

1955.

COMMONWEALTH OF AUSTRALIA.



TARIFF REVISION.

TARIFF BOARD'S REPORT

ON

ASBESTOS FIBRE.

P. 1
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P. 12

24TH MARCH, 1955.

Produced in the matter of
Asbestos Personal Injury Cases;
Abrams Lead & copied to
Richard F. Scruggs.

Printed for the GOVERNMENT of the COMMONWEALTH by A. J. ARTHUR of the
Government Printing Office, Canberra.
(Printed in Australia.)

F.1075/55.

PERSONNEL OF THE TARIFF BOARD.

M. E. MCCARTHY, C.B.E., A.A.S.A., Chairman.

J. B. CUMMING, A.A.S.A., Member.

V. A. CLARK, B.Com. (Tas.), Member.

P. B. NEWCOMEN, C.B.E., Member.

F. W. HIGGINS, Member.

A. DATE, B.Ec., Member.

F. I. ELY, Member.

For the purposes of the inquiry and report on this matter the powers of the Board have been exercised by—

M. E. MCCARTHY, Chairman.

V. A. CLARK, Member.

P. B. NEWCOMEN, Member.

F. W. HIGGINS, Member.

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TARIFF BOARD'S REPORT.

ASBESTOS FIBRE.

On 15th January, 1954, the Minister for Trade and Customs referred to the Tariff Board for inquiry and report in accordance with section 15 (1)(d) of the Tariff Board Act 1921-1953, the following question:—

Whether assistance should be afforded the production in Australia of asbestos fibre and, if so found, the nature and extent of such assistance.

In pursuance of the Minister's reference the Board has held the necessary inquiry and submits the following report:—

EXISTING DUTIES.

CUSTOMS TARIFF 1933-1954.

	British Preferential Tariff.	Inter- mediate Tariff.	General Tariff.
Item 574 (2). Asbestos, crude	Free	Free	Free

TARIFF BOARD NOTES.

1. Under the Customs Tariff (Canadian Preference) and Customs Tariff (New Zealand Preference) the goods under reference, when imported from Canada or New Zealand and complying with the preference provisions, are admitted under the British Preferential Tariff.

2. Goods classifiable under Item 574 (2), when originating in and exported from certain proclaimed countries, are accorded "Most-Favoured-Nation" treatment and are admitted under the Intermediate Tariff.

3. The goods under reference are free of Primage duty from any country.

IMPORTATIONS.

Official statistics of the goods under reference are set out in Appendix A.

PUBLIC INQUIRY.

In accordance with section 11 (4) of the Tariff Board Act 1921-1953 the matter covered by the Minister's reference was made the subject of a public inquiry by the Board at—

Sydney—2nd June, 1954, 3rd June, 1954, and 4th June, 1954.

Melbourne—21st June, 1954.

WITNESSES.

The following witnesses tendered evidence on oath at the public inquiry and were examined by the Board:—

IN FAVOUR OF PROTECTIVE DUTIES.

Keith Osborne Brown, managing director, Australian Blue Asbestos Ltd., 59 St. George's-terrace, Perth, Western Australia.

Malcolm George King, director, Australian Blue Asbestos Ltd., 59 St. George's-terrace, Perth, Western Australia.

Honorable Harry Charles Strickland, Minister of the Crown, Government of Western Australia, Parliament House, Perth.

IN OPPOSITION TO PROTECTIVE DUTIES.

Alexander Sydney Phillips Sangster, director and works manager, Wunderlich Ltd., Baptist-street, Redfern, New South Wales.

John Thynes Adamson, managing director, James Hardie and Co. Pty. Ltd., Asbestos House, York-street, Sydney.

John Seymour Prond, consulting mining engineer, 3 Finlay-road, Turrumulla, New South Wales.

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Eric Wilson Sisman, director, British Belting and Asbestos Ltd., Cleckheaton, Yorkshire, England.

William Stewart Jeffery, director and general manager, Australian Asbestos Pty. Ltd., 54 Meekers-road, Marrickville, New South Wales.

Norman George Webster, technical assistant, Bell's Asbestos and Engineering (Australia) Ltd., 213 Waverley-road, East Malvern, Victoria.

Alexander Walker, representing Gollath Portland Cement Co. Ltd., Railton, Tasmania.

Robert Lawrence Lawrie, representing Ellis & Clark Ltd., 204 Flinders-street, Adelaide, South Australia.

Raymond Walter Everett, representing Kandos Cement Co. Ltd., Yorkshire House, 14 Spring-street, Sydney, New South Wales.

OTHER EVIDENCE.

Ian Charles Henderson Croll, Senior Mineral Economist, Bureau of Mineral Resources, 485 Bourke-street, Melbourne.

Colin Francis Adams, Superintendent of State Batteries, Western Australian Mines Department, Perth, Western Australia.

George Felix Mead, assistant-mining engineer, Bureau of Mineral Resources, 485 Bourke-street, Melbourne, C.I.

Eric Adams, manager, Dominion Industries Ltd., Christchurch, New Zealand.

EVIDENCE.*

A copy of the official transcript of evidence tendered at the inquiry is forwarded herewith.

SUMMARY OF EVIDENCE.

The main points in the evidence tendered at the inquiry have been summarized and are set out in Appendix B.

TARIFF BOARD COMMENTS.

ORIGIN OF REFERENCE.

The Minister's reference arose from representations made by Australian Blue Asbestos Limited, Western Australia, requesting that assistance be given to the production in Australia of asbestos fibre. Imported fibre is at present being admitted free of all duties regardless of origin and free of primage duty.

HISTORY OF INDUSTRY.

Asbestos is a commercial term applied to a group of minerals characterized by a silky fibrous texture and high heat resistance. The mode of occurrence is in well-defined veins of fibres or in irregular masses disseminated throughout the host rocks, which are widely distributed in the rocks of the earth's crust; deposits of major commercial importance, however, are confined to less than a dozen regions, most of which are within the British Commonwealth.

The mineral, asbestos, has been classified into the two broad groupings of Serpentine and Amphibole. This inquiry is mainly concerned with the three varieties which are designated—chrysotile, amosite and crocidolite. Chrysotile, more commonly known as white asbestos, is commercially the most important form of asbestos and comes within the Serpentine grouping; amosite and crocidolite (the latter commonly known as blue asbestos) fall within the Amphibole grouping.

* Evidence not printed.

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Whilst there is no internationally recognized standard method of grading asbestos, the most widely used system is that adopted by the Quebec Asbestos Mining Association for Canadian mined chrysotile asbestos. The grade is broadly governed by length of the fibre: the greater the length the higher the grade and consequently the higher the price.

The principal uses for asbestos fibre are—

- (i) in the case of long fibres, spinning into yarn for weaving heat resistant cloth and for insulating materials;
- (ii) reinforcement in asbestos cement products, requiring medium length fibre; and
- (iii) for the manufacture of insulating paper, floor tiles, paints, lubricants, &c., where short fibres are used.

The universally accepted method of selling asbestos fibre is by the short tons of 2,000 lb.: hereinafter, all reference to tonnage in this report will mean short tons.

In the period 1947 to 1952 inclusive, the major producer in the world (excluding the Union of Soviet Socialist Republics) was Canada, producing 73 per cent. of the known world total. Canadian annual production increased from 661,820 tons in 1947 to 929,339 in 1952. South African and Southern Rhodesian production ranks next in importance, being 7.4 per cent. and 6.7 per cent. respectively of the known world total, whilst Australia's contribution was only 3 per cent. in the six years to 1952. Australian production represents a self sufficiency of 7 per cent. only.

Commercially, Canada produces only chrysotile, the bulk of which is of "soft" texture which appears in a full range of grades; the balance is a "harsh" fibre chrysotile occurring in non-spinning grades. The Union of South Africa produces chrysotile, crocidolite, amosite and anthophyllite whilst Southern Rhodesia produces mainly chrysotile.

The main commercial amosite production in the world is in the Pietersburg—Lydenburg area of the Transvaal, where production increased from 30,332 tons in 1948 to 63,280 tons per annum in 1952; the total crocidolite production from South Africa in the same period increased from 10,903 tons per annum to 44,735 tons in 1952.

In Australia the commercial production of asbestos fibre has hitherto, been on a small scale, as shown by the following table:—

	1947.	1948.	1949.	1950.	1951.	1952.	1953.
Tons.							
Chrysotile ..	381	390	403	653	1,208	1,243	1,506
Crocidolite ..	1,039	225	1,314	1,153	1,307	3,252	14,250
Other types ..	123	363	90	1	..	..	..

Whilst chrysotile is in strong demand, deposits in Australia are limited; conversely crocidolite reserves far exceed the apparent demand.

Deposits of asbestos occur in New South Wales, Tasmania, South Australia and Western Australia. The only deposit being worked at present in New South Wales is one of chrysotile at Baryulgil, 52 miles north-west from Grafton, where a maximum yearly output of 430 tons was obtained in 1953; other small deposits of chrysotile occurring, but not at present being worked, are situated at Woods Reef (12 miles east of Barraba) and at Red Hill, near Broken Hill.

No leases are current in Tasmania, although there are occurrences at four or five locations. Total Tasmanian production from 1899 to 1953 was 903 tons of chrysotile and 7 tons of amphibole.

In South Australia prospecting for chrysotile has been undertaken in a number of locations since 1929, but with little success. In this State crocidolite occurs widely in a belt extending 400 miles north of Encounter Bay but actual production has been recorded only from Robertson and from Oraparinna Station. Although neither deposit is being worked now, an aggregate of 910 tons was obtained from them from 1951 to 1953. Two small deposits of amphibole were worked from 1936 to 1940 for a total of 66 tons.

The principal deposits of asbestos in Western Australia are in the region south of Port Hedland and south-west of Marble Bar. At Nunyerry and at Lionel, good quality chrysotile is produced and four other small deposits in the same area have been worked. Total production of chrysotile from this region to the end of 1953 was 2,695 tons; most of this was of a grade higher than that generally required in Australia and was exported.

In terms of area and known reserves the crocidolite deposits in the Hamersley Ranges, Western Australia, are the most important known asbestos deposits in Australia. These deposits are similar to the crocidolite appearing in South Africa, but the Australian fibre is longer. Whereas the earliest recorded production was in 1937, it was not until 1943 that plans were laid for large-scale operations when Australian Blue Asbestos Ltd.—97 per cent. of whose shares are held by the Colonial Sugar Refining Co. Ltd.—took over the leases.

The interest of the Colonial Sugar Refining Co. Ltd. in asbestos fibre was the result of that company's entry into the building materials field in 1938, when a factory for the manufacture of cane fibre insulation board was established. In order to be in a position to supply the full range of building boards the company also acquired control of its present subsidiary, Asbestos Products Pty. Ltd., which is a small producer only of flat asbestos cement sheets and corrugates.

The extension of the activities of the Colonial Sugar Refining Co. Ltd. into the asbestos fibre field brought the company into competition, although only in a minor way, with the well-established asbestos cement producing companies of James Hardie and Co. Pty. Ltd. and Wunderlich Ltd. An early conflict of opinion arose between James Hardie and Co. Pty. Ltd. and the Colonial Sugar Refining Co. Ltd. concerning the acquisition by the latter company in 1943 of the Wittenoom blue asbestos deposits. James Hardie and Co. Pty. Ltd. contended that these deposits could not be operated profitably because blue asbestos would only be used in the manufacture of asbestos cement for the same purpose as South African amosite was used, and the amosite could be obtained for about half the price at which it was estimated the Western Australian blue asbestos would be offered for sale. James Hardie and Co. Pty. Ltd. intimated that it would, however, be prepared to buy at prices equal to the landed cost of imported fibres any Australian fibres equivalent in grade and quality. The Colonial Sugar Refining Co. Ltd. considered that the development of the Wittenoom Gorge deposits had good prospects of success, even without the support of James Hardie and Co. Pty. Ltd., and that there were other possible uses for blue fibre than in the products being manufactured by that company.

The development by Australian Blue Asbestos Ltd. of the Wittenoom Gorge deposits in the Hamersley Ranges, 150 miles inland from Roebourne and Point Samson, encountered all the problems inherent in the establishment of a mining venture in such an isolated region, particularly during the war period. Labour was difficult to obtain and equipment and transport costs were very high. In addition the nature of the host

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rocks presented mining difficulties which required a special technique which was evolved only after considerable delay and experimentation. The hard and abrasive nature of the ore added to milling costs and contributed to the general difficulties which caused the company, in 1916, to make representations for assistance from the Western Australian Government and the Commonwealth Government. The result of these representations was that the Commonwealth Government, in association with the Western Australian Government, agreed to provide a freight subsidy of 10s. per ton on asbestos shipped from Point Samson to Fremantle and an additional subsidy of 2s. per ton on asbestos sent by road from Wittenoom to Point Samson. A further subsidy was provided on goods sent by road from Point Samson to the mine, with the exception of building materials for houses built under the Commonwealth-State Housing Agreement. Although the assistance thus agreed to was for a limited period and was to be reviewed in June, 1949, it was continued beyond that date and did not cease until July, 1952. According to the evidence of Mr. F. G. Mead, Assistant Mining Engineer of the Bureau of Mineral Resources, the Commonwealth's share of the subsidy amounted to £480 in 1947-48; £1,985 in 1948-49; £2,745 in 1949-50; and £1,284 in the period from 1950 to the end of June, 1952.

The Commonwealth Government also provided the funds under the Commonwealth-State Housing Agreement with which the Western Australian Housing Commission had 152 houses built at Wittenoom for a total cost of £381,534. The houses were actually built by Australian Blue Asbestos Ltd., at cost plus 2½ per cent. In addition the State and Commonwealth governments have provided the usual services, viz., water supply, school, hospital, police, post office and maintenance of the aerodrome taken over from the company.

The continuous efforts which Australian Blue Asbestos Ltd. undoubtedly made to secure economies in mining and milling operations met with some success, but, in face of the increasing supplies of asbestos fibre which became available in overseas countries, the company has had difficulty in effecting sales and untold stocks have progressively increased. The possibilities, therefore, of profitable operation, quite apart from the need to recoup the losses of the earlier developmental period, have not improved.

