I Michael Robert Lees, Artist, of Hardsworth House, Hardsworth, Bradworthy, Holsworthy, Devon EX22 7SD, do make oath and say as follows:

WATCH COMMITTEE
Assessment of potential exposure of teachers and others from the use of drawing pins on asbestos (amosite) insulating board in a school classroom setting.

A Report by Michael Lees

Note: All statements are supported by documentary evidence. Statements given by HSE officers and Government Ministers are direct quotes from my wife’s case file obtained under the Freedom of Information Act.

HSE: “OVER TIME CUMULATIVE DOSE COULD BECOME SIGNIFICANT” “SIGNIFICANT (MEANINGFUL, “REAL RISK”))”

My wife died aged 51 of malignant mesothelioma of the pleura. She had been a primary school teacher for thirty years.

At my wife’s inquest the Coroner summed up by stating that he considered that my wife’s mesothelioma had been caused by an exposure in a school. I have carried out a comprehensive investigation to determine why this should have happened. Almost all of the schools that my wife taught in contained asbestos in one form or another. In one school the school authorities were unaware that any asbestos existed at all, let alone that every ceiling was asbestos insulating board (AIB). Consequently building and maintenance work was carried out with no safety precautions being taken, at times while the classrooms were occupied.

Practical experience of inserting drawing pins
I have practical experience of inserting drawing pins into an AIB ceiling in a school classroom, as I have frequently done it myself. I have also seen my wife brushing debris from her face, hair and clothes that had fallen from the AIB ceiling when she was displaying the children’s work. During all of this her face was about six inches from the ceiling. She and the other infant teachers pushed drawing pins into AIB on almost every working day for many years.

When you compare the high levels of fibre release that were clearly apparent in the real situation with the levels of airborne fibres that the HSE/HSL have counted in their laboratory simulations it is clear that there is a great disparity. I therefore am unable to accept the conclusions of the HSE/HSL tests which give an unrealistic measure of fibre release. Neither can I accept the exposure levels that the HSE/HSL have calculated that my wife, the other teachers and the children have experienced.
It is a common practice of teachers, and particularly primary school teachers, to display the children’s work by pinning it to the walls and ceiling with drawing pins. My wife displayed the children’s work in this manner throughout her thirty year teaching career.

**Expert opinion estimates fibre levels as possibly significant**

I realised that over time, daily low level exposure such as this would have had a cumulative effect, particularly when added to the other causes of fibre release. I therefore asked the HSE if they could assess the levels of fibres likely to be released from inserting drawing pins into AIB. So that the overall risk to the teachers and children could be determined.

The HSE case officer supplied me with the HSE guidance EH71, so that I might obtain some idea of the fibres released. The document gives levels from various activities involving work on AIB, and the one that was most comparable to inserting drawing pins was drilling into AIB. I made a rough estimate that, hole for hole, a drawing pin might release a fifth the fibres that a small drill bit would. I asked how many holes and what sized drill caused the levels noted in EH71. The case officer could not tell me, although she considered that the fibre levels that the teachers breathed in were such that there was a strong ground for telling them.\(^1\) She then arranged for me to talk to an expert, who she said would be able to give an informed opinion on the levels of exposures and whether they were significant:\(^2\)

> "I asked Mark to phone Mr Lees to talk with him in detail about the likely extent of his wife’s exposure to asbestos."\(^3\)

On October 9th 2001 Dr Piney, a Specialist Principal Inspector in Occupational Hygiene, phoned me and we talked for about an hour. I gave him details of my wife’s exposures and that of the other teachers and children. I described the maintenance activity and how, throughout her career my wife had displayed work by inserting drawing pins into AIB. He told me that the fibres released from each pin would not be many, but the accumulation over years could be a significant enough dose to cause mesothelioma. He said that the other teachers should be told. He would mull over how to carry out a test and would talk with colleagues. He told me that the HSE laboratory in Sheffield had the capability to carry out such a test, and although he could not say whether one would be carried out, he considered that the results would be additional intelligence for the HSE.

My concerns had been confirmed that the cumulative exposure of my wife and the other teachers could have been significant and that they should be told. Although he thought that the exposures of the children would have been less than the teachers’, it was difficult to quantify quite how much less. He left me in no doubt that he would consider carrying out a test to determine fibre levels.

Immediately after our conversation Dr Piney e-mailed the case officer and copied it to the HSE Principle Inspector with responsibility for schools. Dr Piney’s e-mail is as follows:

> “I have had a long talk with Mr Lees about the death of his wife and her possible exposure to asbestos.”

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\(^1\) Tel Haberfield/Lees 9 Oct 01

\(^2\) HSE PI Johnson/ Piney Request to SG 001140 22 Oct 01 client 010404323

\(^3\) E-mail HSE Haberfield/ Parkes 29 Oct 01 Subject Mr M Lees
From Mr Lees description of how she pinned children’s work to an Asbestolux ceiling I think that she was exposed.

Although the fibre release would have been low each time it is possible that, cumulatively, her exposure/dose became significant.

He asked me whether I thought that his calculations of possible exposure were accurate. His approach is fair but the key question, which I could not answer, is how many asbestos fibres would be released by sticking in and taking out pins from an asbestolux ceiling?

It might be possible to do some empirical tests but I need to mull the idea over.”

He is going to see his MP on Friday and ask that the issue of teacher/children and asbestos is raised with the Department of Education.⁴

The HSE case officer recorded in the case log:

“M. Piney believes likely that Mrs Lees was exposed.”⁵

Dr Piney’s definition of significant is as follows:

“Significant ie: sufficient to cause significant, meaningful “real risk.”⁶

I wrote to Dr Piney confirming our conversation, and thanked him for considering carrying out a test. I put on paper the details of my wife’s exposure that I had told him on the phone. This was so that if any test was carried out then it could be designed around the known parameters. (My letter is attached at Annex 9 to the WATCH committee papers 2006/2)

He did not reply.

Nine months passed. No test was carried out.

