

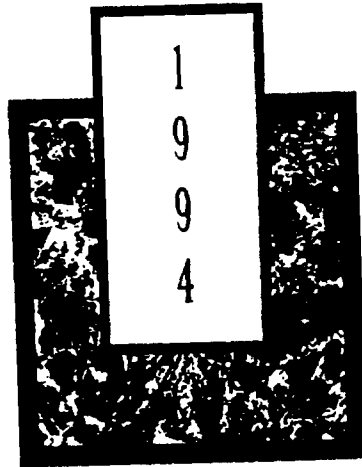
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MINING
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Asbestos



CANADIAN
MINERALS YEARBOOK
CHAPTER REPRINT



Natural Resources
Canada

Ressources naturelles
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Canadian Minerals Yearbook

This review is a chapter reprint from the 1994 edition of the *Canadian Minerals Yearbook*, which will be available by the end of July 1995.

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Asbestos

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In 1994, Canadian asbestos shipments increased marginally from 1993 levels. Canadian mines, which are located in Quebec, operated at an average of 94% of current capacity. A tailings reprocessing operation in Newfoundland operated at about 50% of capacity. Average prices increased by about 4%. Total shipments for 1994 were estimated to be 525 000 t valued at \$228.2 million, compared to revised shipment figures for 1993 totalling 522 967 t valued at \$222.8 million.

Canadian exports of asbestos for 1994 were an estimated 525 846 t. This represented a 3% increase in volume from the previous year. The value of these exports increased by an estimated 4.5%. Exports in

the January-September 1994 period totalled 379 605 t valued at \$222.7 million, compared with 357 991 t valued at \$210.1 million for the same period in 1993.

In 1994, world production of asbestos is believed to have decreased by about 13% to reach a level of 2.7 Mt. This decrease is the result of continued problems in Russia and Kazakhstan, where production has decreased steadily, mainly due to a lack of funds since the collapse of the former Soviet Union.

Employment in the Canadian asbestos industry remained fairly stable throughout 1994.

ASBESTOS AND ITS USES

Asbestos is a generic name covering several naturally occurring fibrous hydrated silicates. These are separated into two basic groups: serpentine and amphiboles. Chrysotile is the only member of the serpentine group, while the amphibole group consists of crocidolite, amosite, anthophyllite, actinolite, and tremolite. Of all these minerals, chrysotile is the least dangerous to human health and is the only one extracted in Canada. Chrysotile, which is sensitive to acid, tends to dissolve in the lungs, unless the lungs are overburdened, rather than remain as an irritant like the other types of fibres do. In the past, most of the problems associated with asbestos in general, and chrysotile in particular, have been due to poor working practices that existed in the first half of this century. With the marked improvements in today's work practices and the increased protection of workers, the occupational risks associated with asbestos have been tremendously reduced and are controllable with existing technology.

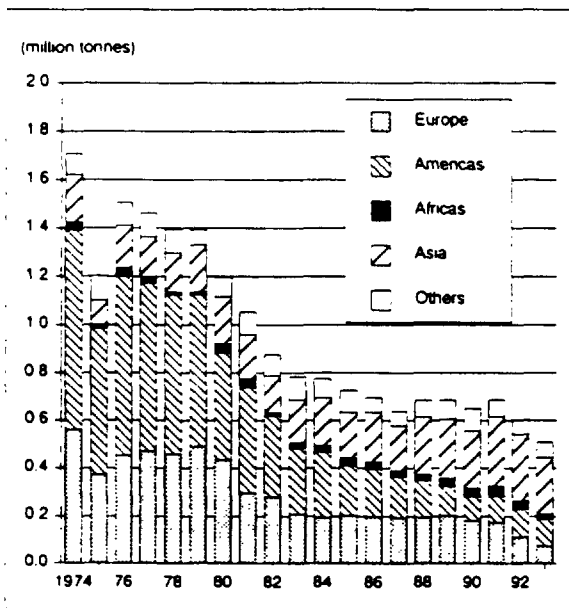
Because of their chemical and physical properties, asbestos fibres are an extremely useful material that has been, and still is, widely used throughout the world. In Canada, chrysotile asbestos fibres are classified into seven groups, each one with its own sub-categories with the longest fibres assigned to Group 1 and the shortest to Group 7. In decreasing length, asbestos has been used in textiles, clothing, packings, woven brake linings, clutch facings, electrical insulation materials, high-pressure and marine insulation, asbestos-cement pipe, other asbestos-cement products (e.g., sheets and mouldings, shingles), gaskets,

ASBESTOS, WORLD PRODUCTION BY COUNTRY, 1994

Country	Tonnes*
Commonwealth of Independent States	1 400 000
Canada	525 000
Brazil	190 000
Zimbabwe	150 000
China	250 000
Republic of South Africa	100 000
United States	10 000
Greece	50 000
India	25 000
Swaziland	30 000
Colombia	5 000
Yugoslavia	1 000
Romania	3 000
Total	2 739 000

Sources: Natural Resources Canada;
U S Bureau of Mines.
• Estimated.

Figure 1
Canadian Asbestos Exports, 1974-93



Sources: Natural Resources Canada, Statistics Canada

paper products, vinyl sheet backings, and millboards. The shortest fibres (Group 7) are used in moulded brake linings and clutches, and as a filler in vinyl and asphalt floor tiles, cement, plastics, roof coatings, and caulking compounds. Some 85% of all asbestos produced globally is used in asbestos-cement products. Low density and friable products are no longer marketed.