The figures given in evidence to show the declining cost of producing crocidolite at Wittenoom over the past four years due to increased output and improved technique were as follows:—

	Output tons.	Cost per ton into store, Fremantle.
Year ending 30.6.51 ..	1,004 ..	261
" " 30.6.52 ..	2,594 ..	202
" " 30.6.53 ..	2,656 ..	182
6 months to 31.12.53 ..	2,220 ..	137

The production rate had reached 4,500 tons per annum at the date of the inquiry. The cost of grade 3 fibre (the basic grade) into store at Fremantle was stated to be £132 per ton.

As against increases in output shown above the sales of fibre over the three years ended 30th June, 1953, were—

Year Ending	Australia.	Overseas.	Total.
30th June, 1951 ..	294	525	1,113
30th June, 1952 ..	1,533	813	2,376
30th June, 1953 ..	1,043	1,654	2,697

REQUESTS FOR DUTY AND REASONS THEREFOR.

On behalf of Australian Blue Asbestos Ltd., Mr. K. O. Brown requested that the existing Tariff Item for Asbestos—5741(x)—at present duty free from all countries, be amended to provide a 40 per cent. tariff on importations of grades of asbestos fibre imported into Australia of length equivalent to Canadian Grading Groups 1 to 5, with the proviso that exemption apply to these gradings if entered for use in manufacturing articles, the total asbestos content of which consists of not less than 15 per cent. by weight of Australian crocidolite asbestos.

On behalf of the Western Australian Government the Honorable H. C. Strickland, M.L.A., Minister for the North West, supported the request for tariff protection.

The principal reasons advanced in support of the request for a protective duty were—

- (i) asbestos fibre is a strategic mineral and it is nationally important that deposits of the magnitude occurring in the Hamersley Ranges, Western Australia, should be fully developed;
- (ii) the grade of crocidolite produced at Wittenoom Gorge and the adjacent Western Gorge is at least comparable with overseas crocidolite and if a minimum consumption is assured the Australian fibre will be able to compete with imported fibre;
- (iii) the use of 15 per cent. of Australian crocidolite in asbestos cement product fibre mixtures would ensure profitable production of the Australian fibre;
- (iv) the economic welfare of the inhabitants of the township of Wittenoom, and to a great extent of the population of Roebourne and Point Samson, is dependent upon the successful operation of the asbestos mine;
- (v) tariff assistance is necessary to ensure that the financial assistance already given by the Western Australian Government and the Commonwealth Government to foster development of the North West will not be nullified;
- (vi) the use of Australian crocidolite in place of Canadian chrysotile would save Australia dollars.

OPPOSITION TO THE IMPOSITION OF A DUTY AND REASONS THEREFOR.

On behalf of James Hardie and Co., Mr. J. T. Adamson opposed tariff protection but requested that if assistance be afforded asbestos production in Australia such assistance should be confined to the payment of a bounty.

Mr. A. S. P. Sangster, on behalf of Wunderlich Ltd., also opposed the imposition of a duty, and requested that any assistance afforded the asbestos industry in Australia be given in such a way as not to compel asbestos cement product manufacturers to use Australian fibre.

The remaining opposition witnesses contested the application on the grounds that such imposition of a duty would place a serious financial burden upon the businesses they represented.

The principal reasons advanced in opposition to a protective duty were—

- (i) any administrative action designed to compel manufacturers to use Australian crocidolite would raise costs of production generally and in specific cases would require modification of existing machinery.

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- (ii) the granting of a 40 per cent. duty on imported asbestos would place asbestos cement product manufacturers at a disadvantage in that high prices would depress sales and the ultimate users of asbestos cement sheets, in the main persons in the lower wage group, would pay more for the small fibre-cement Jewellings;
- (iii) the proposed duty would not effectively save dollars because the usage of crocidolite would merely replace South African amosite;
- (iv) the development of the remote asbestos deposit in Western Australia was ill advised and uneconomical, and it is unreasonable to expect asbestos cement manufacturers to pay for such a costly experiment.

AUSTRALIAN MARKETS AND DEMAND.

The total usage of asbestos fibre in Australia at the present time is approximately 32,000 tons. It has been estimated that 85 per cent. of this quantity is used in the production of flat and corrugated sheets, pressure pipes and sundry other forms of asbestos cement products. The remaining 5 per cent. is used in the manufacture of heat-resisting fabrics, brake linings, boiler lagging, insulating materials, floor tiles, gaskets, battery boxes, packings and paints.

There are only four manufacturers of asbestos cement products. Of these, James Hardie and Co. Pty. Ltd. produces nearly 70 per cent. of the total output and Wunderlich Ltd. about 22 per cent. The remaining proportion of the total production is divided between Asbestos Products Pty. Ltd. and Goliath Portland Cement Co. Ltd.

The varieties of asbestos fibre used in asbestos cement manufactures are chrysotile, amosite and crocidolite and of these chrysotile is commercially the most important. Australian consumption of the three varieties has been approximately in the proportions of 60:30:10 respectively, but, in 1953, the statistics of usage showed the relative proportions as 83:25:1. Each type of asbestos fibre has particular properties which determine its suitability, either alone or in combination with other types, for various uses.

Mr. J. S. Proud, a consulting mining engineer, giving evidence on behalf of James Hardie and Co. Pty. Ltd., stated that there are four considerations upon which the strength, quality and cost of an asbestos cement product depend. These are—

- (i) The amount of asbestos used;
- (ii) The tensile strength of the asbestos;
- (iii) The bond strength between the surface of the asbestos and the cement; and
- (iv) The speed of filtration and final density of the product.

Each manufacturer, therefore, determines the proportions of each type of fibre and the quantity of cement and water in the mix according to his own formula, having regard to the technical operations best suited to the type of machine which he operates, as well as to the final costs of the product. Much of the discussion at the inquiry centred on the technical characteristics of the fibres used by Australian manufacturers and the relative costs of manufacture as a result of the substitution of one fibre for another.

Australian asbestos cement manufacturers generally favour the use of a high proportion of soft chrysotile fibre to ensure the required bond strength between fibre and cement and a quantity of harsh fibre, equivalent to about one-third of the total usage, of amosite or crocidolite or a combination of amosite and crocidolite, according to the speed of filtration required and the density specification of the final product.

Although there are several small deposits of chrysotile asbestos currently being worked in Australia, the demand for this variety is far in excess of available local supplies and the bulk of Australian requirements is drawn from the extensive Canadian fields. Amosite fibre is imported from the Union of South Africa and Southern Rhodesia, where large deposits exist, the output from which is being rapidly increased. The very extensive deposits of asbestos in the Wittenoom Gorge area of the Hamersley Ranges in Western Australia, which are being worked by Australian Blue Asbestos Ltd., consist of crocidolite fibre (blue asbestos), which is commercially the least important variety from the point of view of present demand.

On the basis of a production rate of 4,500 short tons per annum, the price of Grade 3 Australian blue f.o.b. Fremantle is £135, equivalent to an into-store cost of approximately £144 at Sydney. If an assured sales volume of 5,000 short tons could be obtained, Australian Blue Asbestos Ltd. states that the average price of its fibre could be reduced to £110 per short ton, at which price, it is claimed, it would be competitive with equivalent grades of imported asbestos fibre. The company believes that overseas markets could be found for 4,000 tons per annum at a price equivalent to £A.110 per short ton f.o.b. Fremantle and that it would be necessary to dispose of 4,000 tons per annum within Australia.

In its efforts to reduce the cost of production of asbestos fibre, Australian Blue Asbestos Ltd. is developing a richer ore body at Western Gorge, a tributary of Wittenoom Gorge. The company's plans, however, provide only for a proportion—up to 20 per cent.—of the total production of fibre to be drawn from the Western Gorge deposits on the basis that this would conform with accepted mining practices and enable the life of the whole mine to be extended to its utmost. The alternative of mining only the richer ore deposits at Western Gorge was not acceptable to the company, although, on the basis of evidence given by Mr. C. F. Adams, Superintendent of State Batteries in the Mines Department of the Western Australian Government, the company's return would show a profit instead of the present loss if the whole of the output could be obtained from Western Gorge. Mr. Adams's evidence indicated that the recovery of fibre from Western Gorge is expected to yield 1 ton of fibre for every 18 tons of rock mined, whereas at Wittenoom the yield was 1 ton of fibre from 25 tons of rock.

In 1946, at the time when the company made representations for governmental assistance, its plans were based on a production rate of 6,000 tons of fibre per annum. At a then selling price of £50 per ton f.o.b. Fremantle this was estimated to provide a return on capital of 3 per cent. The price of £50 was assessed in relation to 4K Canadian fibre, the cost of which was £46 per ton at Sydney.

The present cost of 4K Canadian fibre is £100 per ton landed in Australia while, on a proposed production schedule of 5,000 tons per annum, Australian Blue Asbestos Ltd. must sell at £110 per ton Fremantle in order to make a reasonable profit. The company claims that this increase in price is not out of place compared with the increases which have taken place in the prices of other forms of building materials and that it reflects the additional cost of labour and transport which have taken place since 1946.

COMPANY'S PROPOSAL.

Australian Blue Asbestos Ltd. in estimating that the Wittenoom venture would be profitable on the basis of a production and selling rate of 5,000 tons of fibre a year, has allocated a theoretical market of 4,000 tons for consumption in Australia and 4,000 tons for sale overseas.

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In regard to the Australian market, the company contends that, for Wittenoom to continue to exist, James Hardie and Co. Pty. Ltd. must use at least 12 per cent. of Australian blue fibre out of its total usage of asbestos fibre. In the company's own words, "If Hardie's firmly believe that they cannot pay more than £50 per ton for No. 3 blue fibre, then obviously a high protective tariff is needed to make sure they will use blue fibre rather than import. James Hardie & Co. Pty. Ltd. is such a large producer, so long established and with such a long past history of success and current strong financial position, that it could afford to continue to refuse to use the blue fibre, unless there is a high monetary incentive for them to do so."

Australian Blue Asbestos Ltd. claims that, because of the policy of James Hardie and Co. Pty. Ltd. and the view of that company in regarding Australian blue fibre as being equivalent only to South African amosite at £50 per ton, a protection equivalent to £90 per ton of No. 3 grade Australian blue fibre would be needed. Australian Blue Asbestos Ltd. requests a duty of 40 per cent. ad valorem on all imported fibre (including chrysotile), but with complete remission of the duty if Australian blue fibre is used to the extent of not less than 15 per cent. by weight of the total of all asbestos fibre contained in asbestos cement manufactures.

In response to suggestions by various witnesses opposing the imposition of a tariff duty, but suggesting the granting of a subsidy in order to keep raw material costs to a minimum, the representatives of Australian Blue Asbestos Ltd. stated that they were not claiming a bounty and, in fact, would consider that a bounty could be quite ineffective as a means of protection, as it would not necessarily have the result of compelling James Hardie and Co. Pty. Ltd. to use the local product instead of South African amosite.

The applicant company stated that, on the basis of a comprehensive series of experiments which it had conducted, there were no technical reasons why asbestos cement manufacturers could not use up to 25 per cent. of blue fibre in their mix. In advocating the use of Australian blue in preference to imported fibres, particularly South African amosite, Australian Blue Asbestos Ltd. claims that, as a result of various trials which it has carried out in association with its parent company, Colonial Sugar Refining Co. Ltd., into the properties and uses of asbestos fibre, the use of blue fibre would result in increases in strength to weight ratio and yield, and the conclusion is drawn from these experiments that blue fibre is more than a replacement for cheap amosite and is an effective replacement for 4K chrysotile. In the company's view it is superior to 4K fibre and therefore worth more per unit.

Views of Manufacturers.

Mr. J. S. Proud, consulting mining engineer, stated, on behalf of James Hardie and Co. Pty. Ltd., that fresh zone amosite of South African origin and Western Australian blue asbestos are of similar reinforcement value and both, being harsh fibres, are parallel in usage. Amosite is at present being used to a maximum extent and Canadian chrysotile to a minimum so that any enforced usage of Australian crocidolite would only replace portion of the amosite at present being imported from South Africa. In his view, blue asbestos, occurring in vast deposits both in Australia and Africa occupies only a minor role in world trade and, as chrysotile reserves are adequate for many decades, it would be many years before large tonnages are required from Australia or African sources.

Mr. J. T. Adamson, managing director of James Hardie and Co. Pty. Ltd., said that, as basic raw materials, fresh zone amosite and Australian blue asbestos are equivalent and inter-changeable in asbestos cement products, but are not comparable on a price

basis. At the present time Australian blue grade 3, which costs £135 per short ton f.o.b. Fremantle, would land into the company's Sydney store at £144, while fresh zone amosite lands into the same store at an average cost of £35 10s. per short ton.

The company's total asbestos purchases for use in 1954 amount to 26,546 tons. The value of this quantity is £2,132,409, of which 600 tons, costing £33,000, are obtained from the company's mine at Baryngill, New South Wales. The balance of 26,046 tons, valued at over £2,099,000, is imported and a 40 per cent. tariff on the value of that quantity would cost the company £832,000 and seriously damage its business.

If, as the only alternative, the company is obliged to use 15 per cent. of Australian blue, i.e., 3,987 tons in place of an equivalent quantity of fresh zone amosite the additional annual cost would amount to £347,700. The total increase in price to consumers which would be necessary to recover that additional cost, without making any profit margin, would amount to £481,500 per annum.

If Australian blue were reduced to £110 per ton f.o.b. Fremantle, the additional annual basic raw material cost would be £347,000, and the necessary additional cost to the consumer would be £300,250.

In the view of James Hardie and Co. Pty. Ltd. the chances of securing an overseas market for Australian crocidolite are negligible unless the producing company can get its costs down to the level of those of the South African Cape Asbestos Company. The price of S grade Cape blue (the equivalent to grade 3 O.S.B. blue) is £A.72 10s. per ton f.o.b. Cape Town.

