

Meeting date: 10 November 2009**Open Govt. Status:** Fully Open**Type of paper:** For Discussion**Paper File Ref:****Exemptions:**

WATCH COMMITTEE

Asbestos – Refinement of a control banding approach to control of asbestos exposure situations

Issue

1. Progress on the development of a control banding approach for tasks involving work with asbestos.

Timing Considerations

2. Routine.

Recommendation

3. WATCH is invited to consider the issues noted in this cover paper and to respond to the action in paragraph 25.

Background

4. Over the course of a number of meetings, WATCH has been focussing on the question of what can be said about asbestos-related cancer risk in relation to cumulative asbestos exposure. The October 2008 summary statement represented a significant step in answering this based on H&D model, as well as how that knowledge might inform control approaches for work with remaining asbestos containing materials (ACMs). Since then work has been undertaken to develop a simple spreadsheet-based tool to provide those without expert knowledge with information about the likely extent of risk (in the absence of controls) and required controls for work they need to undertake with ACMs.

Argument

5. The concept of a simple web-based tool for control banding was outlined at a previous meeting, and comprised three elements: 1) exposure assessment and estimation, 2) “risk bands” calculated from the H&D model, and 3) required controls. Further work to develop the exposure assessment aspects of the tool, and to integrate the three elements, has been now carried out. A detailed description of the exposure assessment and estimation is given in Appendix 1.

6. There are two aspects of the work developed so far that have required some degree of interpretation of the conclusions agreed in October 2008. The first relates to the extent to which it is feasible to make a direct link between risk and required control. This is relevant because WATCH recommended that a control banding approach should be proportionate, “requiring action that is commensurate with risk”. The second issue relates to whether the degree of quantification and extrapolation implicit in the risk bands as currently proposed is consistent with WATCH’s conclusions.

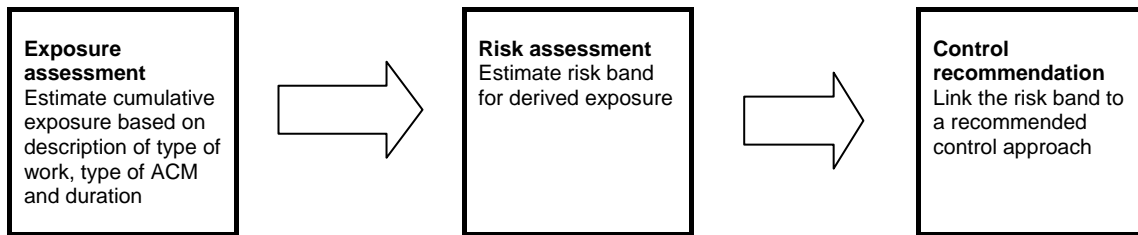
7. At this stage WATCH is therefore asked to consider the approach as developed so far in the light of the October 2008 statement (reproduced in Annex 2), with particular reference to these two issues which are discussed in more detail below.

Issue 1: making the link between risk and control

8. An idealised view of how an evidence based assessment of risk should inform decisions about control might be summarised as shown in Figure 1. Such an approach would directly link the final recommended controls to a view about the risk as recommended by WATCH:

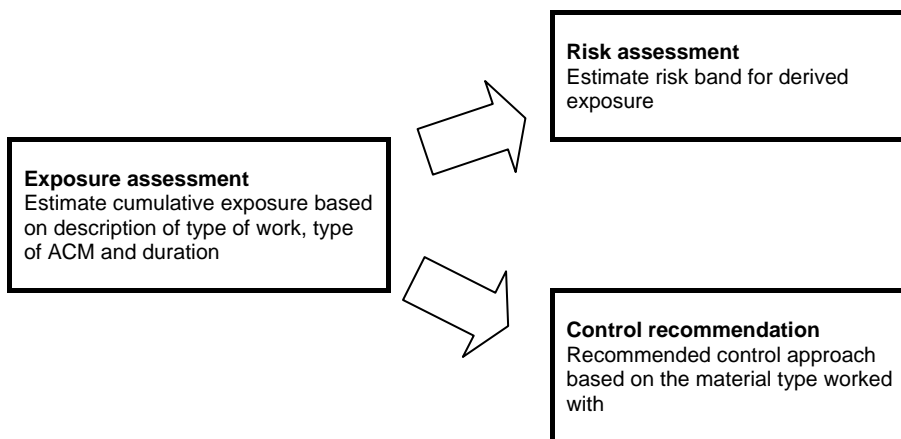
“Such an approach would emphasise proportionality, requiring action that is commensurate with risk.”