CANADIAN DEVELOPMENTS

In 1994, J.M. Asbestos Inc. moved toward completion of its \$130 million ore development program. When the project is completed in February 1995, J.M. Asbestos Inc. will lay off 140 of the 270 employees it recalled for the project. The remaining 130 employees will remain with the company and replace workers who have retired. The company now has enough reserves to stay in operation until 2000 at its current production rate of about 210 000 t/y. In order to ensure continuity of the operations past this point, the company is now involved in a major study. The two main factors that this study will have to include are: (1) the relative stability and long-term prospects of world asbestos markets; and (2) what mining technique will best ensure the success of this project. The company will address these questions over the next two years.

In 1994, the production levels of LAB Chrysotile, Inc. (the largest Canadian asbestos producer) were up slightly in comparison with those of 1993. Workers

at the Black Lake operation signed a contract covering five years, the longest duration ever negotiated. At the Bell mine, the only underground asbestos operation in Canada, current reserves will permit its continuation until 1999. However, a drilling program is currently being undertaken to delineate further reserves, which may ensure the mine's life into the next century. At LAB's British Canadian operations, the development phase is continuing as planned. At the company's Black Lake operation, at current rates of production, reserves are sufficient for the next 16 years.

In July 1994, the Quebec Department of Transport announced that it will include asbestos in the surfacing of Quebec roads. This decision follows a series of tests conducted since 1989 at a number of locations. The advantages of incorporating asbestos fibres in asphalt have been known for some time, including its better resistance to extreme weather conditions. The higher cost of using asbestos in asphalt is more than offset by such benefits.

As it had done in previous years, Teranov Mining Corp. of Baie Verte, Newfoundland, the only remaining asbestos producer in the province, returned to production in the spring after being closed for the winter months. (Problems with frozen tailings continue to prevent the company from operating year-round.) However, due to continuing technical difficulties, especially with screens, production in 1994 was below 1993 levels. The operation was again shut down in mid-November and is expected to resume in April 1995. In 1994, Cliff Resources Corporation exercised its option to purchase the remaining 50% of Princeton Mining Corporation's interest in Teranov Mining Corp. Under this agreement, Cliff Resources will pay Princeton Mining Corporation \$1 million in preferred shares and a further eight million common shares as interest. As a consequence, Teranov Mining Corp. is now co-owned equally by Black Hill Minerals Ltd. and Cliff Resources Corporation. Chrysotile Management Corporation Ltd., located in Vancouver, British Columbia, will look after the marketing aspects of the Teranov operation and of future production at Cassiar, British Columbia. It is believed that reprocessing of the tailings could continue at the Teranov site for up to 15 years.

In British Columbia, at the site of the old Cassiar Mining Corporation operations, the joint-venture group comprised of Minpro Pty Ltd., Cliff Resources Corporation, and Black Hill Minerals Ltd. has invested about \$2.5 million in preparatory work for the construction of a wet milling pilot plant slated to start operation in 1995. The plan calls for the reprocessing of the existing tailings and, in the process, the rehabilitation of the site.

In October 1994, the Ontario Ministry of Labour (OML) established new work exposure limits for 19 substances. Amongst the latter are two types of asbestos fibres: amosite and crocidolite. A new

unique limit of 0.1 f/cm³, down from 0.5 f/cm³ for amosite and from 0.2 f/cm³ for crocidolite, was adopted. The ministry will be considering the establishment of a revised limit with respect to exposure to chrysotile asbestos after it completes a study of the economic impact of such a measure.

In 1994, the Canadian General Standards Board issued new standards for Asbestos-Cement Pressure Pipe (CAN/CGSB-34.1-94), Asbestos-Cement House Connection Sewer Pipe (CAN/CGSB-34.23-94), Asbestos-Cement Sewer Pipe (CAN/CGSB-34.9-94), Low Density Asbestos Sheets (CAN/CGSB-34.18-94), and Asbestos-Cement Drain Pipe (CAN/CGSB-34.22-94).

INTERNATIONAL AND REGULATORY DEVELOPMENTS

United States

On November 5, 1993, the U.S. Environmental Protection Agency (EPA) published in the Federal Register its long-awaited clarification notice regarding the status of several asbestos products in the United States. In issuing this clarification notice, the EPA exercised its authority to ban certain asbestos products. Under this authority, which was allowed by the U.S. Fifth Circuit Court of Appeals at the time of the Court's remanding of the EPA's 1989 asbestos ban and phase-out rule, the EPA could only ban asbestos products that were neither being manufactured, processed nor imported into the United States as of July 12, 1989, the time of issuance of the ban rule. The clarification notice states that asbestos-cement sheets (corrugated or flat), asbestos-cement shingles, asbestos clothing, roofing felt, millboard, pipeline wrap, and vinyl asbestos tile are authorized for use in the United States. However, the use of asbestos in corrugated paper, commercial paper,

flooring felt, rollboard, and specialty paper is prohibited. In addition, all new uses of asbestos in the United States are also prohibited. To this end, the EPA defines "new uses of asbestos" as commercial uses that were not manufactured, processed or imported on July 12, 1989. The table below is a summary of asbestos products authorized or prohibited in the United States.

