

**AMENDMENT TO THE CONTROL OF ASBESTOS AT WORK  
REGULATIONS 1987 AND ACOF**

**SUMMARY OF THE REGULATORY IMPACT ASSESSMENT**

***CHANGES MADE SINCE THE SECOND CONSULTATION***

**Changes to the number and size of buildings**

1. We have made a very significant change to our estimates of both the total number and size of commercial buildings since the second consultation. This followed the recent publication of new and much improved figures from the valuation office, several weeks after the issue of the second CD. The figures were calculated on a significantly different basis to the previous estimates from 1995, both in the type of buildings included in the four bulk classes (factories, offices, shops, warehouses) and the amount of floorspace excluded from the statistics. We had previously combined the 1995 figures with information provided by consultants to estimate total UK floorspace.

2. On reviewing the methodology in the light of the new and more complete floorspace statistics from 2000, we discovered that we had substantially over-estimated the total floorspace of factories/industrial buildings. The main implication of this re-estimation is that survey costs are significantly reduced, since these are essentially determined by the floorspace data. Remedial costs are less affected, because of the estimates are partly made on a unit basis. Total factory costs have therefore been dramatically reduced and as these previously represented more than two-thirds of the total for commercial premises, the effect has been to roughly half these total costs.

3. The opportunity has also been taken to further refine the data using a previously unknown 1997 research report which gives as accurate as possible a picture of both numbers of buildings and total floorspace. This, in combination with the new valuation office report has resulted in a greater degree of accuracy in our estimates. As a consequence, all our cost estimates have changed slightly, in addition to the major reduction for factories. The new building data now forms the basis of our estimates, and we would not anticipate any further significant changes.

**Other changes to costs**

4. As with the first consultation, many comments on the RIA from consultees centred on the estimates of the cost of asbestos surveys. In response to previous comments, we had already added two extra components to the cost of an asbestos survey. The first was a cost equivalent to an extra 50% of the survey cost, up to a maximum of £150 per building, for the preparation and marking up of drawings and plans. Secondly, we had added a 'call out' fee of £200 to the cost of a survey. This call out charge was adjusted for each building category according to the average number of buildings at a typical site.

5. Despite these changes, several respondents commented that our survey costs were too low. However, it was evident that these respondents were taking the call-out charge to be the full survey cost. Our full survey cost was in fact significantly higher when compared to an

example quoted by a respondent who wished to demonstrate that our figure was too low. As a result, we have made no major changes to survey costs. On advice, we have increased the call-out charge to £250, and the maximum cost for drawing and plans is now £250 on a per premises basis (some premises will be very large).

6. The Asbestos Cement Products Producers Association (ACPPA) questioned several areas of cost they read as being missing. Some of these were not societal costs, and their inclusion would have been double-counting (for example legal compensation is a loss to one party but a gain to another). However, they did ask whether we had included both replacement materials and labour (re-instatement). As a result, we sent more details of our estimates of asbestos removal costs to the Asbestos Removal Contractors Association, and also a major demolition company that routinely removes asbestos before demolition. Both organisations broadly supported our estimates as covering all resource costs, including both re-instatement and removal. They did, however, suggest higher figures for some building types, which have slightly raised our estimates. Importantly, they both said our estimates of removal costs from factories was reasonable.

7. Many respondents from local authorities again questioned enforcement costs. A preliminary assessment of the enforcement costs of these proposals has been made in para 33. They will be more properly considered as part of the full review of the Enforcing Authority Regulations currently being undertaken by HSE. We recognise that there will be an increase in the overall enforcement effort associated with the Control of Asbestos at Work Regulations.

8. Finally, we have made an estimate of the proportion of costs in the rented housing sector that relates to common areas of the building and will therefore fall in scope of these proposals. Previously, these costs were included in a separate assessment of a potential application of similar proposals relating to rented housing. The estimate provided in the cost section below is only approximate, but it does indicate that this element of cost should be modest in comparison with total costs in either the commercial or the rented housing sector.

### **Changes to the risk assessment procedure**

9. We have reviewed the previous risk assessment, and made a number of changes. The previous approach started by estimating long term average exposure levels in broad categories of job. This presents a difficulty in the treatment of job mobility. We have therefore re-estimated exposure patterns starting with an estimate of the distributions of exposure levels on a typical (current) working day. The effect of these changes is to suggest lower long term average exposures for the more highly exposed groups. The number of predicted annual mesotheliomas, and the number and proportion of predicted lung cancers is reduced.