The principal opposition of James Hardie and Co. Pty. Ltd. to the imposition of a tariff on the lines suggested by the applicant company is based on the high additional costs which that proposal, if enforced, would bring about. Increased prices for asbestos cement sheets would result in higher costs in the low bracket building trade and would also tend to make corrugated asbestos cement sheets much less competitive with corrugated galvanized iron for roofing purposes. The additional cost would also make the larger diameter concrete pressure pipes non-competitive with cast iron pipes.

James Hardie and Co. Pty. Ltd. use the Hatschek type machine in the manufacture of asbestos cement and, apart from the original Hatschek machine imported from Switzerland in 1917, all the company's machinery and plant have been designed by the company and built in Australia. As a result of continuous capital expenditure on new and improved equipment with greater mechanization, the cost of manufacture of asbestos cement products since 1948 has increased by only 40 per cent., although the cost of raw materials (asbestos and cement) has increased by almost 100 per cent. and the basic wage has also increased by about the same percentage. As basic raw material costs represent 65 per cent. of the company's production cost of its main lines, it has only been by increased manufacturing efficiency that it has been able to develop to its present size and importance to the community. The proposal of Australian Blue Asbestos Ltd. would, if implemented, destroy many of the valuable results achieved in maintaining the asbestos cement industry as a supplier of low-cost building materials.

Wanderlich Ltd. claims that crocidolite is unsuitable and would not normally be used except in cases where suitable grades of chrysotile and amosite were not available. The company is reducing its usage of crocidolite concurrently with its return to the pre-war mix of chrysotile and amosite. The company has been using Fourdrinier machines and has found that, with these machines, it was possible to use a limited proportion of Australian blue fibre, but its high price made its use economically unjustifiable.

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However, the filtration properties of the fibre are good and helped the company to maintain production at a time when well-graded amosites were not available in sufficient tonnages.

In order to reduce costs, Wunderlich Ltd. is carrying out a programme of replacing the Fourdrinier machines with Hatschek and Magnani machines which are proving very satisfactory. In these machines, unless modified at considerable expense, the Australian blue fibre will not run satisfactorily, but no difficulty has been found in using up to 20 per cent. of suitable amosites on the Hatschek and Magnani machines, as the amosite provides the filtration rate necessary for the faster speeds of these machines.

In the case of Wunderlich Ltd., the cost of imported fibre for 1954 would be approximately £754,000. A 40 per cent. tariff would increase the cost by £306,000. Usage of fibre in 1954 would be about 8,500 tons and the alternative of using 15 per cent. of this tonnage, i.e., 1,275 tons, under the applicant company's proposals for the compulsory use of Australian blue asbestos would, at present prices, cost Wunderlich Ltd. £153,000. As the blue fibre could not be used on the company's Hatschek and Magnani machines, it would be necessary to allocate it to the existing Fourdrinier machines in place of amosite and this would not be practicable, as a quantity of 1,275 tons would represent 25 per cent. of the total fibre used on these machines and would have the effect of producing a sheet blue in appearance compared with the standard light grey in the company's other products. The variation in colours would create an impossible situation for the company in marketing this product.

Goliath Portland Cement Co. Ltd. has a much smaller output of asbestos cement products than either of the previous companies mentioned. This company opposes the proposals of Australian Blue Asbestos Ltd. on the grounds of the intolerable financial burden which would be placed on the manufacturer by the compulsory usage of high cost Australian blue fibre, or the alternative penalty rate of tariff which the applicant company has sought.

The only other manufacturer of asbestos cement products is Asbestos Products Pty. Ltd., a subsidiary of Colonial Sugar Refining Co. Ltd. The applicant company states that Asbestos Products Pty. Ltd. uses an average of 20 per cent. of blue fibre in addition to a small quantity of amosite. Asbestos Products Pty. Ltd. was still working on some stocks of blue fibre which it had purchased at £170 per ton at a time when Australian Blue Asbestos Ltd. had excess stocks of this fibre at Fremantle. The company's total fibre consumption has never been more than 2,000 tons a year and, because of its location, it is not possible to extend the size of the business. Asbestos Products Pty. Ltd. could not, however, continue to use 20 per cent. blue fibre at a cost of £170 per ton while competitive companies were able to purchase it at £130 per ton.

COSTS OF IMPORTED AND AUSTRALIAN ASBESTOS FIBRE.

The respective current costs of those types and grades of fibre stated in evidence to be used in asbestos cement sheet manufacture are shown hereunder:—

Type	Cost, hundred square feet, 4 ft. per ton
Canadian Chrysotile 4K	100
Canadian Chrysotile 5K	11
South African Amosite	55
Western Australian Crocidolite	128
South African Crocidolite	—
Grade N, Cape Blue	92
Grade P.A.M., Cape Blue	120

* This cost, based on £120 f.o.b. Fremantle, was quoted by Australian Blue Asbestos Ltd. to be the selling price at the date of inquiry.

Evidence was given that with a profit margin of 5d. per square yard of asbestos cement sheet, a manufacturer could choose to absorb 2d. per square yard, which was represented by an increase of £10 per ton in average fibre cost. A tariff of 40 per cent., sufficiently high to make the increase £20 per ton or more, was considered by the applicant necessary to ensure that a manufacturer would decide to use 15 per cent. Australian blue fibre.

In order to illustrate the effect of the monetary advantage of using 15 per cent. Australian crocidolite in lieu of incurring the 40 per cent. duty, the applicant submitted a series of examples showing the relative cost of typical fibre mixtures. Using the above landed costs these comparisons are shown hereunder:—

	Landed Cost £ s. d. including 40 per cent. duty.	Cost of mixing 15 per cent. duty.
Example 1— 100 per cent. 4K or with mixture of: 60 per cent. 4K 40 per cent. blue	£ 100 0 0 106 0 0	£ 124 0 0 —
Example 2— 50 per cent. 4K 40 per cent. amosite or with: 40 per cent. 4K 40 per cent. amosite 15 per cent. blue	22 0 0 68 5 3	112 0 0 —
Example 3— 20 per cent. 4K 40 per cent. 4K 40 per cent. amosite or with: 5 per cent. 4K 40 per cent. 4K 40 per cent. amosite 15 per cent. blue	72 0 0 78 0 0	90 0 0 —

CONCLUSIONS.

During the inquiry it became quite evident to the Board that the question of the use by manufacturers of a greater proportion of Wittenoom asbestos had previously been the subject of negotiations and discussions between the principal parties. As the result of antagonisms which had arisen, there was little evidence of a willingness to compromise and what, in earlier circumstances, might have been minor points of difference, were contested with a vehemence more appropriate to major points. On the question of relative quality, which is an important matter, there was a conflict in the technical evidence submitted by the opposing interests. For the purpose of these conclusions however, and without committing the Board to an opinion on a matter which, if necessary, should be determined by experts, the Board has assumed that manufacturers of asbestos cement products in Australia could use about 4,000 tons per annum of Wittenoom material without detriment to their products.

On the basis of this assumption the problem is largely reduced to matters of costs and prices in which consideration of the proposed method and measure of assistance and of important principles is necessary.

The costs of production by the applicant company and consequently the selling price depend upon output. The price of £135 per ton f.o.b. Fremantle being charged by the company for grade 2 fibre in November, 1953, was based on production and sale at the rate of 4,500 tons per annum. With production at 3,000 tons per annum the company claimed that it would be able to sell at a price of not less than £110 f.o.b. Fremantle, but 4,000 tons of this quantity would have to be exported.

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In commenting on the scale of production and export of its crocidolite fibre during the earlier period of the operations of the Wittenoom mine, the representatives of Australian Blue Asbestos Ltd. said—

From 1940 to 1952 asbestos fibre was in very short supply throughout the world (and production from Wittenoom was very low) and there was no difficulty in disposing of the whole output from Wittenoom. In 1953 a recession occurred in the world asbestos market and, as by that time we were relying largely on the overseas market to take our production, it became increasingly difficult to dispose of the output without incurring heavy losses. The overseas recession confirmed our opinion that it was not safe to rely largely on an export market; although, because of the reluctance of Australian consumers to use Australian blue fibre, we had been forced to do so.

Over the period 1946 to 1952, South African production of crocidolite fibre rose from 10,000 tons to 44,700 tons per annum and it is against production of this magnitude and the lower mining costs in South Africa that the applicant company's estimates of overseas markets must be measured. The company believes that its fibre has properties which should make it acceptable on the world market at a price equivalent to £A.110 per short ton Fremantle and to some extent this view is supported by the fact that it has negotiated sales in the vicinity of that price. In the limited market which exists for crocidolite fibre, Australian supplies would come into competition with similar grades of South African crocidolite which provide the bulk of the world demand for that type of fibre. Any increase in the costs of production of Australian crocidolite, or any appreciable drop in the price of the South African fibre would invalidate the assumptions made by Australian Blue Asbestos Ltd. of a firm and continuing overseas market for its product. The Board considers that the company's assessment of an outlet on the world market for 4,000 short tons of Australian crocidolite per annum at an f.o.b. price of £A.110 suffers from a degree of optimism which is neither supported by the history of its earlier marketing experiences nor justified by the likely trend of its future competitive position.

As an integral part of its proposals, Australian Blue Asbestos Ltd. requests the imposition of a tariff rate of 40 per cent. ad valorem on all imports of asbestos fibre, such duty to be remitted if the manufacturers use at least 15 per cent. of Australian blue in their total fibre consumption. On the value of imports in 1952, a rate of 40 per cent. would increase the cost to manufacturers of asbestos cement products by an amount conservatively estimated at more than £700,000, and the applicant company readily admits that this rate was intended to provide a tariff barrier which would make it uneconomical to manufacturers to absorb the duty on imported asbestos instead of using Australian blue fibre. The effects of these alternatives on the costs of individual manufacturers, as estimated by them, are, as shown above, much in excess of this figure.

Quite apart from the questionable principle of compulsion involved, the proposals ignore, or leave to be inferred, the developments which the Board considers are likely to occur if action were taken on the lines suggested by the company. If recognition were given to the needs of Australian Blue Asbestos Ltd. for assistance in the form desired by that company, a principle would be accepted and a pattern set from which there would be no escape in the event that the company found itself unable to dispose of the estimated export volume of 4,000 tons per annum at a price of £A.110 per ton; in such circumstances it would be necessary to increase the proportion for the local market beyond the 15 per cent. now proposed as a basis, or raise the cost of fibre to the Australian manufacturers to offset losses incurred in selling at lower

prices in the overseas market, or to adopt a combination of both these courses. It is significant that the company's tariff proposal includes the words "the total asbestos content of which consists of not less than 15 per cent. by weight of Australian crocidolite asbestos or such greater percentage as may be gazetted from time to time by the Minister for Customs". The company also admits that it would be possible to keep up the price of blue fibre, even if costs of production were to fall, but it states that it is prepared to accept a profit margin not in excess of £10 per ton. As this would be on the full mine production, it would be within the terms of the company's assurance to charge higher prices to the Australian consumer in order to sell exports at world parity prices. It follows, therefore, that to bring the price down to £110 per ton f.o.b. Fremantle the following conditions are necessary—

1. There must be an export market for about 4,000 tons per annum.
2. The export market would need to yield about £110 per ton f.o.b. Fremantle.
3. Costs of production should not increase.
4. A further capital expenditure of £70,000 by the company.
5. Australian users must take about 4,000 tons per annum at a price of £110 per ton.

There is no assurance that the first three of these conditions will be fulfilled; the fourth rests with the company; the fifth depends upon fulfilment of the first four and to the extent to which these are not fulfilled the price to local users would need to be above £110 per ton f.o.b. Fremantle to keep the company in profitable production. It is clear that the best expectations of the company are that it can maintain a price as low as £110 per ton f.o.b. Fremantle for domestic purposes.

In formulating its proposals to ensure the profitable exploitation of the Wittenoom asbestos deposits, Australian Blue Asbestos Ltd. has given scant consideration to the effects of its proposed selling price on the three independent manufacturers of asbestos cement products, or on the cost to the community in general of the increased prices of those products. On the basis of the substitution of a minimum quantity of 4,000 tons of the applicant company's crocidolite at a cost, in Sydney, of £115 per ton in place of an equivalent quantity of South African amosite at £56 per ton, the additional cost to manufacturers would be £245,000 per annum. In order to ensure the local consumption of the minimum quantity of 4,000 tons, the company has proposed that 15 per cent. of the total fibre used must be Australian crocidolite. The compulsory use of this proportion at the present consumption rate of about 30,000 tons of asbestos fibre would represent 4,500 tons and the additional cost to manufacturers would be approximately £279,000.

The investment by the Colonial Sugar Refining Co. Ltd. in Australian Blue Asbestos Ltd. is stated to be £1,650,000. A further capital expenditure of about £70,000 would be required to increase milling capacity to 8,000 tons of fibre per annum. A maximum profit margin of £10 per ton would represent a total profit of £80,000 or less than 5 per cent. on the total capital of the company, and would have the result of allowing the undertaking merely to survive, with little expectation of expanding production even if costs could be reduced. To contribute towards this unsatisfactory result manufacturers would be required to pay at least £279,000 more for their raw materials and the cost to the consumers of asbestos products would be proportionately higher. In addition, Wunderlich Ltd. would need to incur the expense of modifying its new Hatchek and Magnani machines to use Australian blue fibre.

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The company's proposals involve the virtual prohibition of imports until local production is disposed of; they also involve the compulsory use of a proportion of Australian material at a cost which will be at least twice the cost of the imported material now being used, and in some instances they involve local users in increased expenditure in adapting plant. The Board views with concern the prohibitive and compulsory aspects of these proposals. Justification for them might lie in defence or strategic aspects which are outside the ambit of the Board's considerations, but on economic grounds the industry has no features which single it out for more generous treatment than has been afforded to many others which have been examined from time to time and which have only wanted the assured sale of their production within Australia at an assured margin of profit to be certain of success. On economic grounds it has, in fact, fewer claims, principally because it does not appear to have any prospects of being able to supply more than a portion of Australian requirements—and then only at excessive costs. The material mined in Australia can be mixed with Canadian, but cannot entirely displace it.

