

FILE NAME: Eternit (ETER)

DATE: 1977

DOC#: ETER026

DOCUMENT DESCRIPTION: Book Excerpt - Selected Written Evidence Submitted to the Advisory Committee on Asbestos 1967-77

MP 0227407 B

614.712/SEL



Health &
Safety
Executive

Selected written evidence submitted to the Advisory Committee on Asbestos 1976-77

Chairman: W Simpson

Chairman of the Health and Safety Commission



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Eternit Building Products Limited

Introduction

Eternit Building Products Limited is part of the Eternit group of companies who, together, are probably the largest manufacturers of asbestos cement in the world.

With over seventy years' experience of asbestos cement products, we are pleased to have this opportunity of submitting written evidence to the Committee; not only because of the public concern regarding asbestos in general, but because of the importance of asbestos cement to the community at large and, of course, to the Eternit Group.

This submission falls into three sections. In the first, we examine the benefits of asbestos cement; consider the alternatives; and review regulations and opinion on health and safety, including dust-count procedures, from around the world.

Section two deals specifically with the manufacture of asbestos cement in this country by Eternit Building Products Limited. In particular, we outline the dust-count methods and the health and safety procedures adopted.

Section three contains our conclusions from the evidence submitted in the first two sections.

Wherever possible, we have sought to back up any opinions expressed with evidence in the form of reports from various authorities around the world. These reports make up Appendices I-XI which, through their sheer volume, cannot be included within this document but are submitted separately.*

*This appendix is not included in this volume.

Section 1 Asbestos Cement: its properties and a review of health and safety procedures around the world

1.1 Its properties

Although perhaps already well-known to the Committee, it is important to establish from the outset the fact that there are significant physical differences between asbestos cement and other products containing asbestos.

The main factor is the ease/difficulty with which asbestos fibres can become detached from their matrix and enter the air to become a potential hazard.

Asbestos cement building materials contain, on average, only 12% of asbestos fibres, the balance being Portland cement. Thus, in effect, each fibre is completely encapsulated in cement, and cannot inadvertently become free in normal use. In this respect asbestos cement is very much safer than other primarily fibrous asbestos-containing materials.

Asbestos cement has been used extensively in the construction industry in Britain throughout this century, mainly in industrial and agricultural applications, but increasingly also in more prestigious projects.

The material possesses physical and chemical properties that endow it with quite exceptional characteristics. It has the usual properties of concrete as regards resistance to compression: between 450 kg/cm² and 650 kg/cm² according to the product; and thanks to the reinforcement created by the fibres, its resistance to bending under stress can reach 300 to 400 kg/cm². As regards chemical properties, asbestos cement inherits its

components' resistance to chemical agents as well as their quality of being rotproof. It is also waterproof.

The characteristics of asbestos cement give it the following benefits when used:

- *lightness*, which makes the supporting structures lighter – for instance for factory buildings – thus making them cheaper;
- *fireproof*, it has already and will in the future save many lives. How many tragic fires could have been less devastating had asbestos cement been used on a larger scale?;
- *mineral structure*, making the material practically indestructible;
- *inexpensive*, which means that more houses can be built at less cost;
- *resistance*, to rodents and insects, far better than the resistance of other building materials;
- *conductivity* is very low for heat.

All these characteristics make asbestos cement products invaluable. Whilst substitutes can be found, none come close to matching the unique combination of benefits found in asbestos cement.

The Fulmer Grange Research Institute has illustrated this point in the Tables (shown overleaf), taken from their Fulmer Special Report No 5 'Asbestos characteristics, applications and alternatives' (1976).