10. We have used the latest Government Actuaries Department (2000 based) population projections, and now make proper allowance for the improved levels of survival of the population into the age groups at which mesothelioma (and lung cancer) deaths are most common. This increases the number of predicted deaths, and (together with the change to the baseline described at para 13) more than offsets the reductions from the revised exposures.

11. We have corrected an error in the calibration of estimated current exposure levels with the exposure index of the projection model. We have now aligned the age-cut off in our

projection model with our exposure assumptions, since our intention is to only count deaths up to age 79 (the prediction of rates at older ages being highly uncertain). The inclusion of an 80-89 age band in the projection model meant that risks at younger ages were very slightly underestimated. The number of predicted deaths is unchanged since this is largely to do with the allocation method.

12. We have done a fuller quantitative examination of the uncertainties underlying these risk estimates. This is summarised in the uncertainties section below.

### **Changes to the baseline of risk estimation**

13. We had previously made a significant change in the baseline, and we have further refined this change. In response to previous comments, we had allowed for a reduction in future risk due to the routine demolition of buildings. Existing regulations will apply on demolition, but the benefits of any asbestos management programme ceases at this point. Data from the valuation office suggested an average building life of fifty years. We therefore reduced both the costs and benefits attributable to the proposals by 2% each year.

14. We have since pursued data on demolition in the commercial sector from a number of governmental and industry sources. We have not been able to estimate a global figure for demolition. However, we know from our work on housing that the demolition rate for the cohort of older buildings containing asbestos will rise on a yearly basis, as these buildings reach the end of their lives. We therefore apply a demolition rate of 1% of current stock a year currently, rising to 4% by the end of the period, and giving an average of around 2%. The effect of this change is to slightly increase benefits, since commercial buildings and the ongoing benefits from establishing a management system last longer from the present. The effect is through discounting, rather than any change in the average demolition rate. A further change is that we now make cost estimates on a 'per premises' basis. A premises may contain several buildings, and we initially attempted to account for this. However, using the new valuation office data, it is more convenient to work on a premises (or hereditament) basis. This does not affect our estimates per se, although it does mean that care has to be taken in comparing current estimates of building numbers with the previous ones.

### ***RISK ASSESSMENT***

15. We now estimate that around 9,000 individuals would go on to contract a fatal asbestos related disease in the absence of *any* further management action, given our best estimate of the future risk from asbestos. These deaths are estimated to occur throughout this century, due to exposure over the next fifty years (the appraisal period) given the long latency associated with asbestos related disease. Removing those who are only exposed at an ambient level (in other words a background level which could come from a variety of sources) reduces this total to 7,800. We would expect some reduction in background levels from these proposals, but we are unable to estimate these.

16. The fatalities prevented rise steadily over the appraisal period to a maximum of 159 per year. The average number of future fatalities that could be prevented is around 78 each year. Because of the long latency, the discount rate (of 2%) has a significant effect on the valuation. For example, the estimated 95 lung cancer and mesothelioma fatalities prevented in 2042 each have a value of only 40% of the current fatality prevention value.

***BENEFITS*****Valuation of total risk**

17. The total elimination of the risk to the 7,800 fatalities identified in the risk assessment section is equivalent to a benefit of £4.8 billion in present values. Over the whole appraisal period, risk in commercial and public buildings is estimated to account for 61% of these fatalities. This figure is estimated to be 65% currently, but falls as commercial buildings are demolished at a slightly faster rate than houses. We believe that management of ACM, coupled with widespread occupational training and control aimed at limiting exposure, will almost entirely remove these risks in commercial and public buildings. The total health benefit avoidable by this approach is therefore estimated at 61% of 7,800, or 4,700 future deaths avoided. This is valued at 61% of £4.8 billion, or £3.0 billion (rounded to the nearest £100 million).

**Cost savings**

18. A proportion of notifiable asbestos removal and encapsulation jobs derive from unplanned disturbance of asbestos by maintenance personnel. The new duties should significantly reduce these occurrences. Work done in managing the presence of asbestos will also reduce work that is carried out under existing legislation when the building is demolished. The total present value of cost-savings in commercial and public buildings from the proposals are estimated at £290 million over fifty years.