Because of the HSE’s conduct surrounding many aspects of my wife’s case, I submitted a formal complaint to the Director General. A background briefing paper on the case was compiled by HSE officers and given to the Director General. The Director General’s draft reply was sent around to the relevant HSE officers for their input, the following is an extract:

“It is unfortunate that you gained the impression from your conversation with Dr Piney that it would have been significant.”⁷

The HSE had arranged for a specialist officer to give an expert opinion. The officer had sufficient time to consider the situation before he called me. He realised the

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⁴ E-mail Dr Piney/Haberfield 9 Oct 01. E-mail copied Haberfield/ Parkes, Rajham
⁵ Case officer log Cont no:62861 9 Oct 01
⁶ E-mail Dr Piney Wales and South West Specialist Group/ HSE Head of Asbestos Policy 29 Jan 04 Note to Hindmoor DfES
⁸ Draft reply DGO 186/2002 July 02 FOI
importance and weight that would be placed on his professional opinion. In our conversation he made clear and specific statements to me that he knew would be used. I wrote to him and he failed to reply. He then denied that he had ever made the statements that he had.

My wife’s case file provided under the Freedom of Information Act confirms the statements that were made precisely as I understood they had been made. The conduct of Dr Piney is described at the Appendix.

The HSE Principle Inspector for Education e-mailed his colleagues:

“Anything to add re the tests he is calling for, and I propose to decline?”

The HSE Principle Inspector for Education confirmed that they would not carry out a drawing pin test. However he gave me the names of certain specialists who, he stated had the skills and expertise to carry out such tests. I therefore contacted Mr Howie who agreed to carry out a test.

No investigation has been carried out by HSE to assess the exposure levels from other sources in specific named schools. HSE have not inspected any of the named schools where they were told that staff and pupils remain at risk. People remain unaware that they have been exposed to asbestos.

**Expert opinion estimates fibre levels as significant**

I wrote to Dr Piney with confirmatory parameters and details of my wife and the other teacher’s practice of displaying the children’s work. The following are from that letter:

- It is very kind of you to consider carrying out tests to determine the levels of asbestos dust released on inserting drawing pins into AIB ceilings.
- I would greatly appreciate it if you would carry out tests to determine the likely levels of exposure for both teachers and children.
- The classroom was about 30ft x 30ft and about 7ft 6ins high.
- My wife taught the kindergarten children. There were about twenty children in the class.
- Every day the children would cut out and colour pictures that would either be fixed with drawing pins to the wall display boards or suspended with drawing pins as mobiles from the ceiling.
- Daily my wife would spend about ½ hour displaying the work. This probably involved 10 minutes of actually inserting and removing drawing pins.
- Other teachers used the ceilings as a pin-board and they verify the practice. My wife’s ever changing displays were renowned, and her classroom has been described as an Aladin’s cave. One had to duck and weave across the room to avoid clowns and aeroplanes.
- Her face was about four to six inches from the ceiling, and she would look up to remove the old drawing pins by twisting and pulling them, then she would insert new pins to suspend the mobiles.
- Where the mobiles had been suspended most frequently the fabric of the panels was damaged, to such an extent that on at least on one occasion while I was helping her she even had to brush the dust from her face.

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9 e-mail Services sector Education Section Parkes/ Piney, Daunton, Rajam, Gooday 29 May 02
10 HSE Parkes/Lees 2 July 02
11 Lees/Piney 17 Oct01 attached
The suspended ceilings was Asbestolux supplied by Cape Products in 1962. Cape have confirmed that the asbestos used was Amosite.

INDEPENDENT TESTS SHOW FIBRE LEVELS ARE SIGNIFICANT

Independent test shows each drawing pin releases 6,500 amosite fibres

Based on HSE recommendations I commissioned Howie Associates to carry out the test. The first Howie test counted about 6,500 fibres released from each drawing pin.

This scientifically confirmed the sort of levels that I had personally experienced and seen.

A second series of tests were performed at a later date by Howie Associates. The second tests confirmed the results of the first. Although the numbers were slightly lower they were all of the same order of magnitude.

These tests combined counts from pins that were widely spaced and from pins that were close together with some overlapping. This represents the precise conditions that occur in the classroom where the AIB ceiling becomes damaged where the pins are inserted most often.

Debris produces large amounts of fibres.

Debris was collected from the cyclone test and the fibres counted. The numbers of fibres were considerable. This proves that the debris produced cannot be discounted and must be considered when calculating airborne fibre concentrations and teachers and children’s exposure.


Fibres re-suspended.

As many of these fibres and debris fell directly on the teacher’s hair, face and clothes it is likely that a significant proportion of the fibres would have been inhaled during the activity and some would have remained on the teacher or her children who were helping her. The residual fibres would have remained airborne for a period of time until they settled. The debris similarly would have fallen onto the occupants, desks, books, toys and the floor. As this was an infant’s class much activity took place with the children sitting on the floor where the teacher read them stories or sang them songs. Their hands and clothes were in contact with the carpet and their faces were close to the floor and hence any fibres would have adhered to them and would potentially have been breathed in. As some of the children were only three the teacher and her assistants would comfort and cuddle them while the children faces rested on their shoulders and hair where the fibres lay. The debris that lay on the floor and surfaces is friable and some would have inevitably been broken up to release more fibres. Little children are very active and such activity would have stirred up the fibres so making them airborne once again to be breathed in.

After receiving the results of the Howie test, the HSE made an estimate of the health risk that would occur from the exposure levels given in the Howie tests:

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Technicon asbestos survey. The Modular Quarterly winter 1964 School Design and construction. Mr B Martin/Lees 7 Jul 01 . Maintenance list S school 15 Aug 64
An independent report from Howie Associates for Michael Lees suggested that there might be significant asbestos exposure as a result of puncturing asbestos insulating board with drawing pins.”

TESTS DESIGNED BY HSE/HSL. PARAMETERS SET WHICH GUARANTEE AN UNREALISTICALLY LOW LEVEL OF FIBRES

On receipt of Howie test results HSE carried out test.
HSE results confirm Howie results
The HSE then commissioned the HSL to carry out their own series of tests.

All the fibres released from pinning were counted using a micro vacuuming technique.

Initially the HSL used the same sampling equipment as Mr Howie had. It would appear from the results that the equipment was not being used correctly. This is because the results were completely inconsistent with those of Mr Howie and with the HSE/HSL repeat of their own test.

Although the summary of the experiment states:

“The values were probably a slight overestimation.”

The repeat of the test using the Howie sampler appears to have been carried out correctly.

The results confirm Mr Howie’s results.

HSE redesigned tests so that residual fibres and debris not collected.
The tests was then specifically redesigned so that no debris would be collected, and by gradually increasing the capture distance from the panel until the distance was 50cms.