Figure 1: Direct link between assessed risk and control



9. However, the control banding approach as currently developed does not reflect this view and can be more accurately described by the diagram in Figure 2.

Figure 2: Controls based on material type with separate assessment of risk in absence of control



10. There are a number of reasons for taking this approach:

- Britain already has a control regime for asbestos which is largely based on the type of ACM worked with. Thus it takes account of potential risk to the extent that some materials are clearly more hazardous than others. However, it does not attempt to take into account likely cumulative exposures (and hence lifetime risks) and thus directly link recommended control with risk.
- Control of exposure has to relate to the specific circumstances of individual tasks with ACMs without precise knowledge of how long such tasks will take in themselves. But in order to estimate risk using the H&D model, an estimate of cumulative exposure is required and this does need to take account of exposure duration as well as exposure intensity. Uncertainty at the outset about exactly how long individuals will be exposed during any given task will translate into additional uncertainty about the required control approach if we want to relate the required control directly to the assessed risk in the specific circumstances of the task.
- Further variation in the risk estimates for individuals involved in any given task will result from differences in their ages.

Thus while the current approach does present a risk band relating to the specific task in question (where the user specifies the likely duration of that task and the age of those exposed), the recommended controls are based only on the material type.

Issue 2: Quantification of risk and extrapolation

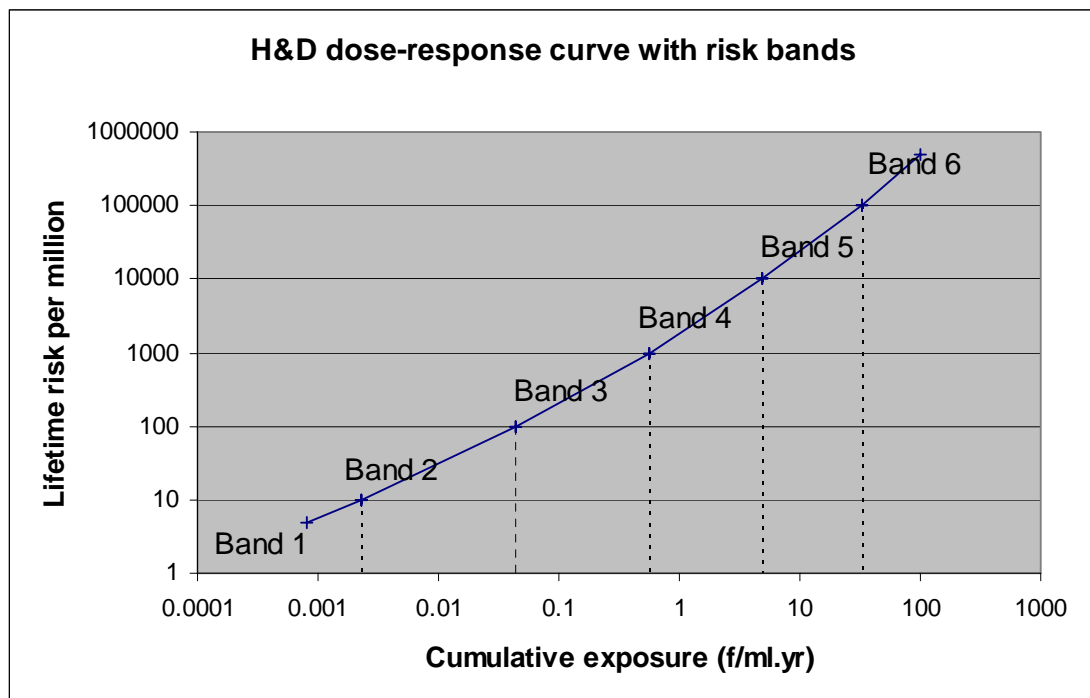
11. The first step in taking forward the development of a control banding approach was to convert the H&D dose response curve into risk bands. The approach was set out in the February 2009 WATCH paper.

12. In taking this approach, our interpretation of the WATCH statement about the model being “sufficiently robust to be used to differentiate the relative magnitudes of risk for the different fibre types in different exposure ranges” has been as follows:

- It is legitimate to use the model to define broad exposure ranges from the model that are consistent with successive orders of magnitude of risk.

13. The basis for this was the overall extent of the uncertainty in the H&D model, as expressed by the “minimum” and “maximum” estimates. When defined in terms of orders of magnitude, the width of the risk bands is such that for any given exposure the estimated risk band is unlikely to be incorrect by more than one band either side of that defined by the “best” estimate.