The Board could not fail to be impressed by the fact that users of asbestos, whose strength and future prospects lie in certainty of supplies of raw materials, and who would be expected to welcome the opportunity of obtaining requirements in Australia, were strongly opposed to the request. Allowing for the possibility that some of the hostility stemmed from earlier discussions between the parties concerned, the Board believes that the largest user of asbestos in Australia would not reject the opportunity of an assured supply of portion of its requirements without having given serious consideration to the long and short-term advantages and disadvantages.

The Board's findings have been reached on economic grounds. On such grounds a conclusion against assistance to the production of blue asbestos fibre in Australia is inevitable. It may be, however, that for other than economic reasons, the Government may desire to ensure the continuance of the venture. Such reasons could, for example, include any likely defence value in the project and the maintenance of a settlement in an area otherwise incapable of population at its present density. None of the reasons which the Board can envisage would appear to justify placing on a particular section or sections of the community, i.e., the asbestos cement manufacturers and users, the excessive burden of cost implicit in the request for protection. On the other hand, assistance by bounty would provide no guarantee of the usage of blue asbestos by Australian asbestos cement manufacturers.

Protection of this industry by the normal method of imposing a duty on importations would result in an excessive cost burden on users and consumers; protection by the method sought by the company would still involve excess costs and in addition would be accompanied by repugnant compulsory conditions. Assistance by subsidy would be at a high cost to the community and to be effective would also require the compulsory use of local materials. The Board considers that no case has been established to justify either the high cost of assistance or the use of compulsion.

RECOMMENDATION.

The Tariff Board recommends that no assistance be granted to the production of asbestos fibre in Australia.

M. E. MCCARTHY, Chairman, Tariff Board.
J. A. HUXSTON, Secretary, Tariff Board,
Kew, Victoria, 24th March, 1955.

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APPENDIX A.

IMPORTATIONS OF ASBESTOS, CRUDE AND FIBRE.

STATISTICAL ITEM 441A—(INCLUDING ALL TYPES OF ASBESTOS).

Country of Origin.	1911-12.		1933-34.	
	Cwt.	SA.	Cwt.	SA.
United Kingdom	74	282	379	1,088
British East Africa			92	95
Canada	99,945	83,908	107,809	109,372
Rhodesia	54,478	68,568	42,889	82,936
Swaziland			1,124	2,697
Union of South Africa	39,120	34,071	32,014	26,847
Czechoslovakia	1,200	1,160		
Soviet Russia	1,042	1,412		
United States of America	148	96	236	266
All other Countries	21	267	24	182
Total	193,813	189,764	184,347	203,404

STATISTICAL ITEM 3811.—CHRYSOPTILE.

Country of Origin.	1920-21.		1921-22.		1922-23.		1923-24.	
	Cwt.	SA.	Cwt.	SA.	Cwt.	SA.	Cwt.	SA.
United Kingdom	40	301						
Canada	199,797	514,263	120,363	495,853	292,892	1,010,828	228,847	1,261,806
Rhodesia	32,455	162,212	14,591	74,476	13,537	70,526	22,331	114,304
Swaziland	8,578	44,254	14,935	78,517	3,502	20,323		
Union of South Africa	20,370	102,380	21,003	30,658	18,801	87,117	50,105	211,927
France	985	4,080						
Switzerland	2,143	10,479						
United States of America	2,470	14,707						
All other Countries			804	4,863	2	27		
Other British Colonies (1923-24 Classification)							2,542	15,292
Foreign Countries (1923-24 Classification)							1,291	4,902
Total	262,633	832,456	170,898	612,407	325,041	1,188,640	404,417	1,637,800

STATISTICAL ITEM 3812.—CHRYSOPTILE (BLUE).

Country of Origin.	1920-21.		1921-22.		1922-23.		1923-24.	
	Cwt.	SA.	Cwt.	SA.	Cwt.	SA.	Cwt.	SA.
United Kingdom	20	181			54	525	68	655
Canada	3,000	4,712						
Union of South Africa	3,124	17,004	2,032	8,897	4,167	27,269	15,569	67,061
Swaziland					1,018	5,475		
Total	6,154	22,897	2,032	8,897	5,259	34,399	15,637	87,636

STATISTICAL ITEM 3813.—AMOSITE.

Country of Origin.	1920-21.		1921-22.		1922-23.		1923-24.	
	Cwt.	SA.	Cwt.	SA.	Cwt.	SA.	Cwt.	SA.
United Kingdom	2,218	10,757	1,774	5,402	83	439		
Canada	12,687	47,821	12,800	40,003	11,684	47,103		
Southern Rhodesia	7,187	29,661	2,170	6,728	3,518	10,635		
Swaziland	3,483	18,399	5,840	10,030	6,069	41,941		
Union of South Africa	269,448	410,128	192,308	452,766	211,854	219,425	104,360	231,466
France	1,827	12,169						
Switzerland	327	888						
United States of America	863	3,690	1,393	5,680				
All other Countries					929	6,103		
Other British Colonies (1923-24 Classification)							1,291	5,800
Total	281,085	533,519	218,797	512,502	254,287	628,646	105,651	237,266

Details of importations shown in official statistics are shown above. Since 1919-21, values shown in official statistics have represented L.S. values in Australian currency. In earlier years values shown were in sterling and represented L.S. values plus 10 per cent. For purposes of comparison values shown in the above table for years prior to 1919-21 have been converted to the new basis.

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APPENDIX B.

SUMMARY OF EVIDENCE.

The main points in the evidence tendered at the inquiry have been summarized as under:—

IN FAVOUR OF PROTECTIVE DUTIES.

By K. O. Brown and M. G. King (representing Australian Blue Asbestos Ltd.)—

1. Australian Blue Asbestos Ltd. is engaged in the mining and milling of crocidolite or "blue" asbestos at Wittenoom, Western Australia: the company's shares are held to the extent of 97 per cent. by Colonial Sugar Refining Co. Ltd. and the remaining shares by Western Australian Blue Asbestos Fibres Ltd. and by Lionel Chrysotile Asbestos Ltd.

2. Asbestos is the term applied to a group of fibrous minerals, the most important of which are—

- (a) chrysotile, or white asbestos;
- (b) crocidolite, or blue asbestos;
- (c) amosite, brown or grey asbestos.

Crocidolite has the highest tensile strength and amosite the lowest.

3. The company produces and markets blue crocidolite in three grades as follows:—

	Price per short ton, L.A. Fremantle.
Grade 1	150
Grade 2	140
Grade 3	130

Grade 3 is the most important commercially and represents over 95 per cent. of the output.

4. Australia uses about 31,000 short tons of asbestos fibre per annum of which 21,000 short tons of chrysotile are imported from Canada and 8,000 of amosite from South Africa.

5. A table is submitted showing technical data in respect of tensile strength, fusion point, specific gravity, &c., of the main types of asbestos.

6. Whereas the specific gravity of chrysotile crocidolite and amosite is given as 2.4, 3.2 and 3.1 respectively, it is the respective weight/volume ratio in the "as used" state which is significant. For most uses asbestos is "stuffed out" or willowed before use and in this state, according to an American authority, the density of crocidolite is approximately one-half that of chrysotile or amosite.

7. Because of its particular mineral properties and its fibrous spinnability asbestos is a raw material for which, in many ways, there is no substitute; it will withstand exposure to weather and high temperatures and will resist acids.

8. World production of the main types of asbestos has increased since 1935 as will be seen from the following statistics obtained from the Bureau of Mines, United States of America.

PRODUCTION SHORT TONS.

Year.	Total.	Chrysotile.	Crocidolite.	Amosite.
1935	402,000	308,000	2,500	4,000
1940	690,000	663,000	10,000	18,000
1946	1,100,000	1,057,000	11,000	30,000
1949	945,000	920,700	22,300	42,000
1950	1,300,000	1,220,200	21,800	42,000
1951	1,700,000	1,520,700	30,200	51,000
1952	1,300,000	1,187,000	18,000	61,000
1953	1,300,000	1,318,100	47,000	38,900

9. The sources of supply of these three types are—

Chrysotile.	Crocidolite.	Amosite.
Canada	South Africa	South Africa
Russia	Bolivia	
South Africa	Australia	
Australia (in small quantities)		

10. Asbestos is classed, commercially, as "crude" and "milled": the former is the mineral as hand selected in its native state and milled asbestos consists of all grades produced by mechanical treatment of asbestos ore. Almost all asbestos imported into and used in Australia is "milled".

11. Grading is done according to the length of fibre and generally long fibred material represents the highest grade.

12. A graph showing the trend of world prices over the past fifteen years is submitted. Whilst South African prices, influenced by the policy of numerous small mines, are prone to fluctuations, the Canadian industry maintains a stable marketing organization. Prices generally weakened in 1953 but this trend is not expected to continue.

13. It is considered unlikely that the competitive position of Australian blue asbestos will deteriorate as compared to overseas producers.

14. Confidential evidence is tendered concerning overseas price quotations to Asbestos Products Pty. Ltd. for chrysotile, crocidolite and amosite.

15. Approximate current prices for various grades of fibre landed Sydney or Melbourne are as follows:—

	F.O.B. Price.	C.I.F. Price per short ton.
3T Grade Canadian Chrysotile	£ 52g.	1 A.
4K Grade Canadian Chrysotile	..	100
5K Grade Canadian Chrysotile	..	102
Grade A Cape Blue (length roughly equivalent to 3T)	32	77
Grade B Cape Blue (length roughly equivalent to 4K)	63	127
Grade F.A.M. Cape Blue (length equivalent to 3T)	..	92
Australian Blue Fibre, Grade 3 (length equivalent to 3T)	..	120
* Amosite Fibre, A.W. Grade	..	133
* Amosite Fibre, DCA/D Grade	40	63

* Grades used for asbestos cement manufacture.

16. The company estimates that by increasing output to 3,000 tons the price landed Sydney or Melbourne would be £A.118.

17. The bulk of Australian importations would be Canadian chrysotile grades 4-5K, and a quantity of grades 3, with amosite next in terms of quantity imported.

18. Whilst asbestos deposits occur in New South Wales, Tasmania, South Australia and Western Australia, the only really large Australian deposit is that being mined by Australian Blue Asbestos Ltd. in the Hamersley Ranges.

19. Scientific surveys indicate that the Hamersley Range deposits are exceedingly large, extending over hundreds of square miles of ore-bearing country, with each square mile carrying possibly 500,000 tons of asbestos.

20. In 1941 the Colonial Sugar Refining Co. Ltd., became interested in Australian asbestos fibre; being at that time already manufacturers of interior wall boards, it contemplated the manufacture of exterior wall sheeting.

21. Following full Governmental investigation approval was granted for the incorporation of Australian Blue Asbestos Ltd. on 17th April, 1943.

22. Existing leases were taken over and other leases acquired making the total area held 4,833 acres. These leases cover rights in Yamphe Gorge, Dale's Gorge and Wittenoom Gorge; at present mining is confined to Wittenoom Gorge.

23. Dry weather roads connect Wittenoom with Rosbroun, 200 miles distant on the north coast of Western Australia, also with Point Samson, Port Hedland, Marble Bar and with Meekatharra, a rail head 430 miles to the south. A modern aerodrome is maintained by the Civil Aviation Department at Wittenoom and a five days per week service to Perth, 700 miles distant, is in operation.

24. Poor accommodation conditions up to the end of 1945 made it difficult to retain employees, and to improve this position the Commonwealth Government and the Western Australian Government agreed to join with the company in financing the construction of the town of Wittenoom 7 miles from the mine; this town is now completely established.

25. At the time the respective governments agreed to assist the industry, it was estimated that a minimum production of 5,000 tons per annum would be necessary in order to compete with overseas prices. Owing to the subsequent disproportionate rise in Australian costs the minimum annual production is now estimated to be 8,000 tons.

26. The company's budget in 1946 was based on a 5 per cent. return on capital at a selling price for fibre of £50 per ton F.O.B. Fremantle. This target of £50 per ton was related to the then landed price of comparable overseas fibres, namely Canadian Grade 4K and No. 3 Grade South African blue.

27. To-day, 4K Canadian fibre sells for £102 per short ton landed in Australia and the company now estimates that at full production of 8,000 tons per annum its product must sell at £110 F.O.B. Fremantle in order to realize a reasonable profit.

28. The increase in the company's estimate of selling price from £50 in 1946 to £110 currently is set out of alignment with the increase experienced in respect of other goods, particularly building materials.

29. The total amount spent by the government on the town of Wittenoom is approximately £100,000 which provided for housing, hospital, buildings for services such as post

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office, police, &c. as well as road sealing. The amount spent by the company on town buildings has been £116,800. Although incident in the all houses are serviced by water, electric light and septic sewerage.

31. Asbestos mining in Wittenoom Gorge has been responsible for arresting a serious dwindling of the population in the north west. In an area of 527,000 square miles the total population excluding natives is 8,400 persons. Of these 730 are at Wittenoom and 280 at Roebourne. It is claimed that asbestos production even at the present stage of development is directly responsible for 800 additional residents in the north west. This increase in population as well as the general activities connected with the trans-shipment of fibre is a substantial contribution towards solving the national problem of populating empty areas in the north of Australia.

32. Since the mine opened in 1947, considerable advancement has taken place in the mode of mining the ore, as a result of technical advice received from overseas experts. It is claimed the company's mining methods are now very efficient.

33. Recently, under advice from Mr. R. P. Luke one of the mining experts brought to Australia, a section of Western Gorge, which is a tributary of Wittenoom Gorge, was exposed and this new area promises to be 60 per cent. better than the ground mined hitherto.

34. Although the cost using 100 per cent. Western Gorge ore looks attractive, it is not economical to use more than a 25 per cent. to 25 per cent. mixture with the Wittenoom Gorge ore.