A further series of tests were then carried out after a radical redesign of the methodology so that only airborne fibres would be counted and it was specifically designed so that debris and residual fibres would not be counted.

Classroom ceilings damaged by drawing pins
The classroom AIB ceilings were damaged where drawing pins had been frequently inserted. HSE were informed of this and such a fact is clearly apparent when one considers the volumes of debris and fibres that I saw falling on my wife.

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13 Draft letter Minister of State for Schools/ General Secretary National Union of Teachers. 2004/0043423PODM Aug 04

14 HSL report MF2004/02 Revell Table 1 p6
HSE ask opinion of demolition contractor about condition of ceiling.
The HSE has attempted to discredit my statement about the condition of the ceilings in my wife’s classroom by quoting a demolition contractor punished for falsifying the documents concerned with this case.\(^{15}\)

The contractors stated that they had checked their records and that the ceilings were in good condition. The case officer therefore assessed that there was minimal or no risk to the occupants of the classroom.\(^{16}\)

The Environment Agency carried out an investigation of the contractor’s conduct during this demolition. They uncovered a series of violations of the regulations and found that the contractors had also falsified important documents. Because of these offences they were issued with warning notices. The contractors word cannot be taken as a true condition of the ceilings, as they are wrong.

Majority of HSE tests assessed fibre levels from AIB panel on the floor
During the first HSE test the majority of the readings were taken with the AIB on the floor with the sampler above it. Initially a vacuuming technique was used where all potentially respirable fibres were sucked up and counted and those test results confirmed those of Mr Howie.\(^{17}\) The HSL sampled from above and concluded that any debris produced by the operation would remain in the hole or around the perimeter and :

“Most of this debris would not normally become airborne.”\(^{18}\)

HSE redesigned test so that debris intentionally not collected.
Having acknowledged the fact that most of the debris on a horizontal surface on the floor would not normally become airborne, the HSE stated:

“It was decided to develop a test method for measuring the release of airborne respirable fibres directly.”\(^{19}\)

“Air sampling method … Tests were carried out with the cowl at about 12,5, 25,50 and 75 mms from the horizontal board.”\(^{20}\)

This then relied on the fact that :

“When the pin is pulled out it creates a suction effect. This suction will pull loose material out of the pinhole and generate a small cloud of airborne material immediately above it.”\(^{21}\)

It had been described to HSE in my Oct 17 paper how the activity had taken place on the ceiling and it was clear from the description that considerable debris and fibres

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\(^{15}\) Caselog Cont no 56496 Haberfield 22 Jan 01 FOI. Environment Agency Investigation report removal of asbestos from school 22 June 02. Background note to DGO 186/2002 para 3 July 02 FOI

\(^{16}\) HSE case officer contd no 56496 22 Jan 01

\(^{17}\) HSL report MF2004/02 Revell table2 sample 08386/03

\(^{18}\) HSL report MF2004/02 Revell p8

\(^{19}\) Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report Piney 20 Aug 04

\(^{20}\) Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report Piney 20 Aug 04 3.1.2

\(^{21}\) HSL report MF2004/02 Revell p8 2.3.1
fell from the holes. And yet they specifically designed a test that relied on the minuscule suction created from pulling the drawing pin out of the hole to disperse the fibres skywards against gravity and the downward flow of air in the chamber. They then sampled the “small cloud” of airborne fibres at distances of up to 75mm. It is understandable that they were able to conclude that:

“When the capture hood is moved further from the AIB surface capture effectiveness was reduced.. to 3 fibres at 75 mm.”

Airborne fibre samples taken from the floor give results 13 times less than from the ceiling.
The level of airborne respirable fibres varies considerably depending on the position of the board. The following figures are taken from the HSL drilling tests performed during this series of tests, and from the HSE publication EH71. The following are a comparison of fibres released depending on the orientation of the board:

A vertical surface gives 6 ½ times more fibres than a sample taken on the floor.
A ceiling gives twice as many fibres as drilling vertically
A ceiling gives 13 times more fibres than drilling on the floor.

Although drilling imparts more energy to the fibres than drawing pins, the comparison is given to demonstrate the considerable difference in fibre release between the ceiling and the floor.

Airborne fibre count taken from floor does not simulate number of fibres falling from ceiling
The airborne fibre test did not simulate how many fibres are likely to fall from above. All it actually proved is that if the AIB is on the floor the suction of a drawing pin being withdrawn from its hole releases very few airborne fibres because of a downward airflow and gravity. It also proves that less fibres are collected the further the sampler is moved away from the source of release. It is not a realistic simulation of classroom conditions.

Parameters were given and yet HSE tests were specifically designed to disregard the known parameters.
The HSE test report states about the known parameters:

“The ceiling tiles were made of AIB....A proportion of the art work made by the infant children was fixed to the ceiling.”

The letter of 17 Oct specifically asks the HSE to assess the levels of asbestos fibre released from inserting drawing pins in AIB ceilings, and it has been acknowledged that this was the practice, and yet on the first series of tests only one sample was carried out to count fibre levels from the ceiling, to:

“Simulate debris falling onto a face”

The parameters I described produced debris on a scale where “My wife even had to brush it off her face.” This was when my wife was removing just one pin from the AIB,
and yet the fibres and debris were such that she was brushing them off her face. The numbers of fibres must have been most considerable, and the action of brushing the debris must have broken up the debris to some extent, consequently releasing fibres.

The HSE test was designed to supposedly simulate precisely this situation of debris falling on a face.

The HSL counted 7 fibres per drawing pin.

As a tiny particle of AIB contains thousands of fibres this result is remarkable. It is clearly wrong and demonstrates that the tests were an unrepresentative simulation of classroom conditions.

One must ask why this test was not repeated to confirm the result, particularly as this was the only test that took place to simulate the actual conditions described in the parameters. One must also ask why the numbers of fibres counted were so very low. It was either because the test had been inadequately designed, the method of fibre sampling collected an unrepresentative numbers of fibres. Or the operative was not inserting the probe with the vigour required when inserting a drawing pin.

The cowl was placed at 30° from the horizontal, consequently only very few fibres could possibly be captured. If one stands on a chair with one’s face a short distance from the ceiling, while looking up at the drawing pin while pushing it in, then ones nose is at least 90° from the horizontal and ones mouth is directly below the falling fibres. The position of the cowl does not seem to be representative of the position of a human face and is likely to be the reason larger pieces of debris were missed. The HSL report states:

"When sampling from a vertical board dust could fall from the hole into the sampling device. Once debris has fallen beyond the entry to the sampler it is lost." 24

The remarkably small numbers of fibres collected on the sampler would indicate that this was a direct consequence of an inefficient method of collecting. It was not a realistic count of the actual number of fibres released.