Material	Cost	Fire resistance up to 1000°C	Resistance to alkaline attack	Reinforcing characteristics		
				Stiffness	Strength	Impact
Asbestos	Low	Exc	Exc	Good	Good	Fair
Glass (alkali resistant)	High	Acceptable	Variable	Good	Good	Good
Cellulose	Low	None	Poor	Poor	Poor	Poor
Mineral wool	Low	Good	Poor	Fair	Fair	Fair
Thermoplastic (nylon/polypropylene)	High	None	Good	Fair	Fair	Good
Carbon	V High	Exc	Good	Good	Good	Good
Steel	High	Good	Will corrode in time	Good	Good	Good

Relative merits of building boards

Material	Cost	Non-combustible	Surface spread of flame	Resistance to moisture movement	Workability
Asbestos insulating board	Medium	✓	Class 0	Exc	Good
Standard mineral fibre board	Medium	✓	Class 0	Poor	Fair
Woodfibre board	Low	X	Class 1*	Poor	Exc
Hardboards	Low	X	Class 1*	Poor	Exc
Gypsum board	Low	X	Class 0	Fair	Good
Chipboard	Medium	X	Class 1*	Fair	Good
Melamine decorative laminate	High	X	Class 1*	Good	Good

*If flame retardant treated.

Because of its unique characteristics, asbestos cement is used in the widest range of situations. It is used for making garden-plant boxes, for cladding facades, for roofing and partitions in collective or individual housing and in agricultural or industrial buildings, for protection against fire, humidity and harmful substances, for its decorative and utility value in homes, gardens, shops, etc. In short, asbestos cement is found wherever its unique combination of qualities have made it irreplaceable.

1.2 Asbestos Cement and Health

Today, it is generally accepted that inhaling *pure* asbestos dust of a certain dimension in large quantities, over a long period can result in illness.

As Eternit Building Products is a manufacturer of asbestos cement products, our intention is naturally to examine the specific problems related to our own industry.

Nevertheless, we consider it relevant to refer to the Congress of Lyon held on 5-6 October 1972, at which prominent medical specialists in 'Asbestos and Health' problems met. This Congress succeeded in clearly summarising all the medical knowledge on the subject. Between 1972 and the present there has been no major change of opinion on the part of those medical specialists who attended the Congress.

Appendix 1* gives a note stating the main conclusions of the Congress. We would like to draw attention to question number 8 as it is relevant to the matter of asbestos exposure and the general public.

The question was:

"Is there evidence of a risk of lung fibrosis from low levels of exposure to asbestos such as have been encountered by the general population in urban areas?"

and the answer given:

"There is at present no evidence of lung damage by asbestos in the lungs to the general public. The

*This Appendix is not included in this volume.

amount of asbestos in the lungs of members of the general public is very small, compared to those occupationally exposed. It is greatest where asbestos is mined or worked and lowest in rural areas."

Returning to the subject of asbestos cement, it is clear that the industry differs from many others using asbestos and in this respect, the following points are relevant:

(a) Low asbestos content

The amount of asbestos contained in asbestos cement products is low – about 12%.

(b) Avoidance of dust

Generally the wet process is used in the factories, thus avoiding the formation of dust.

(c) Implementation of 2 fibres/cc standard

Steps have been taken for *all* Eternit factories worldwide to respect the maximum standard generally accepted of 2 fibres/ml.

(d) New methods of transportation

Together with asbestos mine producers, asbestos cement factories have found solutions to the problem of transporting asbestos from the mine to the works where it is used. New methods include plastic packings, pallets, and containers which means that in Eternit factories worldwide it has been possible for some time to operate within the 2 fibres/ml standard referred to previously.

(e) No risk for occupants of asbestos cement buildings

In answer to the question

"Does using asbestos cement construction materials involve a health risk for the occupants?"

Prof A Gyselen of Louvain University, N G M Orie of Groningen University, K Vuylsteek of Ghent University and R L Zielhuis of Amsterdam University answered in an official report (Appendix II):

"It has not yet been proven that asbestos cement materials used in construction have had bad effects on the health of the occupants."

(Please note that the original French text included in the Appendix expresses this point in a clearer and more positive manner).

(f) *Asbestos cement dust differs from asbestos dust*

A lengthy study, the final report of which will be ready at the end of the year, undertaken by Prof de Ruyttere of the Louvain University, shows that the physical-chemical texture of asbestos cement dust is different to that of asbestos.

Appendix III* gives a short summary of the interim report on the study. One paragraph of this summary report states: "In each case, asbestos cement behaves as cement, whatever the conditions used in this study."

