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Asbestos Study Comm

BRITISH FRICTION MATERIALS COUNCIL

SECRETARIES:
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LONDON, WC2B 4JY

362/m/BFMC

26th November, 1971.

The Secretary,
Friction Materials Standards Institute, Inc.,
370 Lexington Avenue,
New York, N.Y. 10017,
U.S.A.

Paul

Dear Sir,

We have been asked by our members in the British friction materials industry in the U.K. to put their views to you on the proposed Illinois State Regulations concerning asbestos and asbestos products. We enclose herewith their comments on the friction material aspect of these draft Regulations.

We have no doubt that the American lining manufacturers will be making strong representations to the Illinois authorities for amendments to the proposals and perhaps you could let us know their comments. We shall also be grateful if you could make our views known as set out in this enclosure.

Yours faithfully,

John Baker

Secretaries

Enc.



BAN ON ASBESTOS-BASED BRAKE LININGS

The British friction materials industry views with deep concern the proposed ban on the use of asbestos in brake linings by the State of Illinois.

It is not aware of any medical evidence that could possibly justify such legislation. On the contrary it would have the effect of withdrawing from the market products that were used to promote road safety, without producing any significant improvement in the levels of urban atmospheric pollution. It would expect any of the known alternatives to asbestos to produce general particulate pollution of a measurable amount.

1. Whatever materials are used for brake linings the current state of the art is such that the action of braking will generate products of wear. The asbestos content of conventional brake linings is almost entirely converted by the action of braking into forsterite or other amorphous, inert materials which are no longer asbestos. On the other hand, if non-asbestos alternatives are used (e.g. iron powder, sintered metal, ceramics, steel wool etc.,) the resulting wear products will be released unchanged.
2. Measurements have been made of the amount of free asbestos fibre left in brake lining dust. It is an insignificant proportion of what is in any case a minute amount of total dust.

The amount of free asbestos fibre that has been found in brake lining dust from vehicles, is about 1% of the total products of wear. (1). Indeed estimates vary down to 10^{-9} g/g, i.e. for each gramme of wear products only 10^{-9} grammes of free asbestos may remain.

3. We assume that the risk of contracting mesothelioma is the principal cause of environmental concern - there is clearly no possibility whatever as a result of vehicle braking, of a community risk of asbestosis or lung cancer, which are solely occupational risks. For technical reasons only chrysotile asbestos is used in the manufacture of brake linings and disc brake pads. This is not the type of asbestos with which mesothelioma has been mainly associated.
4. Measurements of chrysotile asbestos in the ambient air in an industrial centre in the United Kingdom have shown that the level must be less than 10^{-7} g/m³ because of the limitations of the method used. This means that they must be a thousand times lower than the British Government acceptable level for occupational exposure. Current investigations using a more sensitive method indicate levels of 10^{-9} to 10^{-10} g/m³, i.e. 2 or 3 orders lower still. (2).

Brake lining wear cannot therefore be a serious source of atmospheric pollution.

5. In one of the largest brake testing laboratories in the world, housing many dynamometers engaged 24 hours a day in wearing away friction materials, the average monthly asbestos count is 0.2 fibres /cc, a tenth of the British Government's occupational standard.

Chrysotile Asbestos in Urban Air.

The industrial use of chrysotile asbestos is increasing and the question of whether its concentration in urban air constitutes a hazard has been raised. But measurements of asbestos in air near asbestos factories have proved negative with present analytical methods, so under the sponsorship of the Asbestosis Research Council we are developing a more sensitive technique. This article is a preliminary account of the estimation of chrysotile near a large asbestos textile factory at Rochdale, Lancashire. There are several uncertainties in the technique; so we were expecting to obtain only an order of magnitude estimate. Nevertheless this would have been an important figure to have because of the lack of data on the amount of asbestos in air. As it happened, we were only able to determine an upper limit for the chrysotile concentration which turned out to be three orders of magnitude lower than the threshold value for occupational exposure set by asbestos regulations. Obviously even more sensitive techniques are required and are now being developed.