35. As a result of improved mining methods production has increased and costs are steadily decreasing as follows:—

	Annual production rate short tons	Cost per ton in store Fremantle
Year ended 30th June, 1951..	1,008	203
Year ended 30th June, 1952..	2,504	202
Year ended 30th June, 1953..	3,555	192
Half year ended 31st December, 1953—2,220 tons equals per annum ..	4,400	187
Current rate ..	5,500	185
Estimated for production of 8,000 ..	8,000	182
Estimated for production of 10,000 ..	10,000	70

36. Mining costs at Wittenoom compare favorably with those of the main metalliferous mines in Australia, although the volume of asbestos ore treated is relatively low.

37. The milling methods at Wittenoom have been improved considerably since the initial installation and further extensions will be necessary to cope with a production of 8,000 tons per annum; the present value of the milling plant is £300,000 and a further expenditure of £10,000 will be necessary.

38. The quality of the fibre mined at Wittenoom is high and compares favorably with the best blue (Cape Blue) produced in South Africa, which is the only other country producing blue fibre of such high quality.

39. Whilst three grades of fibre are produced at present, an additional plant is put in, a shorter No. 4 grade and probably a No. 5 will be produced. All fibre marketed conforms with rigid specifications.

40. Practically all fibre sold to Europe is subject to pre-shipment inspection and sampling by General Superintendence Ltd., and the contract specifications call for in average fibre length of 47-in. to 34-in. with a rock, grit and dust content not exceeding 5 per cent. and foreign material not exceeding 1 per cent.; as disclosed by General Superintendence Ltd. the average rock, grit and dust content this year has been 4.5 per cent. This compares very favorably with similar overseas grades.

41. A table is submitted showing the dissection by grades quantity and value of production in the period 1st July, 1950, to 31st December, 1953.

42. Detailed financial statements relating to the company's trading for the three years ending 30th June, 1953, together with a summary of financial results for the five years 1948-53 are submitted as confidential statements. In addition an estimate is submitted showing the extra capital cost required to increase production to—

- (a) 5,000 tons per annum;
- (b) 10,000 tons per annum.

43. The company's inspecting engineer said that to replace the 8-tons a-day would cost 1.7 times their present book value.

44. At a production rate of 8,000 tons per annum the company considers the selling price f.o.b. Fremantle could be reduced to £110—the aim being to sell 4,000 tons overseas and to ensure that 4,000 tons per annum are used in Australia.

45. The estimated cost of production in the statements submitted is £102 per ton in store Fremantle and this is based on the very conservative yield of 1 ton of fibre from every

25 tons of rock. A considerable area of much richer ground is known to exist but the actual extent of this has not been ascertained.

46. Costs submitted for production of blue fibre in South Africa indicate a large difference between South African and Australian labour cost. Native miners in South Africa are paid £2 5s. per week compared with the £30 per week necessary to recruit miners in Wittenoom. There are 25 native miners used for every one white miner, whose wages are £20 per week.

47. Heavy freight cost handicaps operations at Wittenoom, particularly in respect of the increase imposed on the cost of fuel oil and explosives.

48. The average cost of freight and charges to Fremantle for the year ended 31st December, 1953, was £13 per ton and the company considers that this should be subsidised by the Government.

49. Another heavy burden on the company is pay-roll tax, which is approximately £9,000 per annum. This tax becomes an inflated burden on the company because of the need to pay premium wages.

50. The company considers further taxation concessions should be allowed, for example by increasing the present bonus allowance deduction.

51. Sales of fibre over the three years ended 30th June, 1953, were—

SHORT TONS.

Year ended—	Australia	Europe	U.S.A.	Total
30th June, 1951 ..	296	222	222	1,118
30th June, 1952 ..	1,033	467	356	2,376
30th June, 1953 ..	1,043	625	660	2,397

Sales to United States of America for the year ending 31st December, 1953, were 2,000 tons.

52. Complete details regarding the number of employees, total wages and the statutory conditions of employment are submitted, together with details of the production bonus paid by the company.

53. An appraisal of the sales potential made by the company in 1946 estimated that an output of 6,000 tons per annum could be disposed of as follows:—

Australia—	
Wunderlich Pty. Ltd. ..	2,000
Asbestos Products Pty. Ltd. ..	1,000
Other users (including other asbestos cement manufacturers) ..	1,000
Overseas—	
United States of America and Europe ..	2,000
	6,000

54. The world demand for asbestos fibre between 1946 and 1952 was good but in this period production from Wittenoom was low; in 1953 the position was reversed and the company was able to sell only 2,356 tons out of a current production of 4,500 tons.

55. In 1953 a total of 2,054 tons of Grade 3 fibre was sold to the United States of America for a total price of \$50,000 dollars; further orders for 2,000 tons in 1954 have been obtained for a price of \$75,000 dollars.

56. Correspondence from overseas users of blue fibre indicates that a constant demand exists. According to price, availability, personal preference, &c., the proportion used varies between 5 per cent. and 50 per cent. of the fibre content of the products made.

57. The company believes that at a price of £110 per ton f.o.b. Fremantle 4,000 tons of No. 3 Grade blue fibre could be sold per annum.

58. The manufacture of asbestos cement products, by four Australian companies, constitutes the highest usage of asbestos fibre; such products usually consist of 13 per cent. asbestos fibre and 87 per cent. Portland cement by weight.

59. A table is submitted showing the quantity of fibre by type used by these manufacturers in 1953 together with the amount of such fibre.

60. Based on knowledge of overseas practice and the company's experience at Asbestos Products Pty. Ltd., it is quite practicable to use blue fibre to the extent of 25 per cent. of the total fibre used in the manufacture of asbestos cement products. Australia now uses 30,000 tons per annum of imported fibre for these products and if only 15 per cent. of this were Australian blue there would be a market for 4,300 tons of local fibre.

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60. The present practice of replacing a portion of the white fibre with blue fibre and amosite in asbestos cement products, increases the drainage rate and hence speeds up the manufacturing process. Amosite has no effect on yield in square yards but reduces the strength when used to replace an equal quantity of No. 4 grade white fibre; by contrast blue fibre improves the yield and does not affect the strength.

61. In a report issued by the research department of the C.S.R. Co. Ltd. special attention is drawn to the improvements made possible by the inclusion of a percentage of blue fibre in the chrysotile, amosite mixture. The strength to weight ratio of asbestos cement sheet increases with the proportion of blue fibre used; the yield of square yards per ton of cement and of fibre increases when blue fibre is added to the mixture.

62. Crocidolite is more than a replacement fibre for cheap amosite, it is an effective replacement for 4th grade chrysotile.

63. Tables submitted show that the finished cost per square yard of asbestos cement sheet does not increase when up to 33 1/2 per cent. of blue fibre is used in the fibre mixture.

64. The company has been advised by James Hardie and Co. Pty. Ltd., the largest manufacturer of asbestos cement products in Australia, that it is not prepared to use Australian crocidolite at prices anything near as high as the world market price of £110 per ton and considers it no better than amosite of £60 per ton.

65. Wunderlich Ltd. used Australian blue fibre until September 1952, but no orders have been received since that date.

66. Of the remaining two main consumers, Asbestos Products Pty. Ltd., subsidiary of the C.S.R. Co. Ltd., has consistently used 20 per cent. blue, but the Gollath Cement Co. prefers to use a South African blue. Unless all four companies purchase Australian blue fibre, then there is virtually no market for it in Australia.

67. If 15 per cent. to 20 per cent. blue fibre is used to replace amosite the extra cost involved would be 0.27s. per square yard of asbestos cement sheet or an extra overall cost of £2 15s. per averaged sized cottage; if Australian blue fibre is used to replace imported blue, at say £20 per ton cheaper, then the extra cost would be 1d. per square yard or approximately £2 10s. per house.

68. The basis of the company's case for tariff protection is that for Wittenoom to continue operating James Hardie & Co. Pty. Ltd., being such a large user of asbestos fibre, must use Australian crocidolite.

69. The proposal, therefore, is that a duty be placed on all imported fibre but that such duty be remitted in full in the event of the importer using 15 per cent. Australian blue fibre of all asbestos used.

70. Theoretically a duty of 20 per cent. would be sufficient to afford protection to the extent of £20 per ton, however as this duty would only increase the cost of asbestos cement sheets by 0.27s. per square yard, the company considers that a total duty of 40 per cent. would be necessary; the additional duty of 20 per cent. ad valorem above the equalizing rate of 20 per cent. being required to force the use of the Australian Blue Asbestos product.

71. It is not proposed that the duty be applicable to fibres shorter in length than those equivalent in length to Canadian grading groups 1 to 5. The imposition of a duty is to ensure that Australia uses a minimum quantity of blue fibre.

72. If Australia does not consume at least 4,000 tons of blue fibre per annum it will mean an end of the industry at Wittenoom, the failure of the attempt to populate the north-west, and the loss of assets brought into being by governmental and company expenditure.

73. In a letter to the company the United Kingdom firm of Universal Asbestos Manufacturing Co. Ltd. stated that they had used Australian Grade 3 Blue fibre in a 7 1/2 per cent. mix and found it not inferior to the best South African Cape Blue and immeasurably superior to South African amosite.

74. In reply to statements and criticism by Mr. G. F. Mead the following points are stressed:—

- considering the size of the Hamersley Range deposits it is of little significance that fibre values may decline with the distance from the nearest outcrop;
- the Wittenoom mill is no more dirty than the large overseas mills; continual efforts are being made to improve working conditions;
- the road subsidy ceased in July, 1952;
- the company did not charge a profit fee on the erection of houses at Wittenoom; 2 1/2 per cent was added to cover administrative overheads.

75. Mr. C. F. Adams' comments in respect of the potential profit bound up in the mining of Western Corrie are erroneously assumed that this area could supply full production immediately, that the selling price was higher than it was, and that

the extra tonnage could be obtained without cost. The road transport contract from mine to coast is now 6.3d. per ton mile and not 7.3d. as stated by Mr. Adams.

76. Various witnesses stated that blue fibre was technically unsuitable for articles such as brake and clutch linings and the company suggests that this difficulty could be overcome by by-law admission.

77. Although representatives of asbestos cement manufacturers gave evidence opposing the imposition of a duty on fibre, they had in previous inquiries been strong advocates of protection on asbestos cement products.

78. Evidence has been given that Australian No. 3 blue fibre is not suitable for use in Hatzchek vat machines, but the company's opinion is, and this is supported by evidence and correspondence tendered, that only minor modifications are necessary to enable this type of machine to cope with No. 3 grade blue fibre.

79. Although Mr. Sangster draws attention to the high price to which the company's product rose it is emphasized that at all times the selling price reflected cost and world price levels.

80. In stating that No. 3 blue fibre is merely equivalent to amosite at £50 per ton, James Hardie & Co. stress that compensation to use the former would be tantamount to imposing an extra expense of £300,000 per annum. The company does not agree with the comparison of amosite and crocidolite, but even granting this, such an amount spread over James Hardie's output of 25,000,000 square yards means an increase only of 1 1/2d. per square yard.

81. Mr. Adamson has stated that a previous Commonwealth government refused financial assistance to the industry. Although a requested £5 per ton subsidy was not granted, financial assistance was given in other ways, for example, town construction and the payment of a 2 1/2s. per ton freight subsidy until July, 1952.

82. The company states that Wittenoom was permanently established before a world survey of demand was made; apart from an overseas survey in 1946, prior contracts were made with the John Manville Corporation in the United States of America (unable to be fulfilled by the company) and with Wunderlich Ltd. It is pointed out also that the total world production of crocidolite in 1952 was 48,000 tons whereas the total quantity imported into the United States of America is only 8,000 to 8,500 tons.

83. The company agrees that the value of a fibre is truly assessed by testing asbestos cement products containing such fibre, however the full advantage of Australian blue is not apparent unless adequate preparation is undertaken.

84. Additional research data concerning tests conducted by the Gollath Cement Company are submitted which further substantiates the claim that the inclusion of Australian blue fibre increases tensile strength and yield. The relative tensile strength of fibres can be demonstrated approximately by the simple procedure of tugging them apart between the fingers; this method shows up a marked difference between amosite and Australian blue.

85. The company does not fear competition from amosite in the manufacture of pressure pipes and is confident that crocidolite can compete with chrysotile on a price basis.

By Hon. H. C. Strickland (Minister for North West Government of Western Australia):—

1. The Western Australian Government desires to stress the economic importance generally of the north-west of Australia and particularly the importance of the asbestos fibre industry located therein.

2. This area bounded on the south by the 28th parallel of south latitude, the north-west coastline and the boundary of North Territory, comprises 827,000 square miles, which contains a population of 8,400 persons exclusive of semi-civilized, full-blooded aborigines.

3. Towns along the 2,000 mile coastal belt contain the majority of the population which can be conveniently placed into three zones thus:—

	Persons.
— Carnarvon district (extreme south)	2,500
— Kimberleys (extreme north)	2,700
— Central areas	2,800

4. Although overall the population has decreased from a figure of 11,000 in 1933, the population of the town of Wittenoom, which is situated adjacent to the asbestos mines and exists by virtue of such mining, has increased as follows:—

	Persons.
1939	178
1941	198
1953	808

5. The asbestos industry of Wittenoom apart from helping to revive the North West has been instrumental in bringing renewed activity to the town of Roebourne, 200 miles distant, and its seaport, Point Samson.

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4. The economic advantage is seen in jetty activities at Point Samson—

	1935.	1943.	1949.	1951.
General cargo handled in and out (tons)	3,906	4,838	9,061	12,900
Tons of asbestos exported	122	1,010	1,329	4,958
Jetty revenue	£1,362	£3,454	£7,378	£15,631
Wages paid at jetty	£334	£3,094	£5,888	£12,005

7. Commonwealth and State Governments have recognized the need to populate northern areas of Australia and have encouraged production of asbestos by giving substantial financial assistance for housing, schools, hospital, roads, freight subsidies and other facilities. The Commonwealth Government has contributed £303,214 and the Western Australian Government £150,040.

8. Asbestos fibre production in Australia is far below consumption which it is expected will become greater; deposits in the North West are known to be enormous and capable of supplying a portion of Australia's requirements for many years.