In other words, one could say that in asbestos cement, the asbestos really is 'locked-in'. The inference from this is that the dust from asbestos cement is totally different to the dust from asbestos and other products containing asbestos.

(g) *The Biological Activity of Asbestos Cement dust is similar to that of Portland Cement dust*

Appendix IV* gives a very detailed report of Professors F M Kogan, A A Gerasimenko and Bunimovic of the Sverdlovsk Institute of Hygiene of Work and Occupational Pathology; O V Klor, V N Karacarova and R A Olsvang of the Sverdlovsk State Medical Institute came to the conclusion that:

"Physical-chemical properties of the dust, its poor fibrogenic activity on lungs of experimental animals, absence of pneumoconioses and chronic bronchitis in persons having worked in shops with high dustiness of the atmosphere for more than eleven years, and finally insubstantial changes in the immunological state of the organism of animals after prolonged inhalation of dust – all that makes us believe that the asbestos-cement dust is quite close to Portland cement dust as far as the biological activity is concerned. . . ."

(h) *Distinction between Asbestos Cement and Asbestos (Denmark)*

In a short note, dated 9 May, 1972, Appendix V,* Mr Aage Grut (HM Senior Medical Inspector of Labour, Denmark) wrote:

"To whom it may concern. I wish to confirm that the Danish regulation of 14 January, 1972, prohibiting the use of asbestos for insulation against noise, heat and humidity does *not* concern asbestos cement products (Eternit, etc)."

The three documents (Appendices III, IV and V) thus clearly show that in the authors' minds, a definite difference exists between asbestos cement products and other products also containing asbestos.

(i) *New Medical Study on Workers in Asbestos Cement Plant*

Epidemiological studies performed since 1933 on the workmen of one of the largest asbestos cement plants in the world (in Belgium, at Kapelle-op-den-Bos), (average number of people employed: ± 3000), show very interesting results. The final report will be published at the end of the year, however, in Appendix VI* of this report, we are including a summary of said study, of which the conclusion is:

"In the asbestos cement factory, about 60 000 radiographs of workers occupied in the plant have been reviewed and this interim report gives the results of the examination of 1972. From the tables, we may conclude that only the handling of pure asbestos represents a risk of asbestosis in this plant, exception made for one case, but here the exact nature of the fibrosis can only be determined by a histological examination of the lung tissues because the subject suffers chronic progressive polyarthritis".

It is confirmed that as indicated in paragraph (d) necessary steps have been taken to minimise risk when handling pure asbestos (see also para 2.3.3).

(j) *Safety measures applied for sawing, drilling etc.*

The question of the finishing process (sawing, drilling etc) of asbestos cement products is also often raised. It has not yet been proved that 'free' fibres would exist in the dust this created in a sufficient quantity to present a danger to health. However, certain safety measures have been adopted if the finishing operations are performed indoors: for instance wet sawing or installation of dust control apparatus reducing the percentage of free asbestos to below 2 fibres/cc.

We include as in Appendix VII* a short report from the Department of Employment/HM Factory Inspectorate where in Table 3, 'Use of asbestos cement sheets and pipes', it is said that 'effective exhaust ventilation makes it possible to reduce fibre content to less than 2 fibres/cc for sawing machines.'

In conclusion to this section on health, whilst it is today acknowledged that inhaling strong concentrations of pure asbestos of a given dimension over a long period can be dangerous, no study has yet reported that the same danger might exist for the users of *asbestos cement* products. Regarding the staff of the producing plants, if appropriate precautions are taken as indicated in the preceding pages and the 2 fibres/cc standard is respected, we conclude that the health risk is practically nil.

1.3 *Current Dust Regulations in the UK and overseas*

We have concluded in the previous section that, with certain precautions, especially where pure asbestos is used, the manufacture and uses of asbestos cement products can be considered as 'under control' regarding 'health hazards'. The question that remains to be answered is the one related to the possible introduction of regulations aimed at further reducing the risks.

*These Appendices are not included in this volume.

