Table 4.—U.S. asbestos consumption by end use, grade, and type

(Metric tons)

	Chrysotile								Crocidolite	Amosite	Anthophyllite	Total asbestos
	Grades 1 and 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Total chrysotile				
1980	400	3,600	86,900	89,500	19,900	132,300	--	332,600	24,400	1,700	--	358,700
1981:												
Asbestos-cement pipe	--	--	71,300	26,100	1,100	--	--	98,500	31,300	--	--	129,800
Asbestos-cement sheet	--	100	300	2,500	2,500	12,300	--	17,700	1,400	200	--	19,300
Flooring products	--	--	--	400	--	67,800	--	68,200	--	--	--	68,200
Roofing products	--	100	400	1,100	7,300	22,900	--	31,800	--	--	--	31,800
Packing and gaskets	--	1,000	1,600	5,200	100	11,400	--	19,300	--	--	--	19,300
Insulation:												
Thermal	--	--	200	--	--	5,800	--	6,000	--	--	--	6,000
Electrical	--	300	--	--	--	300	--	600	--	--	--	600
Friction products	--	--	1,100	14,200	5,800	26,900	--	48,000	--	--	100	48,100
Coatings and compounds	--	--	100	300	1,100	11,600	--	13,100	--	--	--	13,100
Plastics	100	100	--	300	--	600	--	1,100	--	--	--	1,100
Textiles	--	1,700	--	--	--	--	--	1,700	--	--	--	1,700
Paper	--	100	--	400	900	300	--	1,700	200	--	--	1,900
Other	--	100	200	100	200	6,200	--	6,800	--	1,100	--	7,900
Total	100	3,500	75,200	50,600	19,000	166,100	--	314,500	32,900	1,300	100	348,800

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used in asbestos-cement pipe and crocidolite the rest. Flooring products with 20%, friction products with 14%, roofing products with 9%, and asbestos-cement sheet and packing and gaskets with 6% each, were the other major uses.

One percent of the chrysotile used was spinning grades 1, 2, or 3. Of the rest, the grade 7's were the most used at 53%, the 4's next at 24%, the 5's at 16%, and the 6's at 6%.

PRICES

Cassiar Resources, Inc., started the year optimistically with price increases that averaged 12% higher than those of 1980. Most other Western Hemisphere producers raised their published prices by varying amounts. The depressed markets and high producer inventories, though, made for a buyer's market with much selling below the listed prices. Because most of the asbestos used in the United States came from Canada, Quebec prices set the pattern. Quebec prices are given below.[8]

Quotations for Asbestos Corp. (Quebec) chrysotile, f.o.b. mine, as of January 1, 1981, follow:

Grade	Description	Value per metric ton
3Z to 3F	Spinning fiber	Can$1,325-$2,199
4T to 4A	Asbestos-cement fiber.	937- 1,384
5Z to 5D	Paper fiber	548- 757
6D	Paper and shingle fiber.	450- 470
7TS to 7D	Shorts	138- 278

African asbestos producers privately negotiate sales, thereby ruling out market quotations. The following tabulation shows the average value per metric ton of imports from the Republic of South Africa, regardless of grade, calculated from 1981 and previous U.S. Department of Commerce data:

Type	1977	1978	1979	1980	1981
Amosite	$589	$569	$577	$902	$725
Crocidolite	582	624	686	689	676
Chrysotile	485	451	679	692	595

FOREIGN TRADE

There was a 2% increase in the value of asbestos and asbestos products exported from the United States in 1981 over that of 1980. The fiber share of the export dollar remained at 13% in 1981. All of the gain was accounted for by a 2.4% increase in the value of manufactured asbestos products. There was a 23% decrease in the unit value of imported fibers to $430 in 1981.

In 1981, the United States recovered 160% of the cost of imported asbestos by exporting and reexporting fibers and products.

Canada remained the largest user of U.S. asbestos and products accounting for 34% of the value of exports of these products in 1981, followed by Mexico, 14%, and Saudi Arabia, 7%. Other major buyers of U.S. asbestos and products were, in descending order, Japan, Venezuela, Australia, the United Kingdom, the Federal Republic of Germany, Colombia, and the Netherlands.