**HSE test does not adequately simulate damage to ceiling caused by drawing pins**

My Oct 17 letter states that the ceiling in my wife’s classroom were damaged where "Drawing pins had frequently been pushed into the same area of AIB”.

The letter also specifically mentions that "My wife had to brush the dust from her face.”

These statements clearly demonstrates that the ceiling was damaged and the drawing pins were being pushed into the damaged material. It also demonstrates that debris was being released in considerable amounts.

The HSE report states at para 5:

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24 HSL report MF2004/02 Revell p8 2.2.3
“The test findings show that drawing pins do not do a lot of damage to the AIB matrix”.  

And at para 7.1

"Inserting and withdrawing drawing pins into AIB does not normally cause significant disturbance and damage".

My Oct 17 paper made it clear that there was damage to the ceiling where the drawing pins were inserted most frequently. It can only be concluded from the above statement that the test was not a fair simulation of classroom conditions. One can also conclude that if the AIB matrix was not damaged in the series of tests then the drawing pins were placed so that this was achieved.

**HSE tests show that inserting a drawing pin into AIB can release similar quantities of fibres as drilling.**

In the HSE report Dr Piney refers to our conversation of 9 Oct 2001 and states:

“Drawing pins do not disrupt the matrix significantly and small numbers of airborne respirable fibres are released on the insertion and withdrawal of a pin (see table1). “In contrast when the same type of AIB is drilled with a ¼ inch drill bit something greater than 3000 airborne respirable asbestos fibres are released per drilled hole.

Comparing this result with the pin experiments the airborne respirable asbestos release rate is between 50 and 100 times greater for drilling.

This result explained why I could not agree with Mr M Lees use of the fibre levels in the HSE guidance Note EH35 where he assumed that drawing pins would cause the release of 1/5th the number of fibres quoted for drilling.”

HSE publication EH 71(EH 35) gives a table of exposure levels for various kinds of work, I had used this to make an assessment that drawing pins would release 1/5th the number of fibres of drilling.

The background note to the Director General refers to my conversation with Dr Piney, it states;

“He took the exposure caused by drilling asbestos insulating board and assumed that drawing pins generated a fifth of this exposure. Dr Piney explained that this was a mistaken assumption and that the fibre release from drawing pins would be much, much lower.”

To form this conclusion Dr Piney has used the result from drilling with a ¼ inch (7mm) drill bit within a collecting shroud. Given the same length, a 7mm drill bit has 12 times the volume of a 2mm drill bit, and 49 times greater than a 1mm drawing pin shaft. He does not state how far he drilled into the AIB.

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25 Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report Piney 20 Aug 04 para 5
26 Potential exposures to teachers and others from the use of drawing pins on asbestos insulating board (AIB) para: Para 7.1
27 HSE Test report Dr M.Piney 20 Aug 04 P7
28 Draft reply for HSE Director General July 2002 FOI
What Dr Piney failed to mention in his conclusion is that he also performed tests with a 2mm drill bit

“Drill test 1. An initial test with the board parallel to the floor (2mm drill) was followed by tests using 2mm and 7mm (1/4 inch) drill sizes on a board held perpendicular to the floor”

The averages given for drilling a horizontal board on the floor and sampling from above are:

**Drilling 2mm hole:** “Average 62 fibres per hole.”

He had concluded that the fibre levels released from the HSE/HSL drawing pin tests:

**Drawing pin (1mm) hole** “will vary from 30-60 fibres per hole.”

One must question why Dr Piney has used results from a test with a drill bit that is not comparable with the drawing pin as its volume is 49 times greater. The selection of data from a drill bit that is a far larger than the drawing pin is wrong and creates a misleading impression on any one reading the report.

**Published figures available for AIB. HSE give a comparison with Asbestos cement.**

As has been seen the HSE publish figures for airborne respirable fibres released from drilling AIB. As has been seen above I have compared the tests with such figures, however the HSL chose not to compare their tests with these figures. Instead the HSL test report makes a comparison with a completely different material. IR/L/MF 08/99 was a test carried out to count airborne respirable fibres from asbestos cement, which is a completely different and far harder material containing chrysotile rather than amosite.

When one considers the difference in density and the asbestos content, and the fact that amosite is more readily released from the matrix than chrysotile, then the AIB would release many times more fibres than the cement and the test figures should reflect this. However the HSE test has shown the very opposite, which once again proves that their results are far too low.

It is wrong to make a comparison between tests that use different parameters when results are available giving like for like.

**HSL give a word of caution on reliance of tests**

The HSL give a word of caution, however this caution has not been included in Dr Piney’s report. The HSL testing officer states:

“Dwell time, the length of time the suction is applied, will affect the amount of material collected. Although these dwell times were not measured they were short, as the action of extracting the pin tended to take it away from the hole

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29 HSL MF2004/02 G. Revell p10 para 2.4.1 20 Aug 04
30 HSL MF2004/02 G. Revell Table 4 20 Aug 04
31 Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report  Piney 20 Aug 04 Some Conclusions p9 para 7.1
32 HSL MF2004/02 G. Revell  p11 20 Aug 04
and the surface of the AIB. It was estimated that on average these dwell times were less than a second. \[^{33}\]

After the first series of HSE/HSL tests the HSL testing officer added another word of caution:

“Many of the samples were collected over short time periods and only small volumes of air were sampled; consequently only small numbers of fibres were collected and counted. The fibre concentrations (and fibre numbers) from low volume, low fibre number samples must be treated with caution and not over interpreted. However, whilst these individual results, in themselves, may not be significant they may help to demonstrate trends or patterns.” \[^{34}\]

Given the caution highlighted in this HSL statement it is therefore wrong for the HSE Head of Asbestos Policy to quote from these test results without adding the words of caution given by HSL. Instead he has stated without reservation:

“That inserting drawing pins into asbestos insulating board and withdrawing them does not cause significant level of fibre release.” \[^{35}\]

HSE estimate of frequency of displaying work in infant class

Dr Piney had been told that my wife daily punctured the AIB ceilings with drawing pins. However it is apparent that he did not believe me. He and other HSE officers put some thought into how often they could convincingly say that an infant school teacher might display the children’s work:

“I think that speaking to a few teachers might help in that it would/could give a bit of a feel for common practice and if we make it up it will not look (or be) as “real” as if we’ve asked (even a few) teachers.” \[^{36}\]

The HSE senior case officer stated:

“Although we could ask a number of teachers this would give us no better idea than making a guess.” \[^{37}\]

He chose not to take the expert advice and instead made his decision “to speak to a few teachers” to ensure that his scientific test looked “real.” At paragraph 6 of his test report Dr Piney states:

“I have taken advice on the normal practice of infant school teachers from two headmistresses managing primary schools in Birmingham. According to the headmistresses the usual procedure is that classroom displays are changed every term, in the case of infant reception classes, displays may also be changed at half-term.” \[^{38}\]

He had achieved what he had set out to do for he had made it look “real” when he wrote his report. He made his calculations of teachers’ and children’s exposure levels

\[^{33}\] HSL Test report MF2004/02 G.Revell
\[^{34}\] HSL MF2004/02 G. Revell 20 Aug 04
\[^{35}\] MacDonald/Lees 23 Aug 04
\[^{36}\] e-mail HSE Principal Special Inspector Dr M. Piney/ Principle Inspector Johnson, Haberfield. Shepherd.
\[^{37}\] E-mail HSE Principal inspector Johnson/ Piney, Shepherd
\[^{38}\] Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report Piney 20 Aug 04 Para 6
based on his “feel for common practice”. He then formed his conclusions based entirely on those spurious, inaccurate figures.

My wife was an exceptional teacher, but also in this particular school, so was the other infant class teacher and the four assistants who used to change parts of the displays daily. It would appear that the “expert opinion” reflects bad teaching practice, rather than the actual situation in the classroom where teachers and children were daily being exposed to asbestos.

**HSE Education Sector estimate 1000 drawing pins annually. Calculation uses 60-120 annually.**
The HSE Education Sector were asked for their expert opinion about how many drawing pins might be pushed into the AIB ceilings in a year. They replied:

> "Having considered this activity here in Sector, a conservative estimate could be 1000 pins/year."[^39]

Having taken the expert advice Dr Piney chose not to follow it. Instead he made his calculation on the following:

> "Displays are changed every term

**For reception class may be changed at the half term

At worst case, 10 pieces of art work are fixed to the ceiling using two drawing pins for each piece."[^40]

This equates to **60 to 120 annually** by using his own criteria. He had asked for and been given an expert opinion. He then chose not to use it.

**Fibre release compared with UK Background levels.**
Dr Piney needed a comparison to set against his results for comparison, he stated:

> I also haven't had time to consult with A...D.... (The HSE statistics branch) on actual risk estimates.

**But I think that the likely dose, compared with the UK background works quite well."[^41]**

He has failed to acknowledge the fact that UK background levels are chrysotile. In the classroom the fibres were amosite. The fact that background fibres are chrysotile rather than the amphiboles, amosite or crocidolite, is made clear by the HSL’s Dr Burdett in an article about fibre levels in public and commercial buildings:

> "In contrast to chrysotile, the presence of commercial amphibole fibres in rural or urban samples is extremely rare."[^42]

[^39]: e-mail HSE Principal Inspector Education Sector, Parkes / Piney, Daunton, Rajham 10 Jun 02
[^40]: Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report Piney 20 Aug 04 Para 6
[^41]: e-mail Piney/MacDonald, Hetherington, Shepherd, Johnson, Cairns, Hermann, Johnson, Haberfield, Nash, Revell. Drawing pins AIB and teachers. 2 Apr 04
The exposure risk from amosite is 100 times greater than that of chrysotile. Therefore a direct comparison of amosite levels and the normal background level of chrysotile is incorrect unless the difference between the two types of asbestos is taken into account. Dr Piney did not take them into account.

He did not use any of the other parameters given to him in my letter of 17 Oct, other than the dimensions of the classroom. Neither did he take into account that the HSE Education Sector had estimated that 1000 drawing pins would be inserted and removed annually. His calculations to provide the comparison were based on the fact that once released the fibres would disperse instantaneously and evenly throughout the classroom. The other parameters used were as follows:

30 children

10 pieces of art work

20 drawing pins

Classroom 30ft x 30ft x 7ft 6inches. 190 cu metres

fibres are present for 10 minutes. This is a generous estimate and in practice asbestos airborne fibre levels will be diluted more quickly.

His calculation and conclusions were then based on his own opinion and flawed science, rather than known facts and expert advice.

“Based on normal primary school infant class activity and making reasonable and conservative assumptions the calculated airborne respirable asbestos fibre levels in the classroom could be between 0.00000632 f/ml and 0.00000316 f/ml for a short period, while the art work displays were taken up and down.”

“It is unlikely that such short term low level additional exposure will add a significant risk to the “natural” asbestos fibre exposure to which we are all subjected.”

This conclusion is based on his unrealistic figure of fibre release. It also does not take into account the fibres falling directly onto the face, hair and clothes of the teacher who was just a few inches below the point of release. It instead presumes instant dispersion throughout the room. He also considers:

“The fibre levels in the classroom will exist for a short time and will dissipate quickly depending upon the general ventilation rate.”

What he does not take into account is that some, if not many, of the fibres will remain in the room to be disturbed with ongoing activity.

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43 The Quantitative risks of Mesothelioma and Lung Cancer in Relation to Asbestos Exposure. Hodgson Darnton Ann Occup Hygiene Vol 44 P565
44 Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report Piney 20 Aug 04 Para 6.1, 6.2
45 Potential exposures to teachers and others from the use of drawing pins on asbestos insulating board (AIB) paras: 7.2 & 7.5
46 Potential exposures to teachers and others from the use of drawing pins on asbestos insulating board (AIB) para: 6.2
Requests for a meeting to resolve anomalies ignored or refused

Since Mr Howie carried out his first test there have been 10 separate requests made to the HSE to hold a meeting to come to a mutually agreed conclusion. These requests have come from Mr Howie, the National Union of Teachers and me. All have been ignored or refused.

One of these occasions was after the HSE/HSL first series of tests. Mr Howie and I requested that a meeting should take place so that the anomalies could be resolved. We asked that if any further tests were to be carried out then they should be carried out with agreed parameters and methodology. He also advised the HSE/HSL of the importance of collecting all the fibres released. However they ignored our requests and his professional advice.

