ASBESTOS

By Robert L. Virta

Domestic survey data and tables were prepared by Shantae Hawkins, statistical assistant, and the world production table was prepared by Glenn J. Wallace, international data coordinator.

Asbestos is a generic name given to six fibrous minerals that have been used in commercial products. The six types of asbestos are chrysotile, the most widely used; crocidolite; amosite; anthophyllite asbestos; tremolite asbestos; and actinolite asbestos. The properties that make asbestos so versatile and cost effective are high tensile strength, chemical and thermal stability, high flexibility, low electrical conductivity, and large surface area.

Legislation and Government Programs

The Occupational Safety and Health Administration (OSHA) issued a final rule on respiratory protection. The standard, effective April 8, 1998, provides guidance on the selection and use of respirators during Class I-IV asbestos projects (U.S. Department of Labor, 1998b).

OSHA revised its regulation on construction and shipyard asbestos standards. Asbestos-containing asphalt roof cements, coatings, and mastics are no longer covered under the 1994 regulation (U.S. Department of Labor, 1998a).

A variety of asbestos-containing products, such as brakes, gaskets, and asphalt roofing products, are used by the military on vehicles, ships, and missiles and in construction. Strategic-grade asbestos is not required in the manufacture of these products, and classified applications in which strategic-grade asbestos is used are believed to be extremely limited. The U.S. Department of Defense authorized the disposal of 8,814 metric tons (t) of strategic- and nonstrategic-grade chrysotile; 30,849 t of amosite; and 33 t of crocidolite from the National Defense Stockpile.

Production

KCAC Inc., San Benito County, CA, was the only company mining asbestos in the United States in 1998. The company mined a highly sheared serpentinite comprising matted, short-fiber chrysotile and unfractured serpentinite (also called a mass-fiber deposit). Domestic production (sales) decreased to 5,760 t (table 1). Domestic production data for asbestos were collected by means of a voluntary survey of the one domestic mining operation, representing 100% of the sales data shown in table 1.

Consumption

U.S. consumption of asbestos declined by 25%, to 15,800 t, in 1998. The three leading domestic markets were roofing products, friction products, and gaskets with 57%, 20%, and 12%, respectively, of the asbestos market.

Approximately 99% of the asbestos consumed domestically was chrysotile; the remainder was crocidolite. Of the chrysotile consumed in the United States, 92% was grade 7, followed by grades 5, 6, 4, and 3, in decreasing order of consumption (table 2). Markets for crocidolite were limited, and consumption was estimated to be less than 5 t despite reported imports of 228 t.

Prices

The average unit value of domestically produced asbestos decreased from that of 1997.

Average unit values of imported asbestos for individual port districts ranged from $55 per metric ton to $3,302 per ton. The average for all shipments of imported asbestos was $205 per ton. Average unit values of exported asbestos for individual port districts ranged from $184 per ton to $4,800 per ton. The average for all shipments of exported asbestos was $353 per ton.

The average unit value for imported crude chrysotile decreased to $147 per ton in 1998 from $165 per ton in 1997. The average unit values for imports of spinning-grade chrysotile and other chrysotile types were $107 per ton and $207 per ton, respectively. For the crude and spinning grades, larger quantities of lower value chrysotile were imported than in 1997. The average unit value for imported crocidolite was reported to be $247 per ton, although most of this material was believed to be chrysotile. Imports of long-fiber chrysotile from South Africa and Zimbabwe and exports or reexports of some grades of Canadian asbestos and low-tonnage shipments had the highest unit values (table 3).

Approximate equivalents of prices, in dollars per metric ton, for Canadian chrysotile, f.o.b. mine, ranged between $147 per ton and $1,262 per ton, depending on the grade. Chrysotile from South Africa ranged from $200 per ton to $440 per ton. Crocidolite from South Africa ranged from $640 per ton to $920 per ton (Industrial Minerals, 1998). Quoted prices should be used only as a guideline because actual prices depend on the terms of the contract between seller and buyer.

Foreign Trade

In 1998, the value of asbestos fibers and products exported decreased by 2%. Mexico was the largest importer of unmanufactured asbestos fiber from the United States, followed by Japan. The largest importer of manufactured products from the United States was Canada, followed by Mexico and Japan (table 4). Automobile brake linings and pads composed

Minerals Yearbook: Asbestos Chapters, 1998
ACL Doc 11033 · Page 1 of 5
Published by AsbestosClaims.Law
asbestosclaims.law/library/11033/1

approximately 93%, 75%, 60% of the value of exports shipped to Canada, Mexico, and Japan, respectively. Export values generally declined for most export categories. Exports and reexports of brake linings and disk pads accounted for 85% of the value of all manufactured asbestos products (table 5).