We used an X-ray diffraction technique based on the measurement of the integrated area under the (002) peak of chrysotile. The equipment, which consisted of a Phillips 2010 generator, a vertical goniometer with a step scanning attachment, and a proportional counter with pulse height discrimination, could be reliably calibrated down to 10 μg of chrysotile compared with the 1 to 10 mg range reported by Crable¹, and was cross-checked by estimating the magnesium content of the calibration samples by atomic absorption spectroscopy. Sampling involved the collection of airborne solids from 1,000 m³ (10⁵ l.) of air by an electrostatic device (H. Litton Systems Inc.) in which up to 10,000 l. min⁻¹ are drawn through a 20 kV corona discharge. Particles in the air are electrostatically precipitated onto a plate and concentrated into ~100 ml. of liquid.

The collection efficiency depends on the size distribution of the particles and the sampling rate, but the size distribution of chrysotile in the atmosphere is not known. Therefore we estimated the collection efficiency indirectly by running the sampler in part of the asbestos factory where a low concentration of asbestos is known to occur (Fig. 1) and we found the collection efficiency to be almost 100% when the air is sampled at about 2,000 l. min⁻¹, dropping to between 25 and 50% at the rate of 10,000 l. min⁻¹, depending on the actual size distribution present. As we were aiming at only an order of magni-

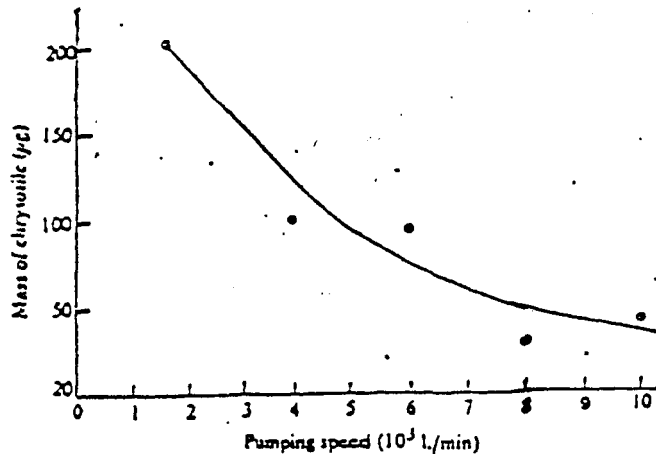


Fig. 1 Observed amounts of chrysotile in 5,000 l. of factory air, sampled at different rates.

tude assessment of asbestos in urban air, we were prepared to accept this uncertainty in the collection efficiency.

The map (Fig. 2) and Table 1 show the location of the sampling sites and the conditions in which the samples were obtained. The factory is in a hollow, and sampling site No. 2 is at the same height as the roof of the filter gallery, which is the chief air outlet from the factory. Sampling site No. 1 is about 30 foot higher than site No. 2. Sites 3 and 4 were in the gardens of houses, site 3 being about 5 km upwind of the factory and site 4 being about 300 m downwind.

All the diffraction traces (for example, Fig. 3) contained strong lines of kaolinite and quartz, probably from the local soil, which made the assessment of chrysotile difficult because the broad (001) line of kaolinite (7.18 Å) is close to the major (002) line of chrysotile (7.36 Å). Fortunately chrysotile is easily decomposed by boiling in 1 N hydrochloric acid whereas kaolinite is unaffected, so it should be possible to measure the amount of chrysotile present by subjecting the samples to acid leaching and measuring the corresponding reduction of the intensity of the composite X-ray band. The fact that this process led to no reductions in band intensity for any of the samples indicated that the amount of chrysotile present was below our detection limit.