***TOTAL COMPLIANCE COSTS***

19. Total undiscounted costs to all non-residential sectors are estimated at £1.8 billion in total over 2000-2050. This is equivalent to £1.4 billion once discounted to present (year 2000) values, since much of the cost is recurring in nature. Costs are summarised below.

Table 1: Total compliance costs of duty to manage, by type of building

Building Type	Initial cost (£m)	Recurring cost (£m/year)	Discounted cost (£m)
Retail/Industrial	905	7	871
Agriculture	196	0.7	180
Schools	56	1	58
Hospitals	24	0.5	27
Other Healthcare	31	0.5	34
State	24	0.3	26
Public	132	2.3	146
Places of worship	26	0.4	29
Total	1396	13	1372
<b>DISCOUNTED COST</b>	<b>1,372</b>		

Table 2: Total compliance costs of duty to manage, by nature of cost

Nature of cost	Compliance costs (£m)	Discounted cost (£m)
Familiarisation	33	33
Initial desk work	46	45
Survey	597	523
Remediation	642	561
Management (initial)	76	67
Management (per year)	13	142
<b>Total</b>		<b>1,372</b>

### Costs to a typical business

20. We previously supplied unit costs over all buildings requiring at least some action. However, since management costs vary so widely, these may not have been particularly informative. We now give a range of examples for buildings of varying sizes and containing asbestos in varying amounts. In these estimates, we cannot differentiate in costs between different types of asbestos material. However, our removal costs are based on out-turn cost data, which will reflect the range of asbestos materials that are encountered in practice. The examples are specified as follows, and costs are described in the table immediately below:

Example 1: A medium size factory premises (2,500 m<sup>2</sup> in total). A specialist surveyor identifies asbestos present in typical amounts, much in poor condition. A decision is made to totally remove the asbestos.

Example 2: A large warehouse (10,000 m<sup>2</sup>). A specialist survey finds asbestos in typical amounts, but in generally good condition. This is managed rather than totally removed, although a small proportion is removed.

Example 3: A small shop, (200 m<sup>2</sup> including store-room). An initial walk-through by the owner finds no obvious risk, even if there was some asbestos present. However, before some renovation work five years later, and asbestos survey is carried out. No asbestos is found.

Example 4: A large 1960's office block (50,000 m<sup>2</sup>). A specialist surveyor identifies asbestos present in typical amounts, but in good condition. Rather than remove this, an on-going system is set up to manage the risk.

21. Our estimates of the costs under these scenarios is as follows. The total costs are intended to be averages rather than maximums, and relate directly to the size of the building in question (this is on a proportional basis within building types, but not between building types). In some of the examples, there will be some small recurring costs for ongoing management. These are estimated to be no more than 10% of the initial management system costs (excluding removal). For the office, we estimate they would be around £700 per year.

Table 3: Predicted costs of the proposals to the above examples

	Familiarisation; desk research; walkthrough	Specialist survey	Management (incl. removal)	TOTAL
Example 1 (Factory)	£450	£1,400	£90,000	£92,000
Example 2 (Warehouse)	£420	£1,400	£11,500	£13,000
Example 3 (Shop)	£11	£420		£430
Example 4 (Office)	£2,800	£19,000	£7,000	£29,000

### **Period during which surveying takes place**

22. The proposed ACoP does not require a survey to identify ACM to be undertaken in all cases before the two year period specified. There is also the option of undertaking a “presumptive” survey, in which material could be treated as if it could possibly contain asbestos, and the risks assessed on this basis. If the building is in good condition, and (for example) it was apparent that any ACM is overlaid or over painted with what is clearly not ACM, then no further action need be taken until work commences which is likely to disturb any asbestos present.

23. For schools, healthcare facilities, public buildings and places of worship, we assume a specialist survey takes place at some point over the next five years. For commercial premises, we estimate that the majority will have to undertake a specialist survey within five years of the proposals coming into force (for example retail premises), but that one-fifth would undertake a survey up to ten years from this date (for example small industrial units), giving an average of six years. Some buildings of all types will be demolished over this time and require no additional action under these proposals.