Canada provided 94% of the asbestos fiber imported into the United States in 1981, and the Republic of South Africa provided 5%. Several countries provided the remainder. Chrysotile again dominated the imported types with 98% of the total. The dollar value of imported fiber in 1981 was 13% higher than that of 1980.

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Table 7.—U.S. imports for consumption of asbestos fibers by type, origin, and value

Type	Canada		Republic of South Africa		Other		Total	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
1979	495,914	$123,673	16,328	$11,135	842	$402	513,084	$135,210
1980								
Chrysotile								
Crude	129	20	--	--	29	32	158	52
Spinning fibers	5,424	4,571	360	338	567	576	6,351	5,487
All other	309,886	78,371	2,041	1,379	899	721	312,826	80,471
Crocidolite (blue)	[1]52	12	7,545	5,201	--	--	7,597	5,213
Amosite	[1]49	302	315	284	--	--	364	586
Total	315,540	83,276	10,261	7,202	1,495	1,331	327,296	91,809
1981								
Chrysotile								
Crude	--	--	957	554	--	--	957	554
Spinning fibers	4,450	4,124	471	175	90	91	5,011	4,390
All other	313,917	86,704	7,802	4,762	1,875	2,000	323,594	93,466
Crocidolite (blue)	--	--	7,376	4,988	--	--	7,376	4,988
Amosite	--	--	506	367	174	128	680	495
Total	318,367	90,828	17,112	10,846	2,139	2,219	337,618	103,893

[1]Transshipment from the Republic of South Africa

WORLD REVIEW

A wide-ranging survey of asbestos-cement use was reported at an industry meeting and described in a trade publication.[4] The trends are detailed in figure 1, which shows a decline in use in Western Europe and North America and increases in the rest of the world after 1970. These curves illustrate what has become increasingly apparent in the last decade. The growth areas for asbestos consumption are in the less developed portions of the world.

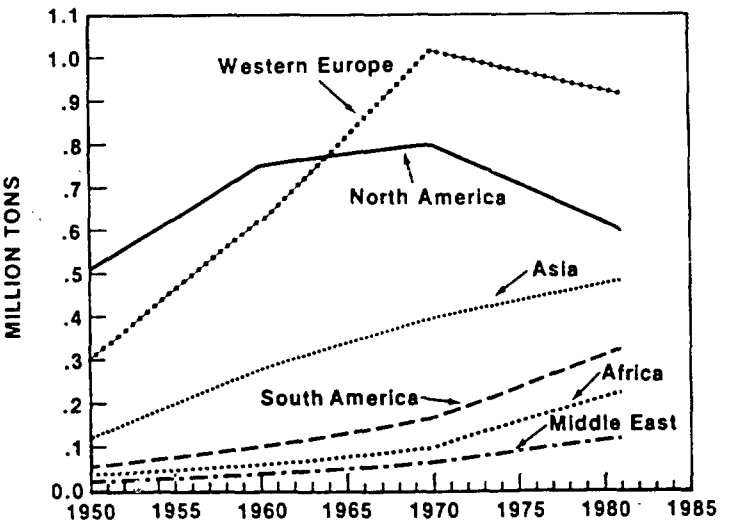


Figure 1.—Asbestos consumption by geographical area.

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Australia.—Woodsreef Mines, Ltd., in Barraba received enough funds from its parent company, Trans Pacific Asbestos, Ltd., of Canada, to retire its bank loan and come out of receivership. It still owes large amounts to the Australian Federal Government and the New South Wales government. In midsummer, the recession forced reduction in work from a normal 3 shifts per day 5 days per week to 1 shift per day 5 days per week.

Canada.—As of October, the Quebec asbestos producers had inventories of about 200,000 tons. This was in spite of many layoffs and temporary mine and/or mill closures. In late November, a Canadian mining paper described the past 12 months as harder on the asbestos industry than any previous period in its history.[7] The article cited an 11% downturn in sales for the first 7 months of 1981 when compared with the already low sales of 1980 and saw no apparent improvement for later in the year. An anomaly during the first part of the year saw sales of the short fibers (40% by weight of the production) grow by 0.8% while the others declined by 15.1%.