Recent efforts by the EPA to eliminate the use of asbestos in favour of substitutes in new vehicle components failed. It should also be noted that, in its judgement remanding the EPA ban rule, the U.S. Fifth Circuit Court of Appeals stated that the agency "failed to evaluate the toxicity of likely substitutes . . ." and that, "while it is apparent that non-asbestos brakes either are available or soon will be available on new vehicles, there is no evidence indicating that forcing consumers to replace asbestos brakes with new non-asbestos brakes will decrease fatalities . . ." In fact, some of the fibres used in non-asbestos brakes (i.e., refractory ceramic fibres and fibreglass) have recently been the focus of concern to both the EPA and the U.S. Department of Health and Human Services (see below).

In November 1994, the EPA proposed to update its asbestos worker protection rule. The EPA invoked Section 6 of the *Toxic Substances Control Act* in order to make standards developed by the Occupational Safety and Health Administration (OSHA) in 1986 applicable to all state and local government employees previously not covered by the OSHA's rules. The rule applies to all construction activities and friction product repairs. (The existing worker protection rule of the EPA only applied the OSHA standards to asbestos abatement activities.) With this new proposal, the EPA would apply a different set of rules to state and local government employees than those recently imposed on other employees. (See discussion of new 1994 OSHA standards below.)

STATUS OF ASBESTOS PRODUCTS IN THE UNITED STATES

Asbestos Products Banned in the U.S.

Asbestos Products Authorized in the U.S.

Corrugated paper
Commercial paper
Flooring felt
Rollboard
Specialty paper
New uses of asbestos

Corrugated asbestos-cement sheet
Flat asbestos-cement sheet
Asbestos-cement pipes
Asbestos-cement shingles
Friction materials
Drum brake lining
Clutch facing
Disc brake pads
Asbestos clothing
Automatic transmission components
Roofing felt
Roof coating
Non-roof coating

Millboard
Pipeline wrap
Vinyl asbestos tile
Acetylene cylinders
Asbestos diaphragms
High-grade electrical paper
Packings
Sealant tape
Specialty industrial gaskets
Arc chutes
Battery separators
Reinforced plastic
Textiles

The American Conference of Governmental Industrial Hygienists (ACGIH) has again carried forward its notice of intended changes for asbestos in its monograph on Threshold Limit Values. If the values proposed in the notice were to be adopted, organizations following ACGIH guidelines would lower their occupational exposure limit for chrysotile asbestos from the current 2 f/cm^3 to a value of 0.2 f/cm^3 . In adopting a single exposure limit for all asbestos fibres, they would ignore the scientific evidence that chrysotile asbestos carries less risk than other asbestos fibres. At the urging of several groups, the ACGIH is currently studying the latest scientific information available on the subject.

On August 10, 1994, the U.S. OSHA issued its new final asbestos health standards for general industry, construction, and the shipyard industry. One of the provisions of these new rules is the general reduction of the permissible exposure limit (PEL) from 0.2 f/cm^3 to 0.1 f/cm^3 as an eight-hour time-weighted average. This new standard became effective on October 11, 1994. These revisions stem from the remanding in 1988 of the OSHA's 1986 asbestos standards by the U.S. Circuit Court of Appeals in the District of Columbia.

In the drafting of these new rules, the OSHA based its analysis on a risk assessment of asbestos completed by the agency ten years earlier. Moreover, the OSHA continued to not differentiate between the risks associated with the different types of asbestos fibres and, in particular, the lower risk associated with chrysotile asbestos. On the basis of its risk assessment, the OSHA concluded that a significant risk exists, even at 0.1 f/cm^3 . (Most of the international scientific community estimates that the risk associated with chrysotile asbestos at levels well above the OSHA's new value is not significant.) This new value is also not based on scientific data, but rather on the fact that, with current technology, the OSHA estimates that lower levels could not be monitored efficiently. The OSHA's new rules also imposed more stringent requirements on the removal, repair and maintenance of in-place asbestos-containing materials. The latter are currently being challenged by a number of parties including industry groups, unions, and two public utilities. The Fifth Circuit Court of Appeals (the Court which remanded the EPA's 1989 asbestos ban and phase-out rule) has been selected to review these legal challenges. Amongst the challengers, the National Roofing Contractors Association, whose members work in the largest consuming segment of the U.S. chrysotile asbestos market, has asked for a stay of enforcement, claiming that "the standard goes far beyond what is necessary to protect roofing workers from significant risks." (In asphalt, chrysotile fibres are totally encapsulated; the extent of released fibres, both during installation and removal, is considered insignificant.)

In August 1994, federal judge Lowell Reed of Philadelphia approved a settlement which may help

resolve a number of legal actions against some 20 U.S.-based asbestos product manufacturers. The US\$1.3 billion deal involving the Centre for Claims Resolution (which represents the companies in question) establishes a framework for an out-of-court resolution of personal injury claims and provides a structure for compensation for victims of asbestos-related diseases. The Centre for Claims Resolution is involved in about one quarter of all U.S. asbestos litigations.

The U.S. Bureau of Mines estimated 1994 Canadian asbestos imports into the United States at about 27 000 t compared with 30 709 t in 1993. Both the U.S. roofing and friction materials industries had a relatively good year (at least equivalent to 1993). Although no longer manufactured in the United States, asbestos-cement pipes are currently being imported from Mexico as there is still an important demand for this product. The situation is similar in the gasket manufacturing industry. The last U.S. manufacturer closed in March 1994, but the demand is still there and is being met by imports.