The HSL designed and executed the second test without collecting all the fibres, despite the fact that technically that is a relatively simple matter. The HSE/HSL also notified Mr Howie and me that a further test had taken place only once it had been completed.

It is unacceptable, that in a case such as this the HSL and the HSE should ignore the requests of an acknowledged expert. And ignore the requests of a teaching union who are concerned about the safety of teachers and children. It is also unacceptable of the HSE and HSL to consider that they could treat my requests with such disdain.

HSL consider that first HSE/HSL test was not designed to accurately simulate exposure from inserting drawing pins into AIB.

The HSE Head of Asbestos Policy gave the reason why the first series of HSE/HSL tests were carried out. He stated:

“In order to determine the risks to staff and children from the use of drawing pins in the classroom, the Health and safety Laboratory (HSL) has, on HSE’s behalf, carried out a series of tests looking at potential fibre emissions.”

The HSL introduction to the second (large chamber) test report refers to the first series of tests (glove box). The HSL state:

“The tests were not designed to accurately simulate exposure during work activity.”

The “work activity” they refer to is the practice of inserting and removing drawing pins from AIB in a classroom.

This statement contradicts the Head of Asbestos Policy’s stated reasons for carrying out the tests. In addition very precise conclusions were drawn by the HSE from the results of the first test that gave precise estimates of exposure levels of teachers and children. Those conclusions were then used as an unambiguous and very specific statement given by the HSE Head of Asbestos Policy and by the Minister of State for Schools:

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47 MacDonald/Lees 23 Aug 04
48 HSL IF2005/06 Concentration of airborne respirable fibres released from asbestos insulating board by drawing pin damage.
49 Potential exposures to teachers and others from the use of drawing pins on asbestos insulating board (AIB)
"Some conclusions"

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“Although this activity did cause some airborne respirable fibre release, between 0.00000632 f/ml and 0.00000316 f/ml for a short period, these levels are extremely low (i.e. between 0.5% and 60% of the normal background level of airborne asbestos in the UK generally). Such exposures would only occur during the work activity itself and an estimate of the contribution that these additional fibres would make to overall exposure concluded that, in a typical day, they would at worst increase exposure by 0.006% and 0.44% of the normal daily dose of people in the UK.”

One must question why the Health and Safety Laboratory were contradicting the HSE statements about the aims of the first test. It would also appear that the HSL were attempting to distance themselves from the specific and unambiguous conclusions that the HSE had drawn from the tests.

If the first series of tests “was not designed to accurately simulate exposure during work activity.” Then the HSE/HSL achieved their aim, for the fibre levels that they counted did not accurately simulate exposure during the “work activity.”

The HSL state that the first series of tests (glove box) were designed to:

“Initially confirm measurements communicated to the HSL.”

The initial HSE tests did confirm the ”measurements communicated to them,” for the results confirmed those of Mr Howie.

The HSL does not mention in their introduction what the second aim of the tests was. It would appear that it was to discredit Mr Howie’s methodology used to assess the levels of fibres likely to be breathed by the teachers and children. The design of the HSE/HSL tests, the methodology used, the parameters selected and the conclusions reached all indicate that the sole aim of the test was to show that the results of the Howie tests were wrong. Having discredited his tests the HSE/HSL tests were able to reach the conclusion that exposure levels to teachers and children were insignificant and no risk to health.

The HSL redesigned the first tests so that the numbers of fibres that they collected were reduced dramatically. From the results of these tests the HSE stated:

“An independent report from Howie Associates for Michael Lees suggested that there might be significant asbestos exposure as a result of puncturing AIB with drawing pins.

However, independent research carried out by HSE’s Health and Safety Laboratory identified this was a consequence of the sampling method used by Howie Associates, which in their view does not reflect the degree of airborne fibre release that occurs in practice.”

50 Draft reply 2004/0043423PODM David Miliband Minister of State for Schools/ General secretary National Union of Teachers Aug 04. MacDonald /Lees 23 Aug 04. MacDonald General Secretary National Union of Teachers . MacDonald HSE contribution to Minister of State for Education Reply to the General Secretary of the National Union of Teachers.POS letter from Steve Sinnott, NUT to David Miliband. undated

51 HSL IF2005/06 Concentration of airborne respirable fibres released from asbestos insulating board by drawing pin damage. Introduction. 8Jul 05 Dr Burdett

52 Draft letter Minister of State for Schools/ General Secretary National Union of Teachers. 2004/0043423PODM Aug 04
Known parameters had been given, but they were invariably ignored. Expert advice was given and also ignored. Many of the parameters are unrepresentative of classroom conditions. When comparisons were made they were not made with comparable tests, even though such test results were available.

It would appear that these tests were designed and the parameters set in a way that guarantees an unrealistically low measure of the fibre levels within the classroom.

SECOND TEST.
Large Chamber

The aim of the test was to simulate the actual classroom conditions. This is a statement from the HSL officer who designed the tests:

“With the overall aim to simulate the types of disturbance that reportedly took place in a classroom”53

This test took place within a 9cu metre dust chamber. The AIB was fixed to the ceiling and the operative was able to climb a step-ladder to insert and remove drawing pins into the AIB. If carried out correctly it is probable that a realistic simulation of classroom conditions could have been achieved. This did not happen.

Second test Total fibre release from HSL and Howie test are on par
By using the HSL measurements of fibres collected on the second test, Mr Howie carried out a back calculation to determine the total fibre release. Those calculations show that at a minimum the fibres released from each pin was 4,600. 54 If you compare that result with that of both of Mr Howie’s tests you will see that they are very much on par.

Test invalid.
At some time during the rest period the AIB panel fell from the ceiling onto the floor. The report states:

“The AIB fell to the floor of the chamber... The experiment was however completed...The AIB falling from the ceiling early in the “No activity “period resulted in a substantial release of airborne fibres... the fibres released from the ceiling tile falling to the floor had not fully dispersed before the third phase of test (walking) began.”

Inevitably some fibres would have been released from the panel as it hit the floor, however other fibres would inevitably have been re-suspended from the impact of the panel on the residual fibres lying on the floor, it would have also broken up any debris that was lying there.

Test repeated. Parameters inexplicably and drastically changed . The HSL test report explains:

53 HSL IF2005/06 Concentration of airborne respirable fibres released from asbestos insulating board by drawing pin damage. 8Jul 05 Dr Burdett
54 RMH/03/324 Howie Associates/ HSE Head of Asbestos Policy MacDonald 3 Nov 04
“Because the AIB fell from the ceiling during test 1, a second test was carried out.”