24. These assumptions do not change total undiscounted costs - a survey will need to be undertaken at some point (where it is required). However, they do change the present value of costs due to discounting. This can be seen as a real benefit of the proposals, in allowing flexibility as to the initial approach taken to asbestos management.

### **Costs in common areas of residential premises**

25. These proposals will apply to the common areas of residential premises. We previously lacked sufficient information to separate costs from total rented housing costs. We have now pursued this further. In particular, we have received information on the proportion of common floorspace from a major demolition company dealing with residential accommodation. We estimate that the total costs of the proposals as they apply to common areas will be £200 million over 2000-2050. This is equivalent to around £110 million in present values, since much of the cost will not be incurred immediately.

26. We cannot separate the benefits of the housing proposals into the proportion relating to common areas. However, accommodation with common areas are more likely to be purpose built flats, than (for example) houses. These flats are more likely to have been built during the periods when asbestos was widely installed, and also are more likely to be `system

built' in any case. The cost benefit balance is therefore likely to be more favourable than the overall balance in the residential sector. Some one-fifth of all housing units are either in a residential block or in a converted house, and therefore likely to have a common area. The overall effect on the balance of costs and benefits in the commercial sector will not be great, and in any case is likely to be positive

### **Costs of accreditation for bulk analysis**

27. We estimate that the new requirement for any laboratory engaged in bulk analysis to be accredited by an appropriate body complying with international standards will cost between £160,000 and £210,000 each year over the first five years, with falling costs after ten years. For the fifty new laboratories, and fifteen existing laboratories, that we estimate may become newly accredited, this would lead to costs over fifty years of £1.8 million in present terms.

### **Impact on small and medium sized business and small firms litmus test**

28. There is likely to be some disproportionate impact on those businesses who operate from small premises, or who have a number of small premises at different sites. This arises through minimum 'call-out' charges that will be incurred if the premises employs specialist surveyors, and effectively sets a minimum charge for surveying any premises (of around £300 in these estimates).

29. However, a number of factors will tend to limit this disproportionate impact on SMEs. Firstly, those in small premises are more likely to be familiar with the layout of their buildings and where any asbestos might be present, and be able to take up the flexibility offered by the ACoP. Secondly, many SMEs will actually work from relatively large premises, and would not be subject to minimum charges (surveying costs would be higher for larger premises, but not disproportionately so). Finally, many SMEs will work from premises which form a unit of a larger building. These SMEs could very well experience relative savings if the work is undertaken by the building managers for a number of units on the site.

30. To confirm this view, we contacted seven small businesses that may be affected by the introduction of the duty to manage. These firms were split evenly between manufacturing and service sectors and occupied premises with areas from 80m<sup>2</sup> (small shop) to over 1000m<sup>2</sup> (factory and office complex). One firm had previously commissioned a specialist 'building survey' of their premises, which did not discover any asbestos. Two other firms stated that they were aware of ACM present in their workplace and that due to the type/structure of their premises they were sure that there was no other asbestos present other than the materials they had identified.

31. Management was seen by most respondents as being a relatively simple affair in small premises. The two firms that were aware of ACM present claimed to operate simple management systems. However, one of these respondents who had an asbestos cement roof indicated that if the asbestos present was found to constitute a risk requiring the removal of the roof, this would involve a significant business expense. All firms contacted were either indifferent about or in favour of the proposals..

**Costs to government**

32. We estimate that some £140 million of the initial undiscounted costs of £1.4 billion at table 1 is likely to be born by the public sector. The costs in common areas of residential accommodation would add some £50 million to this figure, giving a total of around £190 million. This represents the expenditure from public funds over the period when surveys are likely to be undertaken, in the first five years following the introduction of the proposals.

**Costs of enforcement**

33. The enforcement of these proposals as they will affect the Local Authority enforced sector will be considered as part of a review of the Enforcing Authority regulations which will take place later this year. The costs of enforcement will be considered in detail separately at this time. In advance of this we have conducted a preliminary assessment of enforcement costs. These are estimated to be in the region of £5 million in the first year the proposals come into force. Over a ten year period enforcement costs are currently estimated at £20 million in present value terms.

**Costs to HSE**

34. The costs to HSE of enforcement are estimated to be around two-thirds of the above figures. This gives an estimate of around £3 million in the first year the proposals come into force, and around £14 million over a ten year period in present value terms. These estimates are subject to change following the outcome of the review of the Enforcing Authority regulations.