The most commonly used measure indicates the maximum authorised number of fibres per cc. Recent studies have indicated that only fibres of a length above $5\mu\text{m}$ of a diameter of less than $3\mu\text{m}$ and a relation length to diameter of 3:1 might involve a danger for health; the intensity and duration of exposure must also be taken into account. At the ILO Congress (International Labour Organisation) held from 11–18 December 1973, it was said that: "There is evidence that the incidence of diseases is related to intensity and duration of exposure. This it may be possible to determine levels of dustiness where the risk may be minimised to an acceptable level." (Appendix VIII*.)

We would also like to refer to an April 1976 report prepared by Johns-Manville, USA, which we believe to be the most constructive on this subject. The report (Appendix IX*) refuted in detail the suggestion made by the OSHA (Occupational Safety and Health Administration) as published by the Federal Register in October 1975, that the proportion of authorised fibres should be reduced from 2 fibres/cc to 0.5/cc.

This was in spite of a recommendation, in January 1972, dealing with occupational exposures to asbestos made by the NIOSH (National Institute for Occupational Safety and Health) as follows:

"no worker should be exposed to more than 2.0 asbestos fibres per cubic centimeter of air (fibres/cc) based on a count of fibres greater than five microns ($5\mu\text{m}$) in length, determined as a time-weighted average (TWA) exposure for an eight-hour work day . . ."

It was following this recommendation that on 7 July, 1972 the OSHA issued regulations that required occupational asbestos dust exposures to be limited to 5 fibres/cc (TWA), effective immediately and 2 fibres/cc (TWA), effective 1 July, 1976.

In Johns-Manville's report, it is shown that since this regulation was made in 1972, no new study has questioned the validity of the decision to set a 2 fibres/ml standard. The Advisory Committee of the Construction Industry in the USA made a recommendation to OSHA in July 1976 to also adopt the 2 fibres/cc standard.

At the same time, a committee investigating asbestos in Canada published last April its preliminary report. The members of this Committee were Messrs. René Baudry, Gilles Lagace and Laurier Juteau. They ended their report by saying:

"Finally faced with the concrete reality of deciding the norm of occupational exposure to asbestos dust in Quebec, taking into account all the considerations of the present study, we believe that a percentage of dustiness of an average or less than two asbestos fibres longer than $5\mu\text{m}/\text{cc}$ of air with a joint reduction of the total dust and of the total asbestos tenor of these dusts could be reasonably admitted."

As is known, this same regulation of 2 fibres/cc is in force in the UK. To comply with this norm involves important investments which have been made in factories, and facts show that with these changes the norm of 2 fibres/cc can be reached. For the reasons given in the Johns-Manville report a further reduction in the standard would not be justified from the medical viewpoint; such a measure would very likely result in the closing down of factories because of the technical impossibility of achieving a norm below 2 fibres/cc.

1.4 Methods of measuring dust

Several methods exist for measuring the concentration of floating dust, such as:

- Long-running thermal precipitator,
- Impinger,
- Thermal precipitator,
- Royco particle count method.

All these methods have been compared and tested. However, the Membrane Filter method of Dr S Holmes, a member of the Asbestosis Research Council, is the most commonly used. This method is employed extensively in most Eternit factories around the world. A notice will be found in Appendix X*, giving the details of this method. Appendix XI* is a working document for the internal use of the different Eternit works, to make sure that measures are taken in a strictly identical manner.

*These Appendices are not included in this volume.

Section 2 Eternit Building Products Limited: production, health and safety procedures at Meldreth Plant

2.1 Introduction to Eternit Building Products Limited

2.1.1 Background to the Company

Eternit Building Products Limited (EBP) is a recently-formed holding Company, 100% owned by Compagnie Financière Eternit, SA, (CFE). CFE is a Belgian Company, part of the Eternit Group of Companies who, together, are probably the largest manufacturers of asbestos cement products in the world.

2.1.2 The Companies making up Eternit Building Products Limited

EBP is made up of the following:

- (a) G R Speaker & Company Limited (Speaker) which started trading in 1903 as an importer of asbestos cement manufactured materials from Eternit Belgium, and has been importing them ever since, except for the intervention of World Wars.

