airborne concentration of the contaminant, the practices employed, the time of exposure. The chosen respirator may be a simple disposable dust mask, of appropriate standard, for minor works to a powered full-face respirator for larger extensive exercises, depending on the particular requirements.

In extreme cases, the interface between the clean and the contaminated areas may require decontamination facilities and procedures so that the remediators do not spread mould as they enter and leave the work area.

Remediation techniques

Remediation may involve dry vacuuming of mould from surfaces, wiping with a damped cloth or simply disposal of the contaminated item, the preferred process varying according to various factors.

The ease of cleaning of a contaminated surface will obviously depend on the adherence of the mould to that surface. This in turn is affected by the porosity of the surface, the "smoothness" of the surface on a molecular level and the presence of cracks, joints or other crevices in the contaminated surface.

Hard surfaces such glass, metals, glazed ceramic tiles can be decontaminated relatively easily, whereas porous surfaces such as bare masonry or timber represent the opposite extreme. Where surfaces cannot be adequately cleaned, disposal of the item may be the preferred option. The intrinsic value of an item may mean that incomplete decontamination may be an acceptable option in some cases.

Various other techniques available for example heat treatment, steam cleaning, biocides treatment, fumigation and UV treatment.

Confirmation of cleanliness

Having completed a remediation exercise, it is important to reassess the cleanliness of the area and hence any possible ongoing exposure of the occupants. The use of air and surface sampling tests, with appropriate analysis will allow a judgement to be made. Ongoing monitoring of the situation is vital to confirm that any structural

repairs have been effective and that satisfactory drying out of the building is occurring. Of course it is possible that the mould may return, and this is an issue that may need further consideration in due course.

Case Histories

These principles and techniques have been successful at many prestigious locations, both in the UK and abroad. Some of these include Dover Castle, where historic artefacts in the museum, as well as the castle structure itself, have been remediated and preventative measures introduced to limit or prevent recurrence. At the National Library of Scotland, many important books and documents have been sympathetically decontaminated and preserved.

The same approach has been just as successful in mundane buildings such as offices and private houses.

Environmental Management

Much damage has been inflicted in last Century by dealing with the symptoms of the problems and not with the causes. By proper understanding of the causes, its repetition should be avoided in this Century.