**Total cost to society**

35. The total costs of this package of regulations are estimated at £1.7 billion. When considering the comparison between costs and benefits in the commercial sector below, we exclude the £120 million discounted costs relating to the implementation of CAD in the residential sector and the £110 million discounted costs relating to the common parts of residential premises.

***COMPARISON OF COSTS AND BENEFITS***

36. The costs of the various options for dealing with asbestos in the commercial sector are displayed in the table below. We include the cost of the new duties under the Chemical Agents Directive, which these proposals also implement. These are estimated at £200 million over fifty years, discounted to present values, of which £80 million applies to duties in commercial and public buildings. Accreditation will cost a further £1.8 million. The costs of the 'ACoP approach' in commercial buildings are therefore estimated at £1.5 billion over fifty years in present value terms.

Table 5: Summary of costs in commercial and public buildings, including CAD duties and accreditation of bulk analysis

Description	Option number	Present costs (£m, discounted)
ACoP approach to surveying and management	a	1,458
. 'Do nothing' except implement CAD duties.	b	[see below]

37. By comparison, the estimated safety benefits of the duty to identify and manage asbestos, when coupled with full compliance with other regulation, are valued at £3.0 billion, together with cost-savings of £290 million, giving total benefits of £3.3 billion.

#### **Total costs of eliminating exposure to asbestos**

38. Before a comparison of overall costs and benefits can be made, we first recognise that in order to weigh costs against a full elimination of the risk, we have to assume full compliance with both existing regulation, and also proposed future changes that are likely to come about as a result of any tightening of this legislation, in particular under the Asbestos Worker Protection Directive.

39. The costs of full compliance with the Directive (much of which is already present in UK law) has been examined as part of regulatory impact assessment prepared for a proposed revision of the Directive. Costs were prepared on the basis of both the existing control limit, and also a tighter control limit, of 0.1 f/ml for all forms of asbestos. Regardless of whether the new control limit is adopted, it seems prudent to include these costs when judging against total elimination of risk.

40. Total costs of a tighter control limit, coupled with full compliance with each element of the Directive, are estimated at just over £1.9 billion over fifty years in present terms. Of this, the vast majority of cost is due to full compliance with provisions that are already in UK law. The principal costs are from adequate training for *anyone* likely to disturb asbestos as part of their work, adequate control measures if asbestos is encountered being fully implemented, and ongoing medical surveillance over the entire period.

41. In practice we would expect that it would be difficult to gain compliance with the elements of the directive related to controlling exposure in the absence of these proposals. Maintenance workers would be far less likely to routinely take precautions, such as temporary encapsulation, without knowledge of whether asbestos was present where they were working. This is known to be one reason why compliance with current control related requirements is less than full. Undertaking control measures on the off-chance that asbestos is present is far

less cost effective than if the presence and location is known, and this represents a real barrier to compliance with existing regulations.

42. However, we do assume full compliance with existing and proposed training requirements as any maintenance worker may work at sometime on commercial or public property. When calculating the costs of fully eliminating the risks in commercial and public buildings we therefore include the costs of control in these sectors and the full cost of training for all maintenance workers. The total cost of these two elements of the directive is estimated at £1.6 billion of the £1.9 billion total costs of the directive.

#### **Comparison of costs and benefits: proposals as presented**

43. The total costs of fully eliminating the risk in commercial premises are therefore estimated at just over £3.0 billion over fifty years, compared to benefits valued at £3.3 billion. These figures exclude the application of the proposals to the common areas of residential premises, although we would expect the effect of this on the overall cost-benefit balance to be positive. Benefits are subject to the considerable uncertainties described, although we believe we have made the most reasonable estimate. Given this, we therefore believe application of both CAD and the duty to manage risks is justified on a cost-benefit basis.

#### **Comparison of costs and benefits: implement CAD only**

44. The costs of implementing CAD in the commercial sector, with the management proposals in place, is estimated at £80 million. However, in the absence of the management proposals we believe that the CAD related costs would be far higher. In many cases, maintenance workers will not know if any ACM is present, or it's actual location if it is thought to be present. This must affect the risk assessment they would be required to do. In the absence of a preceding survey, the time taken to establish the presence, or not, of asbestos and any subsequent amendments to the workers' risk assessment may be considerable (at least in some cases). This argues that the cost of implementing CAD in the absence of any other management action could be at least double the calculated cost, ie in the order of £160 million. We have not been able to calculate the benefits of implementing CAD only, which is only one element of the total elimination approach. Moreover, we believe that CAD would only be effective given these other elements.