Speaker became a wholly-owned subsidiary of CFE last year.

- (b) The Atlas Stone Company Limited (Atlas) started trading in 1902 as manufacturers of artificial stone and other cement based products. Atlas started to manufacture asbestos cement products in 1929 at Meldreth, near Cambridge, and manufacture continues up to the present time on the same site. Atlas was acquired by CFE as a wholly-owned subsidiary last year.

Atlas also comprises a Concrete Division, but its activities are not relevant to this submission, as it does not use any asbestos fibre in any product which that division produces.

- (c) Bridgwater Panels Ltd, which is two-thirds owned by CFE, was formed some thirteen years ago to offer a specialist cutting and machining service for asbestos cement materials, which is still its main function.
- (d) H J Haynes, which is 100% owned by CFE and has been established some seventy years. Haynes is a roofing and ceiling contractor, a large part of whose business is in roofing in general, and in the fixing of asbestos cement slates in particular.

Thus, all four companies either are, or are in the process of becoming, subsidiaries of EBP.

2.1.3 The function of the Company

EBP is in the business of supplying materials to the building and allied industries. The bulk of products supplied are asbestos cement based. Generally speaking materials are supplied by us, but are fixed by other companies/contractors.

2.2 Production of Asbestos Cement products

2.2.1 The factory

EBP have only one factory producing asbestos cement products in the United Kingdom. This is situated at Meldreth (between Royston and Cambridge), and has just over five hundred employees and a theoretical production capacity of about 140 000 tons of asbestos cement manufactured sheets and other items per annum.

The factory is engaged almost entirely in the production of asbestos cement materials, with a small amount of insulation board.

2.2.2 The products

(a) Asbestos cement

Asbestos cement products produced at Meldreth and which form the substance of this submission, consist primarily of corrugated and flat sheeting and of the accessories pertaining thereto. All are made strictly in accordance with BS 690: Parts II & III: 1973, and Composition Clause 2.1.

Asbestos cement products which are imported, are primarily in sheet form; in most cases the sheet being compressed or decorated or both, and included in this category are asbestos cement slates for roofing and cladding. Also imported is a small annual tonnage (in most years less than 2000 tons per annum) of pressure pipes made from asbestos cement and used principally by Water Authorities for the transmission of drinking water.

(b) Insulation board

Insulation board is produced at the rate of about thirty tons a month. EBP Insulating boards are produced strictly in accordance with BS 3536: Part II: 1974, and in particular Composition Clause 2.1 and 2.4.2 (1) b. The density of insulation board is as per the British Standard Specification, which is not exceeding 720 kg/m³, but less than 900 kg/m³.

2.2.3 Fibre

No 'blue' fibre is either used in our UK manufacture or in our imports.

2.3 Personnel, dust count and diseases

2.3.1 Number of employees

There are 162 people directly employed in production of asbestos cement at the Meldreth factory and ten people directly involved in the production of insulation board and this from a total of just over 500 people employed in the factory as a whole. (On the day on which this submission was drafted, the actual number was 506. The term 'just over 500' is used because the number tends to change marginally from day to day).

2.3.2 Measurement of dust levels

Dust concentrations are measured throughout the factory and its surrounds on a regular basis, supplemented by 'spot checks'.

For daily routine measurement konimeters are used: several readings are taken at each point and an average struck which is taken to be the actual reading; at regular intervals 'control' tests are submitted to the membrane filter method and thus a continual calibration of the konimeter is effected.

It is *not* contended that the konimeter is, in its accuracy, a satisfactory substitute for membrane filter testing, although our experience is that, on average, the konimeter gives a higher count fairly consistently.

However, the konimeter is fast and produces virtually instant readings which makes it a very important weapon in dust control procedures.

The membrane filter method is both slow and requiring of skilled labour and it is perhaps worth recording that readings taken by the Factory Inspectorate at the Meldreth factory in June, were not available to the factory until mid-August, suggesting that the Factory Inspectorate also find problems in getting fast results from the membrane filter.