9. In view of the large sum of Government moneys spent in promoting the asbestos fibre industry, its potential and its impact on the economy of the North West, the Western Australian Government considers that adequate protection should be provided to ensure further expansion and continued production.

IN OPPOSITION TO PROTECTIVE DUTIES

By A. E. P. Sangster (representing Wunderlich Ltd., Baptist-street, Redfern, New South Wales)

1. The company, which operates asbestos cement factories in three States, is opposed to any Tariff on imported asbestos fibre and if assistance is given to the production of fibre in Australia such assistance should not entail any form of compulsion on manufacturers of asbestos cement to use it.

2. Approximately 2,100 persons are employed by the company, the assets of which are valued at £3,285,794, in the manufacture of building materials in metal, asbestos cement and ceramics.

3. In the manufacture of asbestos cement products in Australia approximately £1,500,000 worth of materials are produced annually; asbestos fibre, nearly all of which is imported is the largest item of cost, representing approximately 40 per cent. by value of the total materials.

4. Asbestos cement sheets are made in a series of operations, the final one of which is termed a wet machine. Various types of these machines are available and until recently the company operated machines called the Fourdrinier; these are now in the process of being replaced by Hatschek machines which have a faster rate of production than the Fourdrinier.

5. Since 1918 the company had had experience with a large range of asbestos fibres from many sources. In the main fibre has been obtained from Canada, and, up to 1922, was augmented by Australian fibre from Tasmania and New South Wales; after 1922 supplies of amosite were obtained from South Africa to form a mixture with 85 per cent. of Canadian chrysotile.

6. In the early years of the last war when it appeared supplies would be restricted, the company developed a chrysotile deposit at Baryulgil, in New South Wales, and in 1944 Jas. Hardie & Co. Pty. Ltd. joined in the project. Subsequently, Jas. Hardie & Co. Pty. Ltd. acquired complete ownership of this mine.

7. The conditions of general shortage necessitated the purchase and use of many grades and qualities of fibre which were unsuitable. At that period the company was reluctantly compelled to introduce crocidolite into mixtures. Supplies were obtained from South Africa and some procured in Australia. As supplies became more plentiful it is the intention to eliminate blue fibre and return to the pre-war mixture of chrysotile and amosite.

8. Blue fibre from Western Australia was first purchased in 1944 at £45 per ton c.i.f. Each year the price increased and by 1952 it had reached approximately £179 per ton.

9. In limited proportions Australian blue fibre proved satisfactory on the Fourdrinier machines, but the high price made it uneconomic. The filtration properties of blue fibre are good and production can be maintained when sufficient well-graded amosite cannot be obtained.

10. However, Australian blue fibre is not suitable for use with the Hatschek machine because of building up in the rolls and sieves. On the other hand, up to 20 per cent. of suitable amosite can be used.

11. Experience has shown that the most suitable fibre mixture is of Canadian chrysotile of gradings 4x to 5x coating £99 to £108 per ton c.i.f., and South African amosite at £81 c.i.f. This compares with the latest price of Australian blue at £135 l.o.b. Fremantle, or with £144 c.i.f., which is grossly excessive.

12. Because the bulk of output is used in low-cost housing, asbestos cement product manufacturers must keep prices down to compete with other materials. If the 40 per cent. duty is granted the extra cost to the company would be £206,000, or alternatively the use of 15 per cent. of Australian blue—in order to avoid duty—would involve an extra cost of £105,500.

13. It would be impossible to comply fully with the proviso requiring 15 per cent. of all fibre to be Australian blue because the quantity involved could not be absorbed by the remaining Fourdrinier machines.

14. The company objects in the strongest terms to any interference with its freedom to purchase asbestos fibre from the most favorable sources.

15. In regard to savings effected by the use of Hatschek machines, experience over twelve months indicates that although the capital outlay per machine is approximately £100,000, the annual saving by reason of the lesser number of employees needed to attend the machines over three shifts is of the order of £20,000. This saving is in addition to increased output.

16. The asbestos cement industry in Australia follows the world practice of contracting annually for the purchase of fibre; the company advises that it is committed for fibre requirements until April/May, 1955.

17. In reply to a statement by Mr. E. O. Brown to the effect that about 1,500 to 1,600 tons of Cape blue per annum are imported from South Africa at about £120 per ton it is pointed out that Wunderlich's contract for South African crocidolite is only 200 tons and it is understood that James Hardie & Co. Pty. Ltd. are not purchasing South African blue fibre. In view of this it is doubtful whether manufacturers other than Wunderlich Ltd. and James Hardie would be purchasing between 750 and 1,250 tons of South African blue fibre.

By J. T. Adamson (representing James Hardie & Co. Pty. Ltd., Asbestos House, York-street, Sydney)

1. The manufacturing company of James Hardie & Co. Pty. Ltd., with a fully paid share capital of £1,000,000 is, together with two other companies, namely Asbestos Mines Pty. Ltd. and James Hardie & Co. Pty. Ltd., of New Zealand, a subsidiary of the holding company of James Hardie Asbestos Ltd.

2. From 1903 to 1917 the company imported asbestos cement for sale in Australia and subsequent to this period manufactured asbestos sheets in Australia. At present, the company has 2,022 employees and owns land, buildings and plant with a book value of £1,645,794. The company uses 96 per cent. of total funds in the manufacture and marketing of asbestos products.

3. The company is opposed to the imposition of duty on asbestos fibre and considers that, if assistance is deemed necessary, it should be confined to a bounty paid out of consolidated revenue.

4. The company manufactures a full range of asbestos-cement building materials, pressure pipes and conduits in addition to brake and transmission linings and thermal insulation materials.

5. The turnover of the company is dependent upon the maintenance of its policy of offering the highest quality building sheets at the lowest possible cost. Over the past eight years 32 per cent. of all homes in New South Wales were of the lower cost asbestos-cement construction; only by keeping down the price of raw materials can asbestos sheets continue to compete with all alternative types of building materials.

6. Because the proposal as put to the Board stipulates imported asbestos grades 1-5 as coming within the scope of duty it would be unreasonable to require duty to be paid on fibre entering the manufacturing process for instance of friction materials (which technically preclude the use of crocidolite) and in such circumstances fibre should be admitted under by-law free of duty.

7. The following quantities of raw materials were used by the company:—

	1951.	1952.	1953.	1954. (to- date).
Asbestos fibre—short tons	17,471	10,127	21,837	22,712
Cement—long tons	90,852	67,479	103,814	130,000

8. Manufacturing costs are now too high in Australia compared with overseas costs and in the main line of asbestos-cement flat sheets the raw materials now amount to 85 per

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vent. of the total cost. To impose a duty of 40 per cent. on fibre imported by the company would increase the cost by £293,000. If, as an alternative, 15 per cent. of fibre used was to be Western Australian crocidolite at £142 17s. 9d. per ton the additional cost incurred in replacing the fresh zone amosite now imported at £53 17s. 9d. would be £347,733 and after taking account of trade and cash discounts would amount to £21,502 per annum. Even should Australian blue fibre be refused, as suggested by the applicant to £110 per ton l.o.b. Fremantle the equivalent amount of additional cost to the consumer would be £300,380.

9. Such a large increase in raw materials costs should not be passed on to the low-cost home builder nor could it be borne by the company.

10. If assistance is to be granted it should be by way of bounty; however, unless the Colonial Sugar Refining Co. can reduce costs the chances of competing overseas with Cape Asbestos Company are negligible and the bounty payment would be a permanent charge on the Government. The price of S Grade Cape blue, the equivalent to Grade 3 Australian blue is £5.12 10s. l.o.b. Cape Town.

11. Greater manufacturing efficiency has enabled the company to reduce increased labour costs per unit to 40 per cent. in a period when raw materials and the basic wage both increased 100 per cent.

12. The main users of asbestos fibre in Australia namely James Hardie & Co. Pty. Ltd. and Wunderlich Ltd. were not consulted before the ill advised mining speculation at Wittemoon was embarked upon and therefore it is unreasonable to expect that the efficient achievements of asbestos cement manufacturers should be penalised to bolster up the careless expenditure of approximately £2,000,000.

13. The technical progress of the company has not lagged behind leading overseas manufacturers. In fact, an agreement is in existence with John Mansfield of the United States of America and Turner and Newall of the United Kingdom for the free interchange of technical "know-how" in asbestos-cement manufacture.

14. Consumption of asbestos-cement products in Australia ranks in fourth place in total world consumption and first in the world on a per capita basis.

15. Fibres used in the asbestos-cement industry can be divided, as to type and source, into two general categories, viz.:-

- (a) Soft greasy slow-filtering fibre—Canadian chrysotile.
- (b) Harsh spindly fast filtering fibre—Crocidolite, amosite, most South African chrysotile, Australian chrysotile.

16. The efficient running of a modern Hatcher or Maxon machine calls for a blend of fast and slow filtering fibres and, since the withdrawal from the market of what was really a composite grade produced by Turner and Newall, other sources of supply were sought.

17. The company has developed the use of Fresh Zone Amosite as a fast-filtering fibre and use this in conjunction with Canadian chrysotile. The company, nevertheless, is aware of the advantages which would accrue from a supply of local asbestos fibre subject to a price parity with overseas sources.

18. In 1930 the company first considered the possibilities of the Western Australian deposits of crocidolite but after investigation rejected the development of them as uneconomic.

19. When the Colonial Sugar Refining Co. Ltd. announced their entry into the field of asbestos mining and the manufacture of asbestos-cement products the present chairman of James Hardie & Co. Pty. Ltd., Mr. A. Thorne Reid, communicated with the chairman of the Colonial Sugar Refining Co. Ltd. as he felt it imperative to warn the latter company about the potentialities of amosite. Copies of letters exchanged between the two companies are submitted.

20. James Hardie & Co. Pty. Ltd. maintain and repeatedly stressed in the letters referred to above that, in the manufacture of asbestos cement sheets, crocidolite and amosite are interchangeable; because amosite can be obtained for approximately half the cost of crocidolite the company cannot consider using Western Australian crocidolite.

21. In October, 1945, leases of deposits adjacent to Wittemoon were offered to Turner and Newall of England and also to James Hardie & Co. Pty. Ltd. but these were rejected.

22. It is understood that at this time the Colonial Sugar Refining Co. Ltd. approached the Commonwealth Government for assistance but that the request was refused.

23. In November, 1952, the Colonial Sugar Refining Co. Ltd. advised the company that it would be necessary to apply for tariff protection unless the two major asbestos-cement manufacturers, Wunderlich Ltd. and James Hardie & Co. Pty. Ltd., could aid the Australian Blue Asbestos Company in marketing Wittemoon output. Specific proposals were:-

- (a) formation of a joint selling company;

(b) to raise the selling price of asbestos cement products by 1d. or 2d. per square yard in order to meet the high cost of Australian blue production of £170 per ton l.o.b. Fremantle.

24. These extraordinary proposals were naturally rejected and the application for duty was made for the protection of a completely uneconomic industry which, in the opinion of leading asbestos companies in Australia and overseas, should not have been started.

25. A brief history of the development of the use of blue asbestos is submitted herewith.

26. In order to aid in ensuring continuity of supplies of amosite the company has acquired a small shareholding equivalent to 34 per cent. of the capital in Cape Asbestos Co. Ltd.

27. The uneconomic aspect of using Western Australian blue which can only be used to replace amosite in the company's mixes will be seen from the following price history of the two types:-

	1947.	1948.	1949.	1950.	1951.	1952.
C.S.R. Blue	£ 45	£ 61	£ 100	£ 135	£ 150	£ 170
Amosite	£ 20	£ 36	£ 40	£ 44	£ 47	£ 50

28. Statements that the use of Australian blue fibre would save dollars are inaccurate in that it is Fresh Zone Amosite which would be replaced.

29. If the Board should consider that it is necessary to keep some 250 men working at Wittemoon the cost should not be loaded on to the working man's low cost asbestos-cement home.

30. The company's machines are designed to run the long amosite fibres and if a well defined length of blue fibre of Grade 3 quality could be supplied locally there would be no technical difficulties in using such a fibre. In the main it is all a question of cost.

31. In the manufacture of pressure pipes, which contain 25 per cent. fast filtering fibre, the substitution of this amount of Fresh Zone Amosite by Australian blue fibre would result in an exorbitant cost increase with the price of amosite less than half that of Australian blue.

32. Although the usage of fibre in brake and transmission linings is small, the imposition of the duty applied for would price the company's products out of the market. Firm competition is now experienced from the United Kingdom brake linings which enter duty free except for 10 per cent. primings; this would necessitate in turn an application for duty on brake linings. A somewhat similar situation would develop in respect of thermal insulation products.

33. The record of the asbestos cement industry during the recent war proved its strategic importance, and in the post-war period the economic influence exerted is indicated by the fact that for the year ending 30th June, 1952, the flat sheet production was 14,495,000 yards. For three years ending 30th June, 1952, houses sheathed with asbestos cement flat sheets total more than 25 per cent. of houses built in Australia and nearly 85 per cent. of those built in New South Wales and Western Australia in that period.

34. If corrugated asbestos cement sheets had to bear the burden of a cost increase, these sheets could not continue to compete with galvanized iron. A similar situation would develop with high pressure water pipes. In this regard a letter is submitted from the Minister for Public Works, New South Wales, drawing attention to the effect a tariff would have on the cost of water reticulation services.

35. In reply to a statement made by Mr. Brown to the effect that the products of Asbestos Products Pty. Ltd. were competitive with those of other companies it can be illustrated by price lists that 25 per cent. of the comparable products are higher in the case of Asbestos Products Pty. Ltd.

36. In addition it is submitted that the claim made by Mr. Brown that asbestos cement flat sheets are complementary to and not competitive with other lining boards manufactured by Colonial Sugar Refining Co. Ltd. is without foundation. In New South Wales only 38.1 per cent. of all production would be required for external use on homes, based on 150 square yards of external sheathing per house plus 100 square yards for awnings, gable ends and garages.