Because of the panel incident the HSL repeated the test. Once a test has failed and it is repeated then it is accepted laboratory practice to maintain the same parameters, as only then will a competent result be achieved. But the HSE did not follow the normal practice. Instead they inexplicably increased the airflow by 22 times.

As the pins were being inserted into the AIB, the fibres were being released and they were being carried rapidly sideways in the strong airflow. Few had the chance to fall onto the samplers. The results reflect this, as the sampled fibre levels are far lower that they would have been if the same parameters had been maintained.

Because the drastic change in parameters had almost nullified these results, Mr Howie calculated the likely fibre concentrations had the parameters been the same. His results show that the fibre levels during the period of walking would have been considerably higher than the HSL figures indicate.

**HSL simulate classroom conditions. Air changed every four and a half minutes. Test designed for air conditioned classroom**

Mr Howie challenged Dr Burdett over this prodigious airflow as it was an unrealistic simulation of classroom conditions, however Dr Burdett refuted the allegation by stating:

“I do not agree that such an airflow is extremely unlikely. High level opening windows were common in primary schools for obvious reasons of safety and similar types of flows would also be expected in an air-conditioned environment.

Dr Burdett intentionally designed the test parameters so that the air is changed every four and a half minutes. Perhaps a total change of air in the classroom could take place as frequently as that on a hot summer’s day with a good breeze. However many classrooms are rather stuffy with too few windows open so that there is little fresh air. Perhaps some schools are air conditioned, but it seems remarkable to design a test around the very few that might be. Particularly when one considers that it is highly unlikely that any school that has asbestos walls or ceilings would also have air conditioning.

**Simulated classroom activity**

This series of tests were designed by the HSL to simulate classroom conditions as accurately as possible under experimental conditions. A period of activity took place to simulate classroom activity. The HSC give guidance in relation to similar circumstances where an assessment is required of potential airborne fibre levels from residual fibres remaining on surfaces:

“The monitoring should be accompanied by activities which raise dust from the surfaces at least consistent with normal use of the area and possible future work activities”

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55 HSL IF2005/06 Concentration of airborne respirable fibres released from asbestos insulating board by drawing pin damage. 8Jul 05
56 Burdett/Howie 22 Sep 05
As many areas will subsequently be subjected to normal cleaning activities, air disturbance tests should be carried out using a brush to raise potential dust”

“The type of disturbance method and the length of time it is carried out should be recorded.”

The HSL test report describes the “disturbance method” as being:

“The period of walking around in the close vicinity of the dust would gave an upper estimate of the level of re-suspension.

Therefore we can broadly assume that the dust producing activities were equal to, or more concentrated than would normally have taken place.

The HSL report considers that their “walking activity” produced levels of airborne fibres that were an upper estimate, or even greater, than those within actual classroom conditions. One must question whether one man walking around a chamber really reflects twenty children rushing around a classroom and is “consistent with normal use of the area.” As the fibres would have fallen on all the surfaces in the classroom, it is not mentioned if the fibres were also disturbed in the chamber by brushing the operative’s clothes and the surfaces of the floor and the step ladders. As the tests were designed to simulate classroom conditions, and classrooms are cleaned daily, I would be interested to know whether HSE/HSL guidance for “brushing” did take place. If the HSL did not follow their own guidance then one must question, why not?

Because the panel fell to the floor HSL stated:

“Only the second experiment gave a reliable estimate of the re-suspension of fibres into the air.

As the first large chamber test results have been discounted by HSL, the second test results are the only relevant ones. The “Walking activity” took place 50 minutes after the first pin was pushed in, and 25 minutes after the last. The walking then lasted for 30 minutes and was designed to disturb the residual dust and debris on the floor. However the whole of the air in the chamber was being completely changed every four and a half minutes in the strong airflow. Consequently few fibres remained at the beginning of the “Walking activity,” let alone at the end, an hour and twenty minutes after the test began.

From the results of their tests the HSL report concludes:

“Re-entrainment of fibres in a typical classroom are likely to be low.”

It would appear that the low level of fibres counted during the activity were as a direct result of the manner in which the test was designed and executed. The test did not provide an accurate simulation of activity in a classroom.

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57 Proposals for Revised Asbestos Regulations and an approved Code of Practice.. Consultative document 2005 p136 para 293
56 Concentration of airborne respirable fibres released from asbestos insulating board by drawing pin damage IF2005/06 Revell/Burdett
59 HSL Burdett /Howie 4 Jul 05
Classroom windows kept shut
In the particular school where the parameters are known, there were two adjacent infant classes where the practice of inserting drawing pins into AIB ceilings took place on a similar scale. They were connected by a corridor that led to six other classrooms where the practice of pinning to the AIB also took place. During the summer the windows were open and the fibres would have been either circulated throughout the building, removed on the occupants clothes or ventilated into the atmosphere. However my wife particularly felt the cold so that the windows were generally shut during the remainder of the year. Although the classrooms were cleaned once a day, conventional vacuum cleaners do not remove asbestos fibres so that although dusting and cleaning would have removed some of the fibres it would have only circulated the remainder. For most of the year in these particular classrooms the air was not changed every four and a half minutes. Any fibres that were released from inserting drawing-pins, removing AIB panels or any other activities, would have remained in the classrooms for considerably longer than the ten minutes that the first series of tests presumed, and far longer than the fibres were able to remain in the chamber during the second test.

Test parameters set so that pins were “well dispersed”
It is very clear from my Oct 17 letter that the ceilings were damaged. The HSE and HSL were aware of that. The HSL have also stated that the purpose of the test was to simulate the disturbance that reportedly took place in a classroom. The HSL test report states that:

“The pin holes were well dispersed and the operation was carried out in groups of four pin holes at one-minute intervals.”

This makes no mention of damage to the AIB panel or even overlapping pin holes, it is specific that the pin holes were “well dispersed.” It is clear from my description of my wife brushing dust from her face that the ceiling was damaged and considerable fibres were being released, and yet the test parameters were set so that damage would be avoided. Because of this the test gives an unrealistic level of asbestos fibres released in the actual classroom condition.