Latin America

Brazil is an important producer of asbestos, especially in the increasingly active market of Latin America. Sociedade Anonima Mineracao do Amianto (SAMA) produced about 190 000 t in 1994. SAMA requested and passed an environmental audit of its Cana Brava asbestos mine located at Minaçu in the state of Goiás. The company has programs for waste site reforestation, the treatment of mine and mill waste-waters, and dust control (through the use of wet recovery processes).

In 1994, Brazil was the focus of a major attempt to ban the use of asbestos. The European-based *Ban Asbest* group, with some local support, organized an international seminar aimed at discrediting a number of asbestos uses, while promoting certain asbestos substitutes. The Brazilian government subsequently re-affirmed its support of, and commitment to, the controlled-use approach for asbestos.

A number of groups held meetings on asbestos in Cancun in April 1994. They included the Asbestos-Cement Pipe Producers Association, the Asbestos Information Association - North American (AIA/NA), and the Asbestos International Association (AIA). A special meeting bringing together eight Latin American countries also took place. At the latter, it was decided to launch the Confederation Latinoamerican of Asbestos, which should be known as AIA/CLAS, to emphasize its relationship with the AIA. The initiative is aimed at fostering regional cooperation and identifying joint priorities for action in Latin America in the context of broader efforts to gain wider global acceptance of the controlled-use approach for chrysotile asbestos. Appearing to underlie it is a firm commitment on the part of industry in all of the participating countries to implement

International Labour Organization Convention 162 on the safe use of asbestos.

China

China, which had a total production in 1994 of about 230 000 t of asbestos, announced the opening of the Mang Yan asbestos mine. (Mang Yan was the only new asbestos mine to open in the world in 1994.) Northwestern China is still the major producing region, accounting for about 71% of total Chinese production. The mines in southwestern China (Sichuan province) are near closure as the quality of their fibres is poor and production costs are high. Mines in northeastern China are near exhaustion.

Most of China's production is for internal consumption; however, there are exports of about 10 000 t, mostly to countries of Southeast Asia. While China imports only a small amount of fibres from Canada (881 t in 1993), it reports imports of about 30 000 t from the former Soviet Union to supplement its needs. Asbestos consumption in China is mainly for asbestos-cement products, insulation products, sealing materials, and friction products. Consumption by China is expected to increase significantly over the next decade as its economy continues to develop.

Europe

In March 1993, the Zidani asbestos mine in Greece returned to production under the terms of a renewable five-year lease to Hellenic Mineral Mining Co. Ltd. (HMMC). The mine, which was previously controlled by Asbestos Mines of Northern Greece (MABE), produced about 50 000 t of asbestos in 1994.

In a bid to promote compromise approaches on the regulation of asbestos within the European Union (in the absence of a qualifying majority), France submitted a proposed "Convention of Progress." This convention, endorsed by the French Permanent Committee on Asbestos, addresses the principal issues related to worker safety, environmental protection, and the marketing of asbestos-containing products. Under the auspices of the convention, it is proposed that exposure to asbestos would be reduced through time in accordance with the latest scientific and technical advances.

Commonwealth of Independent States

Asbestos production in Russia and Kazakhstan continued to decline due to a lack of funds and other problems. The Ak-Dovurak asbestos mine, which is located in the Republic of Tuva (Russian Federation), was reported to have produced only about 37 000 t in 1993, down from the 153 000 t produced in 1989. The decrease is mainly due to collapsing internal markets. Of these 37 000 t, about 6000 t were exported to China, South Korea, and Turkmenistan. Revenues are split between the mine, the Tuva Republic, and

the Russian Federation. It is reported that about 10-15 years of production are left.

International Labour Organization Convention 162

To date, 18 countries have ratified the International Labour Organization (ILO) Convention 162 on Safety in the Use of Asbestos adopted unanimously in 1986 by ILO members. The most recent country to ratify the convention is Germany.

SCIENTIFIC DEVELOPMENTS

In August 1994, *The Annals of Occupational Hygiene* (a journal issued by the British Occupational Hygiene Society) published the proceedings of the international experts workshop held November 13-17, 1993. The session was co-sponsored by the International Commission of Occupational Health and the International Program on Chemical Safety of the World Health Organization. The complete reference for the proceedings of the workshop is noted below:

- Graham W. Gibbs, Fedor Valic and Kevin Browne (Editors) (1994), *Health Risks Associated with Chrysotile Asbestos - Papers from a workshop held in Jersey, Channel Islands, 14-17 November 1993*, in *The Annals of Occupational Hygiene*, Volume 38, No. 4, pp. 397-646.

These proceedings consist of 22 scientific papers, two letters to the editor of the journal, and one introductory paper by the editors of the proceedings, all peer reviewed. The papers contain information on the mineralogy of chrysotile asbestos, its uses, the nature of exposure, the level of exposure, lung and other cancers in the various industries, mesothelioma, morbidity, experimental data, cellular studies, and disposition and clearance. The workshop was attended by 36 scientists of international reputation representing various opinions and by 11 scientific observers, together representing 12 countries. Prior to the meeting, some 70 other scientists were invited to submit relevant information which was made available during the workshop. The proceedings represent the most up-to-date scientific and technical evidence on chrysotile asbestos.