In 1998, approximately 18,100 t of asbestos was exported, according to the Bureau of the Census. The exports included asbestos crudes, fiber, sand, refuse, and stucco. Exports of domestic origin were estimated to be less than 6,000 t. Reexports of Canadian fiber probably accounted for the bulk of the remaining exports, although some manufactured products and nonasbestos mineral exports may have been included in the 18,100 t.

In 1998, Canada supplied nearly all the asbestos imported by the United States. Most of this asbestos fiber was chrysotile (table 6). Approximately 228 t of asbestos imports was reported as crocidolite. Most of the imports reported as crocidolite, however, probably were chrysotile based on the facts that the U.S. market for crocidolite is estimated to be less than 5 t and that Canada (listed as the source of the crocidolite) does not produce crocidolite. Consequently, any crocidolite received from Canada was mined in South Africa and transshipped through Canadian ports.

The United States also imported approximately 49,600 t of asbestos- and cellulose-fiber cement products, including panels, pipe, and tile, compared with 42,100 t in 1997. The bulk of these imports was in the form of flat sheets and panels (88%), followed by corrugated sheet (5%), pipe (3%), and other (4%). Mexico and Belgium were the major sources of imported asbestos- and cellulose-fiber cement products, respectively.

World Review

World production of asbestos was estimated to be 1.84 million metric tons (Mt). Russia continued to be the largest producer of asbestos, followed by Canada, China, Brazil, Zimbabwe, and Kazakhstan, in decreasing order of production. These countries accounted for 90% of the world production (table 7).

Minroc Mines Inc. (formerly Mineral Resources Corp.) completed its study of the Cassiar asbestos mine and plant in British Columbia. The mine has been closed since 1992, but Minroc planned to wet-process tailings that average 4.2% chrysotile. When fully completed, the anticipated production will be 50,000 metric tons per year (t/yr). Minroc also planned to bring an existing dry-processing facility back on-line, anticipating capacity to be 18,000 t/yr of long-fiber chrysotile when fully operational (Minroc Mines Inc., November 30, 1998, Chrysotile fibre production, accessed January 22, 1999, at URL http://www.minroc.com/prmain.htm).

In eastern Canada, the Government of Newfoundland and Labrador was accepting bids on the Baie Verte asbestos mine. The mine was operated by Teranov Mining Corp. until 1995 and consists of 9.5 Mt of in-ground reserves, 40 Mt of mill tailings, and the mill facility (North American Minerals News, 1998). JM Asbestos Inc. continued to develop its underground operation in Asbestos, Quebec. The underground mine, which will replace its open-pit operation, is scheduled to begin operation in 2000 (Engineering & Mining Journal, 1998).

In Zimbabwe, African Associated Mines planned to reduce its workforce at the Mashaba and Shabanie mines by more than 800 workers. The company cited rising production costs, poor prices, and reduced sales as the reasons for the layoff (Mining Journal,1998).

Outlook

Domestic markets for asbestos probably will continue to decline with friction products, gaskets, and roofing products being the only significant domestic markets for the foreseeable future. World markets for asbestos also have decreased because of bans imposed by several European countries and the economic slowdown in Southeast Asian countries where demand by the construction market dropped dramatically. World production of asbestos probably will continue to decline until the Southeast Asian economies improve.

References Cited

Engineering & Mining Journal, 1998, Engineering and mining project survey: Engineering & Mining Journal, v. 199, no. 1, January, p. 19.

Industrial Minerals, 1998, Prices: Industrial Minerals, no. 375, December, p. 78.

Mining Journal, 1998, Shabanie lay-offs: Mining Journal, v. 330, no. 8464, January 23, p. 59

North American Minerals News, 1998, Offers invited for Baie Verte asbestos: North American Minerals News, no. 35, April, p. 4.

U.S. Department of Labor, Occupational Safety and Health Administration, 1998a, Construction and shipyard asbestos standards: Federal Register, v. 63, no. 124, June 29, p. 35137-35138.

———1998b, Respiratory protection: Federal Register, v. 63, no. 5, January 8, p. 1251-1300.

SOURCES OF INFORMATION

U.S. Geological Survey Publications

Asbestos. Ch. in Mineral Commodity Summaries, annual.[1]

Asbestos. Ch. in United States mineral resources, U.S. Geological Survey Professional Paper 820, 1973.