Drawing pins
This test was simulating drawing pins being pushed into AIB. My wife’s drawing pins were traditional copper coloured drawing pins with a point that is “cut” rather than smoothly ground to a point as a mapping pin is. The point therefore has flat sharp edges that cut and shave when the pin is twisted as it is pushed into, and taken out. The mapping or poster pin is different, as its smooth point tends to push aside more of the material as it is inserted, rather than cutting the material.

I have frequently pushed drawing pins into AIB. AIB is a relatively hard material. Therefore it has to be twisted and turned as it is pushed in and then sometimes, an implement has to be put under the head to move it before it is twisted out. Such activity damages the material surrounding the pin shaft and releases asbestos fibres.

The first HSE/HSL test drawing pins are described as:

60 Mesothelioma: cases associated with non-occupational and low dose exposure. Hillerdal 1999 p508
61 HSL IF2005/06 Concentration of airborne respirable fibres released from asbestos insulating board by drawing pin damage. 8Jul 05 Dr Burdett para 2.1
"A variety of pointed metal probes with similar cross sections to a 1mm diameter standard pin\textsuperscript{62}\)

The second HSE/HSL test “Drawing pin” is not described, however it appears as if the “drawing pins” could be fixed together in a group of four.

"In groups of four pin holes."\textsuperscript{63}

Whether the point is ground or cut is not described. However if the pins are connected together then they cannot be twisted as they are inserted and removed. Consequently they have to be “stabbed” which will tend to push the material aside rather than damaging it by twisting and cutting it. Also on removal it is a simple matter of just pulling the probes straight out. If the points are smooth less damage will also be done.

If that is the case then the test was not a fair simulation, and the number of fibres released would be far less than in the real situation.

Test not a fair simulation . HSL disagree
It would appear that the HSL test was designed and the parameters set in a way that guarantees an unrealistically low measure of the level of asbestos fibres released into the classroom.

Dr Burdett disagrees and although he admits that the first test results are unreliable he considers that the results of the second test have given a realistic result:

He states that :

“I think that this is a representative simulation.”\textsuperscript{64}

Second test proves results of first HSE/HSL dramatically too low
The results from this second test (large chamber) show that the fibre counts and the conclusion from the first series of tests (glove box) were dramatically too low. The conclusions for the first series of tests (glove box) state that:

”Airborne respirable asbestos fibre levels in the classroom could be between 0.00000632 f/ml and 0.00000316 f/ml for a short period.”\textsuperscript{65}

The conclusions from the second series of tests (large chamber) states that:

“The exposure of the person carrying out the the action of pinning and unpinning from the ceiling was of the order of 0.05 f/ml over a period of twenty five minutes.”

When the first HSE/HSL test result is compared with the second the difference is summed up by Mr Howie who states that the second test is:

\textsuperscript{62} Para 2.1 HSL report Revell. Tests to determine release of respirable asbestos fibres from asbestos insulating board due to drawing pin damage. MF2004/02
\textsuperscript{63} HSL IF2005/06 Concentration of airborne respirable fibres released from asbestos insulating board by drawing pin damage. 8Jul 05 Dr Burdett para 2.1
\textsuperscript{64} Burdett/Howie 4 July 05
\textsuperscript{65} Potential exposures to teachers and others from use of drawing pins on asbestos insulating board Report Piney 20 Aug 04 p9 para 7.2
“15,000 times higher than that estimated by Dr Piney in his report.”

The exposure levels to the teacher are:

“3000 times higher than estimated by Dr Piney in his report.”

Dr Burdett compares the results of the first (glove box) tests and the second (large chamber) tests and concludes:

“This value was within the range of values estimated in the earlier test reported MF2004/02.”

A discrepancy of 15,000 times between the tests cannot possibly be described as “within the range of values.”

The HSE report gives a misleading impression because they have failed to acknowledge the dramatic discrepancies between the first and second reports.

The conclusions have been widely circulated as fact, to the Minister of State for Schools, the DfES and the General Secretary of the NUT. Therefore those people and official bodies have to be informed that the HSE/HSL conclusions are wrong. Based on the incorrect results of the first test the Minister of State for Schools wrote to the General Secretary of the National Union of Teachers and stated:

“Inserting drawing pins into AIB does not normally cause significant disturbance or damage. There is some airborne respirable asbestos fibre release, which HSE’s tests indicate will vary from 30-60 airborne asbestos fibres per hole”

“Such short term low level additional exposures are unlikely to add significantly to the risk caused by the “Natural” asbestos fibre exposure to which we are all subjected.”

Because of the dramatic discrepancy between the tests, the conclusions of the first test can no longer stand. The statements have to be withdrawn.

CONCLUSION

The HSE/HSL tests are not a true representation of classroom conditions. Because of the way that they were designed, the HSE officers have been able to conclude that inserting drawing pins into AIB releases minimal fibre levels. As a consequence the HSE have also been able to conclude that there is an insignificant risk to the health of teachers and children.

This is an incorrect conclusion as it has been based on fibre levels that are grossly inaccurate. If one considers the actual levels of fibres released from frequently inserting drawing pins into AIB the truth is very different. Regrettably the real risk to health is such that over time the cumulative effect of the actual levels of fibres has the potential to cause mesothelioma.

I consider that one must very seriously question why the HSE/HSL tests were designed and executed in the manner that they were. It is patently clear that such
tests were not a realistic simulation of classroom conditions. They appear to have been intentionally designed to produce the lowest possible fibre counts so that the HSE could state that the risk from such an activity is virtually negligible, and the risk to health is insignificant.

I have no doubt that they are wrong.

**WATCH committee meeting**

The WATCH committee bundle of briefing papers and the web-site included certain statements made by me in a letter to Dr Burdett. Those statements have been published by the Health and Safety Commission with no supporting evidence. This paper has been written to provide the evidence to support the statements:

1. **“The HSE/HSL tests are flawed to the extent that they give a dangerously misleading impression of asbestos fibres released into the classroom.”**

2. **“The series of tests have been designed and the parameters set in a way that guarantees an unrealistic low measure of the fibre levels within the classroom.”**

3. **“Your second test report states that “the results support the first test. Which is manifestly wrong when the results are many thousands of times greater. It would appear that your report is intentionally written so that this huge discrepancy between the HSL tests is not immediately apparent. It would therefore appear that the HSL is intentionally attempting to mislead.”**

I stand by those statements.

The HSE have a duty to ensure that teachers and children are kept safe from the dangers of asbestos.

The HSE have failed in that duty