14 The concept is illustrated in the chart below (which relates to cumulative exposures to amosite starting at age 30 for 5 years). The boundaries of the risk bands are defined by orders of magnitude of lifetime risk (eg 10-100 per 100,000; 100-1000 per 100,000; etc) and these can be translated into exposure ranges based on the H&D “best” model, as shown below.



15. Setting orders of magnitude of lifetime risk as the basis for risk bands clearly implies that the exposure boundaries for each band will change depending on the type of asbestos considered. The boundaries also need to be adjusted for age at first exposure and duration of exposure – this is discussed later.

16. There are two ways in which this approach might arguably go beyond the October 2008 WATCH conclusion:

i) Relative statements about risk and quantification

The WATCH statement summarised the view that the model provides a basis for making “relative statements” about risk in different situations. The risk banding approach potentially goes somewhat beyond this in quantifying the level of risk associated with each band – albeit in broad order of magnitude terms. However, it seems difficult to achieve a meaningful connection between risk and control unless we have some notion of the actual magnitude of risk for each band. In other words, control bands need to be associated with risk bands that – at least in some broad or qualified sense – encompass some quantitative statement about risk.

ii) Extrapolation to low exposures

The WATCH statement made no actual comment about risks for exposures below 0.1 f/ml.yr, though it does state that “the model may be less reliable when extrapolating beyond the exposure ranges for which there are epidemiological data, due to uncertainties in the dose-response relationship at low levels”. In the current approach, those risk bands potentially of most interest will usually relate to exposures below 0.1 f/ml.yr.

Further issues – adjusting for age and duration of exposure in the H&D model

17. Further aspects of the issue about the extent to which risks can be quantified or extrapolated are age at first exposure and duration over which any given cumulative exposures are accrued.

18. Discussions about the H&D model to date have mainly centred on the predictions for exposures accrued over relatively short periods (up to about 5 years) starting from about 30 years of age, because this is what was typical in the epidemiological data. However, a key determinant of mesothelioma risk is age at first exposure. This factor also has implications for risk in relation to cumulative exposures accrued over longer periods since the later part of any longer exposure will be accrued at an older age and therefore contribute less to the overall lifetime risk (assuming the effect of successive blocks of exposure is additive). This means that starting at a given age, a cumulative exposure accrued over a short period of time will result in a higher lifetime risk than if the same cumulative exposure was accrued over a longer period. The non-linear form of the H&D models complicates the way any adjustment for age at first exposure and duration should be carried out.

19. The approach adopted for the adjusting for age is based on the HEI model for mesothelioma risk in relation to time since first exposure. The relevant adjustment factors for mesothelioma risk for age at first exposure, in 5-year categories from age 20, are provided in Table 9 of H&D 2000. For example, the HEI model suggests that the lifetime mesothelioma risk for a short term exposure starting at age 20 would be 2.1 times higher than for that exposure starting at age 30. In practice the age adjustment is straightforward: the estimates output from the model are simply multiplied by the relevant age factor.

20. In order to adjust extended exposure durations (those substantially in excess of 5 years), the overall exposure may be partitioned into 5 year blocks of cumulative exposure. Simply adding the resultant estimates from the model for each 5-year block of exposure – after applying the relevant age adjustment factors to each – may not correctly estimate the lifetime risk because of the non-linear form of the model. The approach adopted therefore makes an adjustment for this in the way the contributions of each 5-year block of exposure are summed.

21. Differences in risk for given cumulative exposures accrued over periods shorter than 5 years are unlikely to be substantial. Shorter durations are therefore dealt with in the risk calculations by simply assuming that they were accrued over a 5 year period.

Link to HSC Strategy

22. The R2P2 framework and CAR, 2006 are the primary strategy documents to which this paper is linked.

Consultation

23. No wider consultation on the content of this cover paper beyond HSE has been undertaken at this stage.

European Context

24. There are no specific links to EU procedures or activities.

Action

25. WATCH is asked to consider the issues summarised in paragraphs 6 and 7 and to form an opinion on the control banding approach as developed so far in the light of the original basis for taking forward such an approach.

Contact:

Nicola Gregg
WATCH Secretariat

References / Attachments

Annex 1 – Model for exposure, control and risk banding assessment for work with asbestos.

Annex 2 - Conclusion (7 November), following drafting by committee members on Friday 24th October and consultation comments received between 29 Oct and 5 Nov 2008

Annex 3 – Copy of Excel spreadsheet (sent electronically only).