We ought to have been able to detect 10 µg of chrysotile by itself, but clearly the presence of kaolinite may have reduced

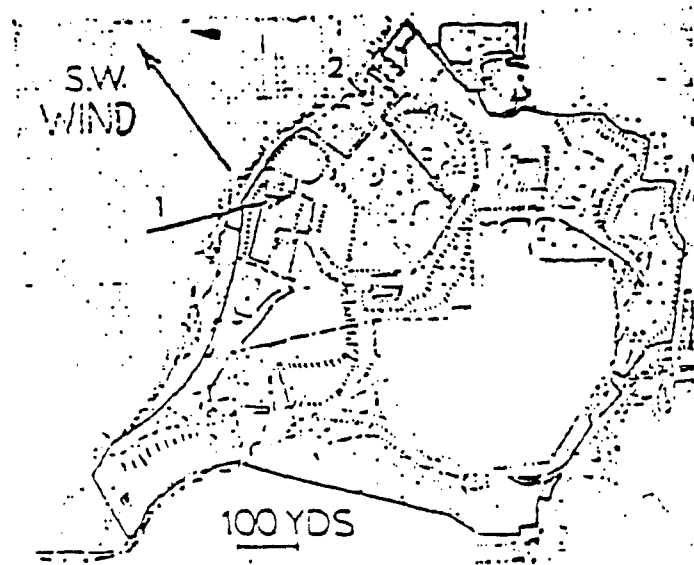


Fig. 2 Plan of T.B.A. factory, Rochdale. The sampling sites are indicated by numbers 1-4.

Table 1 Weather Conditions during Sampling

Date (1970)	Site	Wind	Weather
April 22	1	SW moderate	Broken cloud
April 24	1	SW slight	Ground haze
April 27	1	NE moderate	Ground haze
April 29	1	SW moderate	Ground haze
May 6	1	S strong	Ground haze
May 13	1	N fresh	Ground haze
May 28	3	W light	Overcast, dull
May 28	3	W light	Overcast, dull
May 30	4	W light	Overcast, dull
May 30	4	W light	Overcast, dull
June 3	2	SW light	Overcast
June 10	2	SW slight	Heat haze
June 10	2	SW slight	Heat haze
October 23	1	W moderate	broken cloud
October 23	1	W moderate	Broken cloud
October 23	1	W moderate	Broken cloud
October 28	1	N light	Broken cloud
October 28	1	N light	Broken cloud
October 28	1	N light	Broken cloud

the sensitivity. But the addition of 100 µg of chrysotile to a collected samples could easily be detected, so we can say that our samples collected from 1,000 m³ of air contained less than 100 µg of chrysotile—in other words, there was less than 0.1 of chrysotile per m³ of air. The threshold limit for occupational exposure set by the 1969 Asbestos Regulations² is 0.1 mg m⁻³.

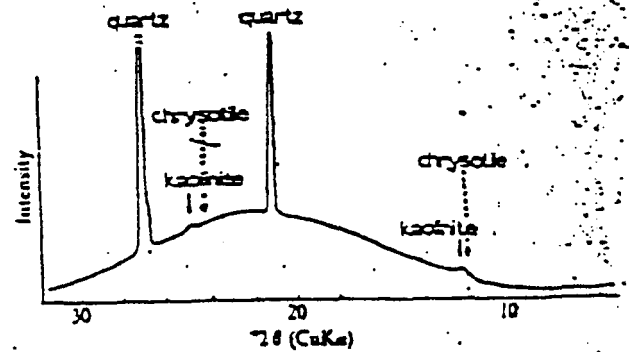


Fig. 3 X-ray diffraction pattern from a typical dust sample near the Rochdale factory.

A more sensitive method for estimating chrysotile is required and we are developing a technique based on electron microscopy. Preliminary examinations under the electron microscope of samples collected by the Litton sampler indicate that the actual chrysotile level may be a further three orders magnitude below the X-ray detection limit (that is, about 0.1 ng).

The samples have so far been collected in the close vicinity of the Rochdale factory. It is now proposed to sample at certain representative urban and rural locations in UK to estimate their chrysotile content.

A. L. RICKARD
D. V. BADAMI

Turner Brothers Asbestos Co. Ltd,
PO Box 40,
Rochdale, Lancashire

Received April 18; revised September 22, 1971.