On January 14, 1994, the Health Effects Institute - Asbestos Research (HEI-AR) announced that it was ceasing operations, mainly due to a lack of interest and declining funding support from the private sector. The HEI-AR was a private, non-profit organization based in Cambridge, Massachusetts. It received matching funds from government and industry and had as its mandate the study of asbestos-related issues. In 1991, the HEI-AR published its landmark study on asbestos in public and commercial buildings. It concluded that asbestos-containing material within buildings in good repair is unlikely to expose office

workers and other occupants to airborne asbestos concentrations above levels found in the air outside such buildings. The report also acknowledged that the removal of asbestos poses the greatest risk of potential exposure. At the time of closure, the HEI-AR had contracted out work to study the exposure to asbestos of custodial and maintenance workers, which had been identified by the first study as the category of workers the most exposed. This study will not be completed.

In the second edition (December 1993) of its *Guidelines for Drinking Water Quality*, the World Health Organization (WHO) once again affirms that asbestos in water is not a health hazard. The WHO states that, after years of study, "there is . . . no consistent evidence that ingested asbestos is hazardous to health, and thus . . . there [is] no need to establish a health-based guideline value for asbestos in drinking water." This assessment is consistent with the views of the EPA. The agency stated in 1991 that "asbestos is not classified as a carcinogen in the regulations (Drinking Water Contaminants Rule) because the EPA has determined it is carcinogenic only when inhaled, not ingested." Such statements are encouraging for the continued use of asbestos-cement pipes in developing countries.

ASBESTOS SUBSTITUTES

Non-asbestos fibrous materials, many of which are used as asbestos substitutes, are coming under increasing scrutiny in the workplace. The 1991 HEI-AR report expressed concern about substitutes for asbestos and stated that "in view of the growing numbers of different types of man-made fibres that are entering commerce to substitute for asbestos as a result of the phase-out of asbestos itself, detailed material characterization and biological testing of such fibres should precede their widespread dissemination into the human environment." In Canada, as a follow-up to a study by Health Canada that determined that Refractory Ceramic Fibres (RCFs) were potentially carcinogenic, Environment Canada has organized an Issue Table aimed at reducing the entrance of RCFs into the environment.

Following an extensive review of the scientific information available on fibreglass and its health effects, the U.S. Department of Health and Human Services, through the National Toxicology Program, has joined an increasing number of agencies that are expressing growing concerns over Man-Made Mineral Fibres (MMMF) by classifying fibreglass as a "suspected carcinogen." Fibreglass is used in about 90% of all U.S. homes, mainly as an insulation agent. At least for now, this new classification is not expected to have significant regulatory consequences as fibreglass products are already carrying labels indicating its potential carcinogenicity. In a recent paper in the *American Journal of Industrial Medicine* ("Fibrous

glass and cancer," Vol. 26, pp. 559-584, 1994), P.F. Infante, L.D. Schuman, J. Dement and J. Huff conclude, based on animal and human data, that fibrous glass materials are carcinogenic. They also conclude that, on a fibre-per-fibre basis, glass fibres may be as potent or even more potent than asbestos.

The U.S. EPA is also currently working on a "Significant New Use Rule" (SNUR) for RCFs, which are recognized to be more potent than fibreglass. In 1991, based on animal data, the EPA concluded that RCFs may present an unreasonable risk of cancer to humans, and in mid-1993, it classified RCFs as a "probable human carcinogen." This SNUR would require any person to notify the EPA at least 90 days before commencing the manufacture, import, or processing of RCFs. The EPA will hold hearings to help in the identification of significant new RCF product forms and applications. Further developments are expected in 1995.

The recently published *IPCS Environmental Health Criteria 151 - Selected Synthetic Organic Fibres* is noteworthy. In the conclusions and recommendations section of this report, experts state that "all fibres that are respirable and biopersistent must undergo testing for toxicity and carcinogenicity. Exposures to these fibres should be controlled to the same degree as that required for asbestos until data supporting a lesser degree of control become available." The same experts recommend that "populations potentially exposed to respirable organic fibres should have their exposure monitored in order to evaluate exposure levels and the possible need for additional control measures."

The European Union has also displayed concerns regarding asbestos substitutes (in particular with MMMF) and ordered a study of all fibres, both natural and synthetic, which resulted in a moratorium over revision to asbestos regulations in Europe. It is expected that this study will take about two years to complete. At the conclusion of the study, the Commission may decide to make regulatory recommendations concerning all fibres, including asbestos.

In Canada, the Fédération des travailleurs et travailleuses du Québec, with the support of the Canadian Labour Congress, continued to work on a code of practice respecting the use of synthetic mineral fibres. This exercise was prompted by the recent data from both animals and humans indicating that these materials were dangerous to health. The proposed code would include a description of each synthetic mineral fibre with its known health effects, as well as recommendations for proper monitoring, safe work practices, and exposure limits. This proposed code of practice is intended to eliminate interprovincial inconsistencies in the protection of workers across Canada.

OUTLOOK

There are strong indications that increased concerns over some substitutes will help the asbestos industry over the next couple of years. It is worth noting that litigations against some manufacturers of substitute products appear to be increasing significantly as consumers are concerned about the performance of these substitutes; this is the case, for example, in Denmark.