37. Since the war, activities in owner-building of low cost homes have increased considerably and for this reason any increase in cost however small is of paramount importance. The company's business was established in the low cost home field and the effect of price increases and consumer reaction is most critical.

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30. The statement by Mr. Brown that Australian Blue Asbestos Ltd. mines plant valued at £319,000 from Colonial Sugar Refining Co. Ltd. for a charge of 8½ per cent. to cover both interest, depreciation, and surplus, in view of the high level of wear and tear, that the hire is absorbing an unreckoned sum.

31. Before James Hardie & Co. Pty. Ltd. and other manufacturers are compelled to use Australian blue fibre, Mr. Brown's company should be compelled to first use 100 per cent. crocidolite; in fact Colonial Sugar Refining Co. Ltd. could incorporate a percentage in other building materials if manufacturers.

32. The extra cost involved in asbestos cement product manufacturers were compelled to use Australian blue would be equivalent to paying a subsidy to the 110 mine workers at Wittenoom an amount of £2,218 per worker per annum.

33. The evidence indicates that Australian Blue Asbestos Ltd. embarked upon a most uneconomic mining project at Wittenoom without an adequate sales survey.

34. The text of cables exchanged with Turners Asbestos Cement Co. Ltd. and conversations with the General Manager of John Manville indicate explicitly that Australian blue must be competitive on the world market with Cape blue at £18 Australian f.o.b. Durban.

35. Although the company has had experience in mining asbestos and is the only manufacturer of asbestos-cement products in Western Australia its views were never sought by the Government before authorizing an expenditure of £454,000.

36. Misleading and inaccurate statements have been made by Colonial Sugar Refining Co. Ltd. and the consulting engineer at Wittenoom concerning the Western Australian crocidolite deposits. It has been erroneously stated that Australian blue would—

- (a) take care of the entire Australian demand for fibre;
- (b) be a dollar saver;
- (c) replace the products of overseas mines which were being worked out;
- (d) enable Australian manufacturers to export sheets.

37. The proposed alterations to Tariff Item 274 (a) are economically and administratively unsound. There would be a danger that the applicant might not always be content with having a monopoly of 15 per cent. blue fibre in all mixes.

By J. S. Proud, consulting mining engineer, of 6 Finlay-road, Turramurra—

1. As consultant to James Hardie & Co. Pty. Ltd. evidence is submitted for the purpose of illustrating the similarity between Fresh Zone amosite and Western Australian blue asbestos; both these fibres have parallel uses being harsh fibres and being used for reinforcement.

2. Comparative use of Australian blue would result in the replacement of amosite and not Canadian asbestos. In fact it would mean the substitution of a raw material costing only £18 per ton into factory by one costing £143 per ton.

3. Any claim as to the value of a fibre must rest upon the validity of the method of valuation and the application of this valuation to the uses to which the fibre is put.

4. The method of testing the value of respective fibres used by James Hardie & Co. Pty. Ltd. consists of making and comparing the flexural strengths of a series of sheets with those of a parallel series of sheets made in the same operation from a fibre of known performance. This method is similar to that used by overseas manufacturers.

5. In Australia the two systems of manufacture in use are the Hatschek and the Fourdrinier. James Hardie & Co. Pty. Ltd. use the former and Asbestos Products Pty. Ltd. use the latter system; Wanderlich Ltd. are in the process of changing over from Fourdrinier machines to Hatschek.

6. The main features of the Hatschek machine are illustrated by the diagrams submitted.

7. The manufacturing process can be divided into three separate parts, viz—

- (a) the formation of the mixture of raw materials, i.e., a slurry of selected asbestos fibre and cement suspended in water;
- (b) the removal of excess water by suction and pressure at the size roller;
- (c) the building up of the product by successive layers on the size roller or by further processing of the newly made material.

8. The asbestos fibre being the reinforcing agent plays a vital part, the whole process depending upon the unique property of affinity of asbestos for cement.

9. The manufacturer must make a thorough study of the available fibres and in each choose those types possessing the necessary characteristics to satisfy the requirements of the particular manufacturing process. The soundness of the economic and technical decisions involved can have a marked effect upon the cost and quality of the finished product.

10. Only chrysotile, crocidolite and amosite possess the high tensile strength necessary to produce a satisfactory board.

11. Different combinations of types of fibre as well as the fibre ratio to cement affect the strength of the product; within limits, strength increases with the quantity of fibre in the mix.

12. Another contribution to bond strength is the surface area of the opened up fibre: both amosite and crocidolite suffer in comparison with soft Canadian chrysotile. The chief cause of meagre surface area is the high specific gravity of the amphibole fibres.

13. The inclusion of some harsh fibre in the fibre blend not only assists filtration but, up to a certain limit, increases the density of the resultant product and hence its strength; in some respects Fresh Zone amosite is superior to Australian crocidolite and at least performs the same function.

14. Tests show that Fresh Zone amosite is interchangeable with crocidolite and with adequate supply the question becomes solely one of price.

15. A detailed comparison between the mining costs of Australian blue asbestos, and the South African products of Cape blue and amosite is rendered difficult because in the latter instance cheap native labour is employed and the Australian mine at Wittenoom relies to a great degree on mechanization. Therefore the real comparison is the total cost of production.

16. The deposits in the Hamersley Ranges, Western Australia, are undoubtedly very large and whilst the mining practices are excellent, the milling process leaves something to be desired. The cost of production is understood to be around £135 per ton at Fremantle when 5,500 tons per annum are produced, reducing to £110 per ton on 8,500 tons per annum; this compares with £60 per ton, landed in Sydney, for Fresh Zone amosite.

17. The chief competitor of the Australian Blue Asbestos Ltd. is the Cape Asbestos Co. Ltd.; there are other South African competitors including the Transvaal blue asbestos producers who, owing to the abundance of chrysotile, may well dump their production on the world markets.

18. The output of Cape blue asbestos in short tons in the 1950-1952 years was as follows:—

1950.	1951.	1952.
13,581	15,741	17,821

Production in 1954 is planned for 30,000 tons should demand require it.

19. Of the total output of Cape Asbestos Ltd., 84 per cent. is of grade B ranging from 1-in. to 1-in. in length and priced in 1953 at £5.55 per ton f.o.b. Capetown. In April, 1953, the cost of production was given at £5.55 per ton and the rate of production under 20,000 tons per year.

20. The demand for blue asbestos in the general asbestos and insulation industries is unlikely to exceed 1,500 tons per annum for many years; the chief market for shorter grades of blue is in the asbestos cement.

21. The Cape Asbestos Co. Ltd. plans a step up in production to 30,000 tons per year. Notwithstanding, some of the harsh chrysotile mined in Quebec has been substituted for blue fibre in asbestos cement pipes and the chrysotile fibre from the new Munro mine in Ontario could be a serious competitor to crocidolite.

22. In the light of the advantages enjoyed by Cape blue the claim that a ready dollar market exists for Australian blue is open to question.

23. Transvaal blue asbestos is a soft fibre and lacks high tensile strength; its chief effect upon Australian blue would be in the low quality market.

24. A multiplicity of grades of amosite is produced in South Africa and the prices in 1953, as shown in the accompanying schedule, range from £12 to £15. South African currency f.o.b. Durban. Present production is approximately 15,000 tons and 75,000 tons per year are planned.

25. Its chief application is in the wide field of insulation although in the post-war shortage considerable quantities were used in asbestos cement. Whilst the soft brown leached varieties were disappointing, experiments by James Hardie & Co. Pty. Ltd. with Fresh Zone amosite brought about a complete reassessment of its potential value for use in asbestos cement.

26. The Fresh Zone material does all that blue asbestos does in asbestos cement manufacture at about half the cost of Australian blue, and because of its light color produces a more attractive sheet.

27. The technical specifications of what the United States of America regarded as strategic materials in 1944 is set out in detail in accompanying annexures; the grades listed are Cape standard grades.

28. It is seen from details of world production of asbestos fibre, submitted, that over 90 per cent. of demand is for chrysotile.

Produced in the matter of
Asbestos Personal Injury Cases;
Abrams Lead & copied to
Richard F. Struggs.

28. Asbestos fibre was first mined in Australia during World War I, by Wanderlich Ltd. and James Hardie & Co. Pty. Ltd., but these operations ceased in 1921 because they became uneconomic. Mining operations were resumed by Wanderlich Ltd. in 1942 at Baryulgah, New South Wales, and in 1944 James Hardie & Co. Pty. Ltd. joined in the project; production last year was 640 tons.

29. When European factories were cut off from South African and Canadian supplies during the recent war, James Hardie & Co. Pty. Ltd. built up supplies to overcome the inevitable post-war shortage period. World supplies are again plentiful.

30. The expectancy of life of the known reserves of asbestos outside Australia even at an increased rate of production range between 30 and 100 years supply.

31. The tendency of some manufacturers to explore the possibility of using low gradings of chrysotile in asbestos cement products could eventually result in the retreatment of large dumps of this type in Africa and Canada; the scales are weighted against the wide use of blue asbestos for many years to come.

32. After years of research work James Hardie & Co. Pty. Ltd. can reasonably claim to have investigated the asbestos resources of Australia; only one small producer of chrysotile emerged from these investigations with a mine that is economically sound.

33. Amosite and blue asbestos, both being hard fibres, are interchangeable and any enforced usage of Australian blue asbestos will merely replace portion of the amosite from South Africa.

34. In contradiction to Mr. Brown's contention, the bulk of the fibre when opened up has no connection with the specific gravity of the fibre.

35. Contrary to what Mr. Brown has stated, there is no international standard method of grading asbestos. The method evolved in Canada is really applicable only to chrysotile produced at Thetford, Quebec.

36. Additional technical data are submitted to substantiate the claim of interchangeability between Fresh Zone amosite and crocidolite.

37. James Hardie & Co. Pty. Ltd. believes a stable market cannot be found for Australian 3 grade crocidolite at £120 per ton f.o.b. Fremantle.

By E. W. Sisman (representing British Belting and Asbestos Ltd., Clenkheaton, Yorkshire, England):—

1. The company, which is in the process of establishing a factory in Ballarat, Victoria, manufactures asbestos textiles, packings, jointings and brake and clutch linings.

2. Research has been conducted into the possibility of using crocidolite crude as an adulterant to basic chrysotile in brake and clutch linings. Whilst this is feasible on the wider types of woven linings, it can only be regarded as an expedient.

3. The disabilities of crocidolite are—
(a) Its harsh springy nature resists that consolidation necessary to produce a dense hard wearing product;
(b) It is more abrasive than chrysotile and can cause scoring of the brake drums;
(c) Grade for grade it is more expensive than chrysotile.

4. It is requested that all asbestos fibres remain free of duty or alternatively any tariff imposed be limited to importations of crocidolite fibres.

By W. S. Jeffrey (representing Australian Asbestos Pty. Ltd., 54 Meeks-road, Marrickville, New South Wales):—

1. As a manufacturer of asbestos rope lagging, the company strongly urges that the type of fibre used, namely white asbestos grade 4K be admitted free of duty should the Board recommend protection for asbestos.

2. Experiments have been conducted with blue asbestos but it has been found impossible to use this type with the company's existing plant.

By N. G. Webster (representing Bell's Asbestos & Engineering (Australia) Ltd., 213 Waverley-road, East Blackburn, Victoria):—

1. The company manufactures a wide range of asbestos products, particularly packing and insulating materials and asbestos rope and as the majority of these materials require 100 per cent. imported amosite fibre any alteration in the existing tariff is opposed. Experience has shown that crocidolite has neither the thermal nor physical characteristics desired.

2. The company's products are used by State instrumentalities, and by the Royal Australian Navy. It is significant that the British Admiralty now specify 100 per cent. amosite for use in temperature boiler and steam pipe insulation.

3. A statement prepared by the company's technical adviser, Mr. Frederick Johnson, supporting the objection to the imposition of a duty, is submitted.

By A. Walker (representing Gollath Portland Cement Co. Ltd., Ballston, Tasmania):—

1. The company wishes to record an objection to the imposition of a duty on imported asbestos fibre, or alternatively to the proposal that a minimum of 15 per cent. of all fibre used shall be Western Australian crocidolite.

2. The company's objection is an economic one. In the manufacture of asbestos sheets South African blue is now used at £93 per ton, and whilst from the technical aspect this could be replaced by Western Australian blue the cost would be prohibitive at £120 per ton f.o.b. Fremantle or £145 at factory. Even at the present price the South African blue is considered too expensive.

3. The company considers that the proposals before the Board would constitute an intolerable financial burden and no undue restriction on its efforts to provide a satisfactory article at a minimum cost. Any assistance afforded the Western Australian asbestos industry should, it is felt, be spread over the whole community by some form of bounty payment.

By R. L. Lawrie (representing Ellis and Clark Ltd., Adelaide, South Australia):—

1. The company, which manufactures electrical insulation sheets, opposes the introduction of a 40 per cent. tariff on imported asbestos fibre.

2. As the result of experiments carried out with different types of fibre, only Canadian chrysotile is now used in the manufacturing process.

By R. W. Everett (representing Randos Cement Co. Ltd., Yorkshire House, 14 Spring-street, Sydney, New South Wales):—

In a letter addressed to the Board, Mr. Alec L. Bell, Joint-General Manager of Randos Cement Co. Ltd. draws attention to the serious effects the imposition of a duty on asbestos fibre will have on the sale of asbestos cement sheets and in turn on the company's sales of cement.

OTHER EVIDENCE.

By J. C. H. Croft (Senior Mineral Economist, Bureau of Mineral Resources, 438 Bourke-street, Melbourne):—

1. Asbestos is the commercial term applied to the two broad groupings of non-metallic minerals known as serpentine and amphibole asbestos.

2. The most valuable variety of serpentine is chrysotile or what is commonly known as white asbestos; the group known as amphibole comprises actinolite, amosite, anthophyllite, crocidolite, tremolite. Of this latter grouping it is crocidolite which, by reason of very large deposits in Western Australia, is of considerable importance in this inquiry.