In November, the Quebec government and General Dynamics Corp. finally agreed to the terms under which control of the Asbestos Corp. would be transferred from the latter to the former.[8] The first phase, effective immediately, called for the transfer of 51% of the voting stock of General Dynamics Canada, Ltd., which owned 54.65% of Asbestos Corp., to the Quebec government. The price was Can$16 million. The agreement allows further acquisition at 2- and 5-year intervals.

After a temporary closure in August, Advocate asbestos mine near Baie Verte in Newfoundland was scheduled for permanent closure on December 31, 1981. The principal owners, Johns Manville Canada, Inc., and Compagnie Financiere Eternit S.A. of Belgium, said that the decision to close was mainly a problem of cash flow and the economics of an overburden-to-ore ratio of 6 to 1 compared with that in Quebec of 3 to 1. Trans Pacific Asbestos, Ltd., showed late-year interest in acquiring Advocate to showcase their Woodsreef wet milling process. The Newfoundland government, interested in maintaining the more than 500 jobs, said that at least three other firms were interested in the acquisition of Advocate.

Greece.—On April 17, 1981, the asbestos mill at Kozani and mine at nearby Zidani were officially opened. Full production at a 100,000-metric-ton-per-year capacity was expected in 1981 with production of grades 4, 5, 6, and 7.

South Africa, Republic of.—General Mining Union Corp. (Gencor) made an offer for the former Cape Asbestos, Ltd., asbestos properties acquired in 1979 by Transvaal Consolidated Land and Exploration, Ltd. Gencor was already South Africa's largest asbestos producer through its 31% ownership of Griqualand Exploration and Finance Co. and Msauli Asbestos, Ltd.

Turkey.—A recent report cited in an international magazine from the Union of Chambers projected the value of Turkey's asbestos production to rise 37% from 1979 to $1.7 million in 1981.[9]

U.S.S.R.—The U.S.S.R. reported that the second stage of the Lenin asbestos plant in the Tuva Autonomous Soviet Socialist Republic reached full production. Design capacity was 120,000 tons per year.

A translation from the Russian gave a thumbnail sketch of the Uralasbest combine.[10] It produced 62.4% of the Soviet asbestos output. It also provided all the asbestos exported from the Soviet Union. The combine incorporated 20 sections and subsections, including two asbestos mines, three asbestos milling plants, anthophyllite asbestos mining, an asbestos millboard factory, mechanical works, and factories for large building panels and other structural building materials. The total personnel numbered about 19,000, including 15,000 of labor force.

Zimbabwe.—Data on the production of asbestos and other minerals during the years of unilaterally declared independence (UDI) became available. For the UDI years 1966-79, inclusive, asbestos was the primary revenue-producing mineral with a value 32% above the next highest revenue producer (gold) and 23% of the total mineral value. Asbestos production maintained a healthy growth rate during that period.

Amiantos of Switzerland closed, in April of 1981, its Pangani, Vanguard, and Buss Mines. The no-longer-viable mines produced only 5% of Zimbabwean asbestos.

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Table 8.—Asbestos: World production, by country[1]

(Metric tons)

Country[2]	1977	1978	1979	1980[p]	1981[e]
North America:					
Canada (shipments)	1,517,360	1,421,808	1,492,719	1,323,053	[3]1,133,000
United States (sold or used by producers)	92,256	93,097	93,354	[3]80,079	[3]75,618
Latin America					
Argentina	686	1,069	1,371	1,261	1,400
Brazil	92,773	122,815	138,457	169,173	180,000
Europe:					
Bulgaria[e]	500	700	600	652	700
Italy	149,327	135,402	143,931	157,794	142,000
U.S.S.R.[e]	1,900,000	1,945,000	2,020,000	2,150,000	2,220,000
Yugoslavia	9,066	10,360	10,041	12,106	[3]13,591
Africa					
Egypt	478	349	238	316	325
Mozambique	--	--	789	800	800
South Africa, Republic of	380,164	257,325	249,187	276,759	[3]236,999
Swaziland[4]	38,046	[r]36,957	34,294	32,833	34,000
Zimbabwe	[r]273,194	[r]248,861	259,891	250,949	253,000
Asia					
Afghanistan	13,000	[e]13,000	[e]4,000	--	--
China[e]	200,000	250,000	250,000	250,000	250,000
Cyprus	36,684	34,342	35,472	34,535	34,000
India	22,177	[r]24,623	32,094	31,253	32,000
Japan	6,307	5,746	3,502	3,897	3,500
Korea, Republic of	6,180	13,616	14,804	9,854	10,000
Taiwan	673	2,031	2,957	683	2,600
Thailand	[4]	[4]	[4]	--	--
Turkey	3,975	13,372	17,210	8,800	10,000
Oceania: Australia	50,601	62,744	79,721	92,418	92,000
Total	[r]4,793,451	[r]4,693,221	4,884,732	4,887,215	4,725,533