The benefits and safety of asbestos-cement products continue to be recognized despite increasing competition from substitute fibres and steel. Asian countries are still the main markets for Canadian fibres, accounting for about 58% of Canadian exports in 1994. Japan's share seems to have reached a plateau and some improvement is expected in the near future as the Japanese economy recovers. Indonesia, Malaysia and Thailand represented strong markets in 1994 and are expected to remain so in 1995. In

Europe, France, Belgium and Spain displayed strength, while some other countries like Italy (where a ban is in effect) have either completely disappeared as an export destination or have continued to reduce their consumption. It is expected that chrysotile consumption in Europe will continue to be reduced; this decline could be moderated by concerns regarding substitutes. The Americas maintained their position as an important destination of Canadian asbestos accounting for about 22% of Canada's exports; 1994 saw a significant increase in exports to Mexico. Exports to the United States dropped by 10% from the previous year. South America remains an important focus for future growth. Canadian production and exports are expected to remain stable in 1995.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 60. (2) Information in this review was current as of December 31, 1994.

TARIFFS

Item No	Description	Canada			United States Canada
		MFN	GPT	USA	
2524.00.10	Crude asbestos	Free	Free	Free	Free
2524.00.90	Other asbestos	7.5%	5%	Free	Free
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement or the like	7.5%	5%	Free	Free
6811.20	Sheets n.e.s., panels/tiles etc. of asbestos-cement, cellulose fibre-cement, etc.	7.5%	5%	Free	Free
6811.30	Tubes, pipes and tube or pipe fittings of asbestos-cement, of cellulose fibre-cement, etc.	7.5%	5%	Free	Free
6811.90	Articles n.e.s. of asbestos-cement, of cellulose fibre-cement, or the like	7.5%	5%	Free	Free
6812.10	Fabricated asbestos fibres; mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate	7.5%	5%	Free	Free
6812.20	Asbestos yarn and thread	11.6%	11.6%	Free	Free
6812.30	Asbestos cords and string, whether or not plaited	12.5%	12.5%	Free	Free
6812.40	Asbestos woven or knitted fabric	8%	5%	Free	Free
6812.50	Asbestos clothing, clothing accessories, footwear and headgear	23.1%	23.1%	Free	Free
6812.60	Asbestos paper, millboard and felt	7.5%	5%	Free	Free
6812.70	Compressed asbestos fibre jointing, in sheets or rolls	7.5%	5%	Free	Free
6812.90.10	Asbestos belting	16.3%	7.5%	Free	Free
6812.90.90	Other asbestos fabricated products n.e.s.	7.5%	5%	Free	Free
6813.10.10	Asbestos brake linings and pads for motor vehicles of heading nos. 87.02, 87.03, 87.04 or 87.05	10.5%	Free	3.3%	Free
6813.10.90	Other asbestos brake linings and pads	7.5%	5%	2.4%	Free
6813.90.10	Asbestos clutch facings for motor vehicles of heading nos. 87.02, 87.03, 87.04 or 87.05	10.5%	7.5%	3.3%	Free
6813.90.90	Other asbestos friction material and articles n.e.s.	8.6%	2.5%	2.7%	Free

Sources: Customs Tariff, effective January 1995, Revenue Canada, Harmonized Tariff Schedule of the United States, 1995

n.e.s. Not elsewhere specified

CTD007075

TABLE 1. CANADA, ASBESTOS PRODUCTION AND TRADE, 1993 AND 1994

Item No	1993		1994	
	(tonnes)	(\$000)	(tonnes)	(\$000)
PRODUCTION (Shipments)¹				
By type				
Crude, groups 1, 2 and other milled	-	-	..	..
Group 3, spinning	7 092	6 213	..	..
Group 4, shingle	116 553	80 435	..	..
Group 5, paper	112 263	54 377	..	..
Group 6, stucco	180 802	60 049	..	..
Group 7, refuse	106 257	21 748	..	..
Total	522 967	222 821	525 000	228 245
By province				
Quebec	509 474	218 798	515 000	225 245
British Columbia	-	-	-	-
Newfoundland	13 493	4 023	10 000	3 000
Total	522 967	222 821	525 000	228 245
EXPORTS				
2524.00.10 Crude asbestos				
Japan	1 593	546	1 791	659
Malaysia	50	19	-	-
United States	34	18	343	226
Other countries	62	4	20	15
Total	1 739	7	2 154	900
2524.00.21 Asbestos milled fibres, Group 3 grades				
EU countries (12) ¹				
Spain	458	593	825	1 072
United Kingdom	738	961	735	956
Portugal	150	206	125	174
Germany	55	72	44	58
France	-	-	32	42
Italy	18	21	-	-
Netherlands	35	33	-	-
EU countries, subtotal	1 454	1 886	1 761	2 302
Mexico	267	350	1 406	1 850
Thailand	790	1 025	714	927
South Korea	581	744	523	678
Israel	550	714	500	649
Turkey	218	283	489	634
India	213	283	338	442
Hungary	370	479	335	433
Brazil	390	536	301	413
Other countries	2 404	2 236	1 501	1 331
Total	7 237	8 544	7 868	9 669
2524.00.22 Asbestos milled fibres, groups 4 and 5 grades				
EU countries (12) ¹				
France	18 228	15 158	20 148	16 005
Spain	9 383	8 882	13 173	12 563
United Kingdom	4 995	4 137	4 849	4 134
Belgium	2 704	2 216	4 565	4 068
Portugal	2 550	2 362	2 190	1 999
Ireland	527	351	1 680	1 117
Germany	160	147	50	56
Denmark	50	35	25	17
Italy	6 641	5 852	-	-
Netherlands	193	196	-	-
EU countries, subtotal	45 431	39 336	46 680	39 959
Thailand	31 127	24 028	40 564	30 414
Japan	19 877	16 502	26 511	21 351
Mexico	11 146	9 661	16 358	14 372
India	20 338	16 248	16 826	13 512
Indonesia	8 915	5 791	15 977	11 031
Colombia	16 239	13 363	12 737	10 575
Algeria	4 600	3 847	10 700	8 539
Malaysia	7 581	5 688	9 188	7 124
Brazil	8 373	6 807	5 808	5 164
Chile	5 026	3 896	5 167	4 130
Morocco	3 531	3 216	4 515	4 127
Nigeria	7 177	6 130	3 799	3 332
Sri Lanka	3 327	3 151	3 118	2 796
Peru	1 945	1 579	3 299	2 718
Egypt	2 957	2 938	2 261	2 237