#### **Uncertainties**

45. This document presents HSE's best point estimates of costs and benefits. As the benefits section makes clear, there is considerable uncertainty surrounding our estimate of future risk of exposure to asbestos. This is particularly the case with respect to the extrapolation of risk to generally low levels of exposure. The uncertainty surrounds both a basic choice about which dose response relationship (linear or non linear) is true for the low levels of exposure we are modelling (compared to the exposure levels giving rise to observed mortality), as well as uncertainty around the estimates that each of these choices would produce.

46. Given this, we cannot present a plausible range of estimates around a central figure. Our benefit calculation adopts a non linear model. We estimate that a linear model would produce benefits of around one third of those in our best case. There is no direct evidence on

this issue, and the indirect evidence is limited and inconclusive. Whilst convention would favour the linear model, and it is easier to envisage mechanisms that have a linear rather than a less than linear effect, the occupational cohort data analysed by Hodgson and Darnton (which we believe significantly enhanced the position), suggests a less than linear effect for pleural mesothelioma.

47. Although the occupational mortality data is complicated by many factors, the very widespread distribution of mesothelioma across the male population does suggest that low exposures can be implicated in mesothelioma causation. For example, the observation that mesothelioma mortality in industries outside the clearly high risk groups does not differ significantly between manual and non-manual occupations is suggestive of a non linear effect.

48. Given these observations, a precautionary approach would favour the non linear model. The evidence is not clear enough for HSE to take a satisfactory scientific view. However, we believe a non linear approach is justified on the basis of a cautious interpretation of the evidence - for the purposes of making our best estimate of the benefits of the proposals which are now being put forward.

49. Uncertainty of this kind is difficult to deal with. Further scientific review of the existing evidence is likely to be inconclusive. Better understanding of the mechanism of asbestos carcinogenicity may in future add weight to one or other of the models, and might ultimately resolve the issue. It is unlikely that this key issue could be resolved even with some considerable work.. However, scientific resolution of this issue is not an early prospect, and may indeed never be achieved.

50. With respect to costs, we believe that we now have accurate data on numbers of buildings and the unit costs of different surveying and management approaches. The principal uncertainties surround the percentages of buildings that have already had ACM removed, or have an adequate management systems (under the ACoP) in place, and also in the type of action that may be taken in the remainder of buildings. However, we believe our estimates represent the best *central* estimate of costs.

51. With respect to the *balance of costs and benefits*, another important sensitivity arises from the use of discounting. The long lag between fatal exposure and death, particularly for mesothelioma, means that the effect of discounting benefits is severe. The discount rate for benefits, of 2%, reflects individual's observed weighting for benefit this year rather than the same benefit next year. The same weighting (this time a *disbenefit*) is included in the rate of 6% for discounting costs.

52. If this 'pure time-preference' weighting is reduced to, say, 1.5%, then the best estimate of benefits is increased to £4.3 billion in present values from £3.3 billion, so that benefits now exceed costs by £1.3 billion. HM treasury recommends that a time preference discount rate is used, but states that there is some uncertainty over it's amount, with figures of between 1% and 2% suggested. It should be noted that the value HSE (in common with the Department for Transport, DfT) uses for discounting benefits lies at the top of the suggested range. The Department of Health uses a figure of 1.5%.

53. The benefit figures are also sensitive to the doubling of the DfT's value attached to the reduced risk of a future fatality. At standard valuations, benefits would be just over one-half the value shown (cost-savings would not change). The overall conclusions are therefore sensitive to this assumption. The DfT value is based on research identifying the amount individuals would be willing to pay to avoid a small future risk. Because of the dread associated with contracting cancer, and the fact that this illness is almost always associated with a long period of suffering, we believe a substantial upwards adjustment to the DfT value is justified.

**Arrangements for monitoring and evaluation**

54. These are significant proposals, and HSE intends to conduct a thorough evaluation at the appropriate time.

HSE Safety Economics

June 2002