[e]Estimated [p]Preliminary [r]Revised

[1]Table includes data available through Apr. 21, 1982

[2]In addition to the countries listed, Czechoslovakia, North Korea, and Romania also produce asbestos, but output is not officially reported, and available general information is inadequate for the formulation of reliable estimates of output levels

[3]Reported figure

[4]Exports

TECHNOLOGY

Examination of an EPA document published in 1981 left no doubt about that agency's interest in asbestos.[11] It described 49 different asbestos related research projects taking place in 10 laboratories under the guidance of 4 EPA offices. Of further interest is that 19 (39%) of the projects had to do with waterborne asbestos.

Funding from Trans Pacific Asbestos, Ltd., parent company of Australia's Woodsreef Mine, was intended to bring into operation a prototype mill to demonstrate its revolutionary wet milling process. At least one U.S. company was showing great interest in this process.

Substitutes.—A paper at a national glass conference gave some details about the asbestos uses in a glass plant and the hunt for substitutes.[12] The author conceded that to eliminate all asbestos one must be willing to accept lower operating efficiencies and higher operating and maintenance costs. He identified 72 separate kinds of equipment in all parts of the plant that contained asbestos.

Another paper detailed one company's very novel approach to a less hazardous substitute for asbestos.[13] Reasoning that, if condensed phosphates were degradable in cellular enzymes, fibrous condensed phosphates would be biodegradable and less capable of cellular damage and carcinogenicity; they produced such fibers. Analysis of the paper indicates that the following questions were not addressed: (1) Would the fibers that have much larger diameters be compatible with present asbestos manufacturing processes? (2) How would further fiberization to produce smaller fibers affect the physical parameters of the fibers? (3) Could long lasting cement products be made using these "fairly resistant to alkali" fibers?

If asbestos continues to be deemed a controllable hazard, then, because the less costly reinforcement will prevail, asbestos could likely win any economic battle. Figure 2 shows the efficacy of several reinforcing agents in plastic matrices. Asbestos is by far the least costly.

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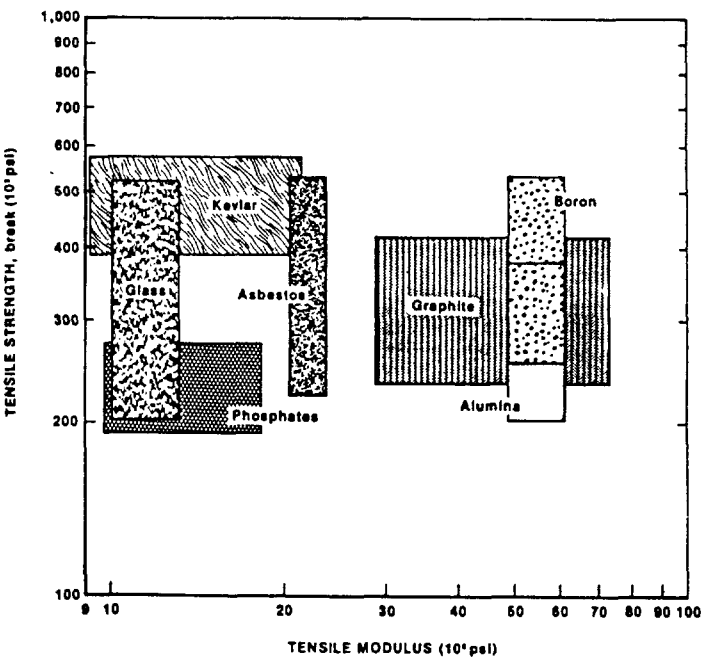


Figure 2.—Strength and modulus of selected fibers.

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