To summarise: our procedures, which are in line with the Eternit manual included as Appendix XI* - utilise the membrane filter method, largely as a control, with konimeters for the daily checks.

Our own frequent readings and ALL the readings carried out by the Factory Inspectorate have produced results below the two fibres per cc level.

2.3.3. Health and safety procedures

On any occasion on which employees are in any way likely to be subjected to dust (for example, when

*This Appendix is not included in this volume.

handling bags containing asbestos fibre) respirators are issued. These respirators are subjected to routine servicing to ensure that they remain effective. The factory is believed to be one of the cleanest in the whole industry and good housekeeping is a jealously guarded reputation: Members of the Committee will be very welcome to visit and inspect the factory.

All cleaning necessitating removal of dust is by industrial vacuum cleaners.

A system of routine medical checks is in force, under the supervision of the factory doctor: a local general practitioner who spends one half day per week at the factory. The factory has a full time State Registered Nurse and the usual first aid facilities.

Safety training comes under the Safety Officer at the moment, but will soon be coming under the recently appointed Group Training Officer.

Within the catchment area of the Meldreth factory, including its employees, there has, since the commencement of asbestos cement production in 1929 and up to the date of drafting this submission, been one known case of asbestos related disease.

This case (AW) joined the company (Atlas) in 1931. In 1960, he registered as disabled, having contracted asbestosis, and is now employed in the factory as an inspector. It should be recorded that AW, who is now sixty-four, was employed on the beater floor dealing with asbestos fibre during the early part of his employment.

2.4 Waste Disposal

Waste is disposed of by dumping in a pit, and then covering the material thus dumped with earth. The pit is used exclusively by this Company with the exception of occasional tipping of general building rubble by the owners. Regular monitoring takes place by the Health Department of the Local Council.

2.5 Delivery and onward handling of products

2.5.1 Delivery

Products are generally delivered loose on timber bearers and unloading is either manual, fork lift or by crane, whichever is available at the point of off-loading. Nearly all deliveries are either by the company's own transport or by specialist sub-contractors who have, without exception, worked for the company for many years. A small percentage of goods are collected by customers.

Imported materials are delivered in small ships, usually between 300 and 600 tons capacity, which are chartered specifically for the purpose and, when carrying asbestos cement materials, do not have any other cargo on board. The freight agents who organise this traffic have been doing so for over fifty years. Ships are loaded on a wharf owned by CFE adjacent to their factory in Belgium, and are unloaded by our own labour on our own wharf at Townmead Road, Wandsworth, or at a wharf in Rye, Sussex, where we rent space in a timber warehouse; stock and movement being controlled by two of our resident employees who have many years experience

in that capacity. Ships are also unloaded on a routine basis at Teignmouth and Belfast, by sub-contract labour.

2.5.2 Handling and cutting

We specify that handling and cutting of our products once they leave our charge and are in the hands of our customers, should be in accordance with the published recommendations of the Asbestosis Research Council (ARC), these instructions complying with the Asbestos Regulations 1969 and the Health and Safety in Work etc. Act 1974.

It was and is our view that the published recommendations of the Asbestosis Research Council if adhered to, form an adequate safeguard for all engaged in handling, cutting or in any way using our products. We do regard it as incumbent upon ourselves to draw our customers attention to these recommendations and this is done in the following ways:

(a) by site visits and by visits to stockists premises:

our sales force, in addition to reminding our customers of the correct procedures to be followed, also visit sites/stockists where our material is being used/stored. The site visits have two principal objectives:

(i) To see that the ARC recommendations are being enforced and, if they are not, drawing the attention of the relevant person in authority to the facts;

(ii) To make sure that our materials are themselves being properly used/stored and to the best effect (a good reference on a building helps to generate further orders).

(b) by distribution of ARC literature;

(c) by correspondence;

(d) by telephone, and verbal communication.

Some of our products, and this applies more to the imported ones, require specialist cutting and machining, quite apart from health considerations connected with the creation of dust. Basically, this is because many of our imported products are very hard and most contractors do not have equipment suitable to cut or drill them.

