Dear Graham,

Asbestos release from AIB

Many thanks for your e-mail of 18th October and apologies for the delay in responding: we were on holiday on Lindisfarne all last week.

Your results are fascinating.

The detailed examination of the results will need more information: e.g. the sampling flow rate(s), the size of the test chamber, the position of the samplers on the test subject and the relative position of the air inlet(s), the test subject and the air outlets during the ventilated chamber tests.

I’ll cover the detailed questions and comment later.

If airborne fibres released during the actual processes of pin insertion and removal had been the only source of risk, as assumed by Mark, the total airborne emission from the 100 holes would have been about 3,000 fibres.

Given that classrooms tend not to be particularly well ventilated, I consider that the results obtained for the non-ventilated period are the more relevant.

Assuming that your samples were taken at 1 litre/min, the total collection on your samplers during the unventilated tests would have been about 26,000 fibres. Given that your samplers were too far away from the source to have collected all the fibres released, at least 500 mm during work with the pins, the total effective emission would probably been at least 100,000-200,000 fibres; the primary conclusion must therefore be that debris from the holes was by far the major source of airborne fibres.

If the non-ventilated period results are considered, the time weighted average exposure over the 75 minute experimental period was 0.35 fibres/ml, and if it is assumed that the typical good kindergarten and primary school teacher changes the display work in the classroom twice a week on average, such teacher’s time-weighted average exposure over the year is about 0.35 x 2/40 = 0.018 fibres/ml of amosite.
It should be noted that from paragraph 168 of the current ACoP, HSE (2002), an exposure to 0.01 fibres/ml is not “an acceptable permanent environmental level.”

The time-weighted average airborne fibre concentrations from your recent series of tests therefore demonstrate that inserting and removing drawing pins into and from AIB exceeds the Clearance Indicator level by about a factor of 2 and constitutes a “non-acceptable” exposure as defined by the ACoP.

The airborne fibre concentrations measured during the seated and walking periods also suggest that significant numbers of fibres had been released into the classroom. Such airborne fibres could constitute a risk throughout the balance of the school day after AIB disturbance and a very significant risk for young children given their longer life expectancy and thus the longer period available for the development of mesothelioma.

The above time-weighted average is therefore likely to be exceeded when the balance of the classroom day is taken account of and if further fibres are released from amosite contamination on the teacher’s hair, face and clothing are taken into account.

I have some comments on the detail of the most recent series of experiments.

I cannot quite understand your comment that the ventilation rate during the unventilated test was 5.3 m³/hr unless I assume that there such flow was provided to maintain the test chamber negative with respect to the ambient environment. Am I correct?

I presume that the result for walking during the ventilated test was <0.01 fibres/ml. Am I correct?

From personal experience during both respirator laboratory testing and Workplace Protection Factor (WPF) studies, I have found that the exhaust air from powered respirators can flush over lapel samples. I therefore measure ambient samples in WPF studies by mounting the sampler onto the respirator facepiece well clear of the exhaust outlet. (As ambient samples in WPF studies are taken using miniature sampling heads, the weight of the head does not affect the respirator fit or stability.)

Was there any possibility that such effect could have affected your results?

As the results clearly indicate the importance of debris as a source of airborne fibres, and as debris on the teacher’s hair, face or clothing could form a reservoir of hazard to both the teacher and the children, I would be very interested in repeating the tests and micro-vacuuming the test subject, head to toe, to determine the magnitude of this hazard reservoir.

It would also be very useful to locate an isokinetic sampler in the outlet air duct to measure the total emission of airborne fibres and to continue such sampling for about 36 hours after completion of the tests. This is important as the teacher and the children...
could remain in the potentially contaminated classroom all day and cleaning staff
could be exposed to any asbestos debris remaining in the classroom in the evening.

I should explain that some years ago I was asked to quantify the total fibre emission
from the dry break-out and clean up from a single 4’ x 8’ AIB panel and sampled in
from the negative pressure unit for 48 hours. I found that we had to sample for about
36 hours before there was no significant further collection. Incidentally, the total
emission was about $5 \times 10^9$ respirable fibres!

As you will appreciate, these most recent results also have significant consequence for
the interpretation of the drilling tests in your original report!

Please give my thanks to Pauline Nash for asking you to pass on the results.

With best regards,

Robin.

REFERENCE

Health and Safety Executive (1992) Work with asbestos insulation, asbestos coating