¹ Crable, J. V., *Amer. Ind. Hyg. Assoc. J.*, 27, 293 (1966).
² *Standards for Asbestos Dust Concentration for Use with the Asbestos Regulations 1969. Technical Data Note 13 (HM Factory Ins*



Asbestos Study Comm

September 23, 1971

Dr. H. G. Jacko
Sundix Research Laboratories
Sundix Center
Southfield, Michigan #42075

Dear Mike:

While you were at the meeting of the Asbestos Study Committee last week, you asked for some information about the Friction Materials Standards Institute. I believe you were trying to understand the basic services that the Institute performs without getting into the detail as spelled out in the Constitution and By-Laws. However to be specific, I am enclosing a copy of the Constitution and By-Laws.

The Friction Materials Standards Institute, is made up of most of the United States manufacturers of brake linings and clutch facings. One of its earliest services was a copyrighted numbering system for the brake linings and clutch facings. In this way if a customer were ordering a set of brake linings to fit a 1963 Chevrolet, he would check our book and select #2065* for the fronts and # 2006* for the rears. Most brake lining manufacturers would provide this lining with the # 2065* and #2006* number. The various brake lining manufacturers make this lining to the dimensions spelled out for original equipment purposes from information we furnished them. We solicit and compile data on all new brake lining and clutch facing releases and we publish a book every other year, with supplements in the in-between year, which keeps the field up to date on the brake linings and clutch facings used on the cars and trucks they will be servicing. Further, we publish bulletins about six or eight times a year to bring the members up to date on any changes that are happening, when they happen.

Because of the multiplicity of brake shoes and the problems in determining which shoe belongs on which vehicles we also prepare a brake shoe identification catalog. The shoe assignments which we give are used by most manufacturers to describe the lining shoe package which they distribute in the after market.

All members of the Institute are allowed to use the F. U. S. I. numbering system which is copyrighted. Further, they can authorize their customers to use the F. U. S. I. numbering system in their catalogs and on their price sheets. As an example of the type of work the F. U. S. I. is doing currently in this area, we are working on a brake block identification book which would allow people in the field to identify the F. U. S. I. number for the block by making certain basic measurements. As you will note, our services are oriented to the replacement market.

Brake Performance Study Committee

Members of the Institute over the past ten years were being deluged with State legislation in the automotive safety area which was then followed by the Federal Government legislation in 1966 setting up under the Department of Transportation, what is now the

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September 23, 1971

National Highway Traffic Safety Administration - N.H.T.S.A. The Friction Materials Standards Institute organized a Committee to help give the various safety administrators guidance so that reasonable regulations would be issued. When regulations establishing brake lining certification tests were set up by such States as New York, Pennsylvania, Massachusetts and others, the Friction Materials Standards Institute worked with the administrators in establishing requirements. During various hearings in Washington for the N.H.T.S.A, on brake system safety regulations, the Friction Materials Standards Institute would review the proposed standards, prepare tests and compile comments on the proposed standards. We still maintain a close watch on Washington and the various States as regards legislation and regulations concerning brake linings. To this date, clutch facings have not been much of an item as regards automotive safety.

Asbestos Study Committee

This particular Committee, as you are aware, is newly formed with its obvious emphasis on asbestos. It may take a somewhat similar posture as the Brake Performance Study Committee and (1) disseminate information to the members, and (2) preparing formal comments to the various environmental agencies where they may be drawing up regulations that concern asbestos in brake linings or clutch facings.

Within the Institute we can take any reasonable steps that will further the friction materials industry in line with the Constitution and By-Laws. Among other things, the Institute has organized the accumulation of information on historical sales by the members of friction articles - brake blocks, disc brake linings, other brake linings and clutch facings. This information is submitted to a Certified Public Accountant who reviews the original input from the members and prepares the summaries of totals. This information in final form is confidential and is returned to the members.

As I do not believe you are interested in the Institute concerning our catalog information, I am not sending any of this type data. Should you wish a copy of our Data Book and Shoe Catalog, please let me know. When I have received an approved copy of the minutes of our recent meeting, I will send you a copy. Dr. Spurgeon of course will be receiving a copy when the minutes are distributed.

Sincerely,

ED Drislane/erc
Enc:

Executive Secretary