CTD007076

TABLE 1 (cont'd)

Item No	1993		1994	
	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)				
United Arab Emirates	1 150	1 072	2 275	2 187
Tunisia	2 735	2 848	1 540	1 639
Yugoslavia	1 532	1 514	1 263	1 026
Pakistan	5 724	4 538	1 196	1 009
Argentina	864	749	1 083	973
Australia	866	736	1 132	960
South Korea	1 564	1 289	1 075	919
Other countries	9 738	8 976	7 424	6 144
Total	221 763	183 903	240 496	196 238
2524 00 29 Asbestos shorts, groups 6, 7, 8 and 9 grades				
EU countries (12) ¹				
France	5 401	1 573	8 003	2 476
Belgium	3 059	1 203	4 404	1 666
Spain	1 888	834	3 346	1 440
United Kingdom	3 168	1 233	2 428	906
Ireland	770	327	1 995	825
Portugal	2 527	820	1 632	495
Denmark	469	223	425	191
Germany	313	106	56	15
Greece	18	3	54	10
Netherlands	36	7	18	3
Italy	2 949	980	-	-
EU countries, subtotal	20 598	7 309	22 361	8 027
Japan	64 636	26 684	62 159	25 956
Thailand	31 400	13 719	35 920	15 851
South Korea	40 798	15 978	40 915	15 398
India	20 831	8 374	19 056	7 776
United States	29 583	8 732	24 599	7 013
Indonesia	10 756	4 340	11 985	5 161
Malaysia	6 415	2 435	9 889	3 827
Mexico	9 212	2 978	10 163	3 506
Colombia	11 237	5 075	7 583	3 093
Brazil	5 988	2 302	6 966	2 406
Taiwan	3 314	1 277	3 146	1 337
Algeria	1 193	514	2 600	1 191
Chile	2 369	900	2 626	945
Other countries	21 365	8 275	19 360	7 248
Total	279 695	108 892	279 328	108 735
Grand total, crude, milled fibres and shorts	510 434	301 963	529 846	315 541
6811 10 Corrugated sheets of asbestos-cement, of cellulose fibre-cement, or the like				
United States	..	1 014	..	589
Japan	-	-	..	8
Total	..	1 014	..	597
6811 20 Sheets n.e.s., panels/tiles, etc., of asbestos-cement, cellulose fibre-cement, etc.				
United States	..	1 376	..	1 784
Finland	-	-	..	22
Australia	..	4	-	-
Total	..	1 380	..	1 807
6811 30 Tubes, pipes and tube or pipe fittings of asbestos-cement, of cellulose fibre-cement, etc.				
Total	-	-	-	-
6811 90 Articles n.e.s. of asbestos-cement, of cellulose fibre-cement, or the like				
United States	..	18	..	29
El Salvador	-	-	..	27
Japan	..	13	-	-
United Kingdom	..	2	-	-
Total	..	34	..	57

CTD007077

TABLE 1 (cont'd)

Item No	1993		1994	
	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)				
6812 10	Fabricated asbestos fibres, mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate			
	South Korea	-	..	81
	Taiwan	-	..	29
	People's Republic of China	-	..	18
	Mexico	-	..	17
	Jamaica	-	..	5
	Thailand	..	133	-
	Malaysia	..	59	-
	Indonesia	..	60	-
	Other countries	..	52	-
	Total	..	304	151
6812 20	Asbestos yarn and thread			
	United States	22	177	26
	Chile	90	362	31
	Colombia	43	183	19
	Czechoslovakia	-	-	12
	Philippines	13	50	10
	Brazil	25	117	5
	Other countries	54	272	1
	Total	247	1 161	103
6812 30	Asbestos cords and string, whether or not plaited			
	United States	..	1	..
	Cuba	..	10	-
	Total	..	12	..
6812 40	Asbestos woven or knitted fabric			
	United Kingdom	68	514	61
	United States	36	429	31
	Other countries	10	75	1
	Total	115	1 020	93
6812 50	Asbestos clothing, clothing accessories, footwear and headgear			
	Egypt	-	-	..
	United Kingdom	-	-	..
	Venezuela	..	90	-
	Total	..	90	..
6812 60	Asbestos paper, millboard and felt			
	South Korea	-	-	..
	Mexico	-	-	..
	Other countries	..	5	-
	Total	..	5	..
6812 70	Compressed asbestos fibre jointing, in sheets or rolls			
	United States	..	1 033	..
	Other countries	..	89	..
	Total	..	1 122	..
6812 90 10	Asbestos belting			
	Japan	-	-	..
	South Korea	..	75	..
	Singapore	..	55	..
	Thailand	..	224	..
	Other countries	..	187	..
	Total	..	541	..