As most of these materials are specified by architects they can relatively easily be pre-cut and drilled, and delivered to site ready for placement. This company 'recognises' twelve cutters in the United Kingdom, and all our customers are recommended to use one of these. There are several other specialist cutters that we do not 'recognise'; this has nothing to do with either their ability or their adherence or otherwise to standards, but is entirely a matter of commercial judgment.

All the cutters that we recognise are visited regularly by our sales force and periodically by our management and, of course, by the Factory Inspectorate, local health officer and so on. In sterling value, nearly half our current business is in this rather specialist category of requiring little or no alteration on site.

2.6 Bridgwater Panels Ltd

Bridgwater Panels Ltd has regular visits from the Factory Inspectorate and from the local health authority. They cut for competitive asbestos cement companies as well as for EBP, and fibre counts taken at their factory have always been below the 'two-fibres' level. They employ twenty-six personnel.

It is perhaps relevant to note that the bulk of their cutting is done 'under water' thus virtually eliminating dust.

2.7 H J Haynes

H J Haynes store some asbestos cement materials, but do not cut or process except in their ordinary way of business as contractors, and then principally on site in accordance with ARC recommendations.

They employ thirty people directly, from time to time engaging more on a sub-contract basis.

Section 3 Conclusions

Recent publicity has focussed public attention on asbestos and, in particular, the potential health hazards. It is essential that the criticisms and doubts raised are examined and reported upon and we therefore welcome the setting up of the Committee to do just this.

The broad concern voiced over 'asbestos' has, of course, embraced a wide and divergent range of products including asbestos cement.

We believe asbestos cement to be a valuable and safe product bringing many benefits to the community and the substance of this submission has been to bring forward evidence to back this claim.

Severe measures have been taken in recent years to reduce any risks, even if they are slight. Most cases of asbestos-related disease date back to the years during which the importance attached to verifying the percentage of dust, be it in the mines or in the factories using asbestos, was not as critical as it is nowadays.

This does not mean that in the past factories did not give sufficient consideration to questions related to industrial hygiene. Usually they complied with hygiene regulations (dust) which were established in accordance with the medical knowledge of those days.

The situation is now changed and medical knowledge and more stringent regulations have, as we have sought to demonstrate in this submission, brought the problem under control.

The main points we wish to emphasise are:

3.1 The essential difference between asbestos cement and other products containing asbestos, which may be summarised as:

- (a) low asbestos, about 12%, the balance Portland cement;
- (b) the complete encapsulation of the asbestos fibre in the cement;
- (c) the dust from asbestos cement has similar properties to that of Portland cement and a different physical-chemical texture to that of asbestos.

3.2 The fact that there is no known substitute for asbestos cement that comes anywhere near to combining its range of properties and benefits.

3.3 The high levels of health and safety procedures which exist in asbestos cement plants.

Examples of asbestos-related disease amongst workers, have come from periods when less knowledge existed and less efficacious standards were commonly accepted, with particular problems resultant from the handling of pure asbestos fibre.

In this respect the following should be noted:

- (a) the improved methods of packing and transporting asbestos fibre from the mine to the plant, and for handling the fibre within the plant;
- (b) the adoption of the two fibres/cc level and its confirmation as the standard by authorities around the world;
- (c) the medical evidence which supports the two fibres/cc level as providing effective protection for workers both in manufacture and in finishing (sawing, etc);
- (d) The EBP record which shows that on *all* occasions readings taken by us or by the Factory Inspectorate at Meldreth have been within the 2 fibres/cc level. Since the commencement of asbestos cement manufacture at Meldreth in 1929 there has been only one known case of asbestos related disease.

3.4 The safety of occupants of buildings which utilise asbestos-cement. There is no evidence of any risk to the health of the general public.

Finally, we would like to record our willingness to meet and discuss any matters arising out of the Committee's work, and to welcome members to our Meldreth plant. In view of the concern which exists amongst the public and which cannot fail to have influenced customers of the asbestos cement industry, we would welcome an early response from the Committee on asbestos cement.