3. The natural characteristics of the various types of asbestos fibre dictate the uses to which they can be put. Whilst such uses are numerous and diverse they may be grouped as follows:—

(a) long fibre—suitable for spinning and therefore weaving into fireproof clothing; brake linings, gaskets, etc.;

(b) medium length fibre—used mainly in asbestos-cement products;

(c) short fibre—for use in floor tiles, paints, lubricants.

4. The principal characteristics of commercial varieties of asbestos are shown in the accompanying table, which however must be regarded as indicating a general average, from which divergence may be expected. It must be emphasized that no two samples from separate localities will have identical properties.

5. It is difficult to correlate grade designations used in various countries, there being no international standard method of grading asbestos.

6. The only national system of grading is that adopted by the Quebec Asbestos Mining Association for Canadian mined chrysotile asbestos. The grading method adopted is one of progressive sieving by controlled agitation through a series of four boxes of differing screen openings. Starting with a known weight of fibre the proportions of each weight remaining in each box after the required operating time is expressed as relative proportions.

7. Each grade of Canadian mined fibre is essentially a blend of fibres of different lengths, whereas in most other countries each grade consists of fibres of a particular length or within a short length range.

Produced in the matter of
Asbestos Personal Injury Cases;
Abrams Lead & copied to
Richard F. Scruggs.

The properties of the varieties of asbestos are set out in the table submitted, the properties of the three main varieties with which Australia is concerned are as follows:—

Properties	White, grey, greenish	Blue	Grey, green or brown
Hardness	2.5-3	4	3.5-4
Specific gravity	2.4-2.6	3.2-3.3	3.1-3.2
Tensile strength (1,000 lb./sq. in.)	90-100	100-110	10-20
Fusion point (°C.)	2,770	2,180	2,550
Flexibility	High	Good	Good
Acid resistance	Poor	Good	Fair
Spinnability	Very good	Fair	Fair
Texture	Soft to harsh	Soft to harsh	Coarse

3. The mode of occurrence of asbestos is either in well-defined veins or in irregular masses; veins can consist of "cross" or "slip" fibres, that is with the long fibres running either at right angles or parallel with the walls of the vein.

4. A total of 6,476,000 short tons was produced by all countries, excluding U.S.S.R., in the six years 1947-1952 in the following proportions:—

Country	Percentage of total output	Types produced
Canada	23.1	Chrysotile
South Africa	7.4	Chrysotile, Crocidolite, Amosite, Anthophyllite
Southern Rhodesia	8.8	Chrysotile
U.S.A.	3.9	Chrysotile and Amphibole
Switzerland	3.1	Chrysotile
Italy	1.8	Chrysotile
Cyprus	1.7	Chrysotile
Finland	1.0	Anthophyllite
Japan	0.5	Chrysotile, Amphibole
Australia	0.2	Chrysotile, Crocidolite, Anthophyllite, Amphibole
Other Countries	0.9	Various

11. The pattern of consumption is not easy to plot because of the incidence of post-war stock-piling; however it is clear that except for Canada and Italy, which enjoy 100 per cent. and 90 per cent. self-sufficiency respectively, consuming countries import the main bulk of their requirements.

12. Information concerning prices is meagre for countries outside North America and close comparison of available prices is made difficult by the lack of uniformity in grading. A chart is submitted showing the prices of approximately comparable grades; these prices are at the level of free on board or free on rail in the country of origin.

13. Commercial production of asbestos in Australia is confined to about fifteen deposits yielding from a few tons to 4,500 tons per year. No deposits of commercial importance have been recorded in Queensland, Victoria or the Northern Territory.

14. In 1953 Australia produced 4,000 short tons of asbestos as follows:—

State	Type	Quantity
Western Australia	Crocidolite	4,250
	Chrysotile	1,172
New South Wales	Chrysotile	430

15. Australian production has progressively increased since 1948 when 1,431 tons were mined. Except for small quantities of crocidolite mined in South Australia, production in the years 1948-53 has been confined to Western Australia and New South Wales.

16. The principal Western Australian deposits are in the region south of Port Hedland and south-west of Marble Bar. Commercial chrysotile is produced at Nanyerry and seams of blue cross fibre crocidolite occur for considerable distances in the ranges of the Hamersley Ranges, situated approximately 400 miles by road from Roebourne. These deposits of blue asbestos were first mined in 1937, but large-scale operations were not started until 1947 when areas were leased to the mining department. Australian Blue Asbestos Ltd. part of the mining is now done in the Wittenoom lease and its tributary, Western Corral.

17. Australian imports and exports in the same period are as follows:—

SHORT TONS

	1947	1948	1949	1950	1951	1952	1953
Imports	10,675	10,543	22,081	28,883	131,034	120,642	120,642
Exports	311	283	431	459	1,310	2,350	2,350

18. The import of asbestos into Australia has had an increasingly significant effect on the expenditure of dollar currency as seen by the following statement:—

EXCESS IMPORTS OVER EXPORTS

	1947	1948	1953
Dollar currency	£A. 732,403	£A. 303,311	£A. 860,839
Other currency	781,938	827,087	468,854
	1,464,403	1,720,398	1,469,673

The improvement in 1953 was due to a small reduction in imports and a significant increase in the quantity and value exported; however, the net effect was mainly on non-dollar expenditure.

19. The Bureau has been unable to obtain full information regarding actual consumption by types and grades of fibre used in asbestos cement products, but of an estimated total consumption of 22,000 tons in 1952 and 21,500 tons in 1953 it is believed the proportions average out at approximately 40 per cent. chrysotile, 30 per cent. amosite and 10 per cent. crocidolite.

20. There seems to be no immediate prospect of a downward trend in the consumption rate, which has expanded in recent years thus:—

Year	Tons
1948	21,081
1947	30,760
1946	17,849
1945	18,005
1944	34,440
1943	31,000
1942	34,250
1941	23,849

21. Asbestos cement products absorb approximately 85 per cent. of the asbestos in Australia whilst boiler lagging, packing, floor tiles, gaskets, battery boxes, etc., account for the balance.

22. The only prices publicly quoted for Australian asbestos are for crocidolite produced at Wittenoom and since 1948 these are as follows:—

Date	Grade 1	Grade 2	Grade 3
January, 1948	170	90	61
August, 1948	170	90	73
June, 1949	170	90	100
November, 1949	200	130	135
February, 1951	250	200	150
January, 1952	300	225	170
July, 1953	200	160	150
December, 1953	170	150	135

All the above prices are f.o.b. Fremantle.

23. The following approximate c.i.f. & e. costs per ton of imported fibre have been supplied to the Bureau of Mineral Resources by James Hardie & Co. Pty. Ltd. shown in £s. per short ton:—

	1944	1949	1950	1951	1952	1953
Rhodesian Chrysotile—						
Grade 3	67	73	114	125-143	135	163
Grade 2	47	52	77	88-99	108	99
Canadian Chrysotile—						
Grade 4K	46	49	73	84	100	100
South African Asbestos—	40	44	48	50	52	55

Dr. A. F. Adams, Superintendent of State Batteries, Mines Department, Western Australia.

3. From a modest beginning in 1923, when fibre was mined by the simple leaching method, the Wittenoom asbestos mine has been developed considerably to a state where up-to-date methods and equipment are recovering the fibre as efficiently as the present capital will allow.

2. Following the taking over, in 1943, of the Wittenoom lease by Australian Blue Asbestos Ltd. an unsuccessful attempt was made to apply rock-crushing and drilling methods. Because of the extreme hardness of the rock enclosing the fibre at Wittenoom it was necessary to install modern light machines with air logs and tungsten carbide tipped steel bits.

3. Initially all the mine openings were kept down to a height of 4 feet which meant that the miners were cramped and retarded. The latest layout has drives of 7 feet high and 8 feet wide.

4. The system of removing broken rock is by power scraper and electrically drawn railed dumping trucks.

5. With the absence of vertical shafts and natural water, humidity is not troublesome and the problem of ventilation not difficult; this is undertaken by a primary fan driven by a 50 horse-power electric motor, displacing 60,000 cubic feet of air per minute and secondary fans (2,000 cubic feet) of 6 horse-power.

6. In the underground section of Wittenoom mine the appliances and techniques combine to form a well integrated whole which works methodically and smoothly.

7. These principles with improvements to suit the location are now being used to mine fibre from Western Gorge, where the grade of fibre shows up to 80 per cent improvement on the Wittenoom fibre. It is considered that the Western Gorge project should be speedily developed though appreciable capital outlay will be necessary.

8. Probable reserves at the present Wittenoom mine are two years' supply and, as indicated by outcrop and test drilling at Western Gorge, some ten years' supply. Possible reserves in all basins can only be guessed at but in terms of present-day production they appear to be considerable.

9. Mining costs are affected by the nature of the rock, the hardness of the rock, the nature of the rock and the abrasive properties thereof. The cost of the rock is the most important factor.

10. The efficiency of the mining does not appear to be as smooth as with asbestos. The hardness of the rock, the nature of the rock and the abrasive properties thereof. The cost of the rock is the most important factor.

11. In the absence of present, crocidolite fibre separation from hard rock has been developed locally with the result that it is to some extent a matter of trial and error.

12. In general the process aims at accentuating the physical properties of the valuable rock and the wanted fibre; the former is crushed to a granular product so as to pass through or over the screens to which the ore is fed, and the finished up fibre is drawn upwards in an air current.

13. The milling problem is essentially one of lack of information and whilst improvements are constantly being made it would be advantageous to increase the grade of mill heads to ensure an improved overall recovery.

14. Milling costs are given as 36s. per ton which includes 2.8s. per ton for jobs bags to contain the fibre. These costs are high but not unduly so in comparison with those of large Australian gold and base metal mines.

15. The mine power unit was redesigned and relocated in 1951 and the present cost per unit is 4.8d. which is about 60 per cent higher than the cost for similar installations located elsewhere; the main reason for this is the cost of diesel fuel at £52 per ton against elsewhere of £25.

16. The road transportation of fibre to Point Samson and the return loading of stores is undertaken by two contractors who charge £3d. per ton mile. In light of comparison with charges made for similar services elsewhere and the capital outlay it is considered the charge should not be more than 8d. per ton mile.

17. The charge for freight from Point Samson to Fremantle is 37s. 6d. per ton; to this must be added handling costs of £2 per ton and £1 18s. per ton at the respective ports.

18. The total capital expended to date is £1,740,000 plus governmental assistance of £480,000 for housing, roads and water supply.

19. Portion of this high capital expenditure can be attributed to—

- (a) the need for the company to provide adequate amenities including cinema, hotel, club, etc.
- (b) the fact that operations were commenced in winter
- (c) the need, particularly in the initial stages, to replace obsolete mine and mill equipment including the complete renewal of the power house.

20. Last year 4,700 short tons of fibre were produced from 120,000 short tons of ore and a loss of £25,000 was sustained. This quantity of the higher quality Western Gorge ore has been created it is estimated that the loss would have been translated into a profit of £298,244.

21. In a total number of employees of 204 there are 124 employed in the mill and workshops; this reflects the difficulties experienced in the separation of rock and fibre.

22. It is considered that fundamentally the Wittenoom mining prospect is conducted along sound lines, and with continued improvement in milling processes, in conjunction with a full-scale development of the Western Gorge deposits, worthwhile profits will be won from Australia's blue asbestos occurrences.

By G. F. Mead (Assistant Mining Engineer, Bureau of Mineral Resources)—

1. The asbestos occurrences at Wittenoom and Nunyerry, Western Australia, have been examined and in the light of the proved consistency of the formations it is reasonable to assume that the following mineral reserves exist:—

SHORT TONS			
	Measured and Indicated	Proved	Total
(a) Wittenoom	100,000	1,150,000	2,010,000
(b) Nunyerry	4,000	4,000	8,000

2. The mining method is dependent upon the nature of the ore and the thickness and dip of the fibre seam.

3. At Wittenoom, the ore is mined by the pillar method, the pillars being 24 ft. square and 24 ft. centres to support the roof. The pillars are in the gorge walls and the fibre is mined from the pillars. The fibre seam is only 1 to 3 inches thick, sufficient rock must be removed to afford adequate working space.

4. The softness of the rock associated with white asbestos normally renders drilling cheap and easy; at Nunyerry coal drills have been successfully adopted for the recovery of fibre.

5. Asbestos mining, the milling of crocidolite contrasts with that of chrysotile, the former, because of the extreme hardness of the rock, is relatively expensive and at the same time the wear on mill machinery is considerable.

6. The extent of asbestos at Wittenoom is a serious problem. Australian Blue Asbestos Ltd. has installed a number of fans and collectors in the mill but conditions are still dusty.

7. Although the Commonwealth Government refused a request for a 10 per cent duty on imported asbestos and a subsidy of £4 per ton on fibre produced, assistance was given to the industry by the Commonwealth and the State Government in the form of—

- (a) freight subsidy of 10s. per ton on asbestos shipped from Point Samson to Fremantle and a subsidy of 27s. per ton on asbestos and goods either way between Wittenoom and Point Samson;
- (b) the erection of houses, school, hospital, post office, etc., in the township of Wittenoom.

By E. Adams (representing Dominion Industries Ltd., Christchurch, New Zealand)—

1. Asbestos cement sheets produced during test runs on Hatzidak machines showed noticeable improvements when No. 3 grade Australian blue fibre was included in the asbestos fibre mix. Improved performance on the machines at varying speeds, the handling properties of the green sheets and general flexibility and appearance were noticeable when 25 per cent of Australian blue fibre was used.

2. A letter from the company dated 15th June, 1954, advised the general manager, Colonial Sugar Refining Company, that New Zealand exchange regulations restricted the purchase of Australian blue fibre. Within the scope of these restrictions the company intends to continue purchasing blue fibre. The company's major requirements of fibre are covered by contract with the Asbestos Corporation of Canada. In addition a contract has been in operation since 1948 with the Cape Asbestos Company.

3. Although only 10 tons of Australian blue were used in the tests referred to, it is considered that this quantity was sufficient to afford conclusive results.