CTD007078

TABLE 1 (cont'd)

Item No	1993		1994	
	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)				
6812 90 90	Other asbestos fabricated products n.e.s.			
	United States	176	247	
	Japan	-	59	
	New Zealand	-	39	
	Taiwan	-	30	
	Other countries	85	53	
	Total	261	428	
6813 10	Asbestos brake linings and pads			
	United States	46 061	46 517	
	Other countries	453	144	
	Total	46 514	46 661	
6813 90	Asbestos friction material and articles n.e.s.			
	People's Republic of China	-	30	
	United States	116	22	
	Total	116	53	
Total exports, asbestos manufactured				
	53 574		53 651	
IMPORTS				
2524.00.10	Crude asbestos			
2524.00.90	Other asbestos			
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement, or the like			
6811.20	Sheets n.e.s., panels/tiles, etc., of asbestos-cement, cellulose-fibre cement, etc.			
6811.30	Tubes, pipes and tube or pipe fittings of asbestos-cement, cellulose fibre-cement, etc.			
6811.90	Articles n.e.s., of asbestos-cement, cellulose fibre-cement or the like			
6812.10	Fabricated asbestos fibres, mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate			
6812.20	Asbestos yarn and thread			
6812.30	Asbestos cords and string, whether or not plated			
6812.40	Asbestos woven or knitted fabric			
6812.50	Asbestos clothing, clothing accessories, footwear and headgear			
6812.60	Asbestos paper, millboard and felt			
6812.70	Compressed asbestos fibre jointing, in sheets or rolls			
6812.90.10	Asbestos belting			
6812.90.90	Other asbestos fabricated products n.e.s.			
6813 10	Asbestos brake linings and pads			
6813 90	Asbestos friction material and articles n.e.s.			

Sources: Natural Resources Canada; Statistics Canada.

- Nil; . . . Not available or not applicable; . . . Amount too small to be expressed; n.e.s. Not elsewhere specified

1 EU includes Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADIAN ASBESTOS PRODUCERS, 1994

Producers	Mine Location	Normal Mill Capacity		Remarks
		Ore/Day	Fibre/Year	
(tonnes)				
Teranov Mining Corp	Boie Verte, Nfld	6 000	20 000	Wet-processing of tailings started in July 1991. Jointly owned by Black Hill Minerals Ltd (50%) and Cliff Resources (50%)
LAB Chrysotile Inc ¹				Partnership owned 55% by LAQ and 45% by Mazarrin Mining Exploration Inc
Lac d'Amiante du Quebec, Ltée (LAQ)	Black Lake, Que	9 000	160 000	Open-pit. Since September 1989, LAQ has been owned by Jean Dupere (President of LAB Chrysotile) and Connell Bros Company, Ltd of the United States
Asbestos Corporation Limited British Canadian mine	Black Lake, Que	7 000	70 000	Sold to Mazarrin Mining Exploration Inc. on September 2, 1992. Open-pit
Bell Asbestos Mines Ltd	Thetford Mines, Que	2 700	70 000	Sold to Mazarrin Mining Exploration Inc on September 2, 1992. Underground Mine was re-opened January 1989.
J.M. Asbestos Inc Jeffrey mine	Asbestos, Que	15 000	250 000	Open-pit (effective capacity reduced by one half since 1982).
Total of four producers at year-end		570 000		

¹ A partnership involving three operating companies.

TABLE 3. CANADA, ASBESTOS PRODUCTION AND EXPORTS, 1985-94

	Crude	Milled	Shorts	Total
(tonnes)				
PRODUCTION ¹				
1985	-	397 729	352 461	750 190
1986	-	332 092	330 289	662 381
1987	-	365 144	299 402	664 546
1988	14	399 550	310 793	710 357
1989	-	410 588	303 448	714 036
1990	-	379 047	306 580	685 627
1991	-	335 506	350 502	686 008
1992	-	259 819	327 175	586 994
1993	-	235 908	287 059	522 967
1994P	..	..	..	525 000
EXPORTS				
1985	44	395 158	326 311	721 513
1986	127	375 948	341 609	717 684
1987	1 696	353 321	293 808	648 825
1988	11 288	381 561	292 236	685 085
1989	17 198	379 601	312 915	709 714
1990	1 469	378 074	269 942	649 485
1991	2 302	353 391	330 360	686 053
1992	1 489	272 013	327 075	600 577
1993	1 739	229 000	279 695	510 434
1994	2 154	248 364	279 328	529 846

Sources: Natural Resources Canada; Statistics Canada.

- Nil, .. Not available, P Preliminary

¹ Producers' shipments

CTD007080