Other

Asbestos. Ch. in Mineral facts and problems, U.S. Bureau of Mines Bulletin 675, 1985.

Asbestos Information Association/North America.

The Asbestos Institute.

Asbestos Cement Product Producers Association.

Industrial Minerals.

Mining Engineering.

[1]Prior to January 1996, published by the U.S. Bureau of Mines.

Published by AsbestosClaims.Law

asbestosclaims.law/library/11033/2

TABLE 1
SALIENT ASBESTOS STATISTICS 1/

(Metric tons, unless otherwise specified)

		1994	1995	1996	1997	1998
United States:						
Production (sales):						
Quantity		10,100	9,290	9,550	6,890	5,760
Value 2/	thousands	$5,120	W	W	W	W
Exports and reexports (unmanufactured): 3/						
Value	thousands	$6,550	$6,010	$5,310	$5,690	$6,410
Exports and reexports of asbestos products:						
Value	thousands	$177,000	$180,000	$163,000	$197,000	$194,000
Imports for consumption (unmanufactured): 4/						
Quantity		25,800	21,900	21,600	20,900	15,800
Value	thousands	$5,390	$4,810	$4,880	$4,660	$3,240
Consumption, apparent 5/		26,800	22,000	21,700	21,000	15,800
World: Production		2,250,000 r/	2,180,000 r/	2,120,000 r/	2,060,000 r/	1,840,000

r/ Revised. W Withheld to avoid disclosing company proprietary data.
1/ Data are rounded to three significant digits.
2/ F.o.b. mine.
3/ F.a.s. value; includes exports of crudes, fibers, stucco, sand, and refuse. May also include nonasbestos materials.
4/ U.S. Customs declared value.
5/ Production, plus imports, minus producer exports of asbestos fiber, plus adjustments in Government and industry stocks.

TABLE 2
U.S. ASBESTOS CONSUMPTION BY END USE, GRADE, AND TYPE 1/ 2/

(Metric tons)

	Chrysotile							
End use	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Total	Crocidolite 3/	Total asbestos
1997	68	78	884	314	19,400	20,800	238	21,000
1998:								
Coatings and compounds	--	--	--	--	266	266	--	266
Friction products	--	--	297	184	2,640	3,130	--	3,130
Gaskets	--	1	187	53	1,730	1,970	--	1,970
Paper	--	--	--	--	789	789	--	789
Plastics	30	1	--	--	--	31	--	31
Roofing products	--	4	--	--	8,800	8,800	--	8,800
Other	48	114	236	--	218	616	228	844
Total	78	120	720	237	14,400	15,600	228	15,800

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Estimated distribution based upon data provided by the Asbestos Institute, Montreal, Canada, and the U.S. Geological Survey asbestos producer survey.
3/ May include imports of chrysotile. Estimated consumption of crocidolite was less than 5 tons.

TABLE 3
CUSTOMS UNIT VALUE OF IMPORTED ASBESTOS

(Dollars per metric ton)

	1997	1998
Canada:		
Chrysotile:		
Crude	165	147
Spinning	182	107
Other	202	207
South Africa: Crocidolite 1/	303	247

1/ May include imports of chrysotile.

Source: Bureau of the Census.

TABLE 4
U.S. EXPORTS AND REEXPORTS OF ASBESTOS FIBERS AND PRODUCTS 1/ 2/

(Thousand dollars)

Country	1997			1998		
	Unmanufactured fiber 3/	Manufactured products 4/	Total	Unmanufactured fiber 3/	Manufactured products 4/	Total
Australia	52	1,670	1,720	55	1,540	1,590
Brazil	156	719	875	44	915	959
Canada	22	125,000	125,000	15	106,000	106,000
Germany	--	3,270	3,270	--	4,740	4,740
Japan	2,660	6,030	8,690	2,200	5,710	7,910
Korea, Republic of	158	1,220	1,370	76	577	653
Kuwait	--	334	334	--	625	625
Mexico	2,060	21,900	24,000	3,770	33,000	36,800
Saudi Arabia	--	1,160	1,160	--	3,780	3,780
Thailand	9	381	390	--	33	33
Turkey	--	212	212	--	4	4
United Kingdom	--	5,600	5,600	--	5,600	5,600
Venezuela	--	1,970	1,970	--	2,600	2,600
Other	570	27,300	27,900	243	28,600	28,900
Total	5,690	197,000	203,000	6,410	194,000	201,000

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ F.a.s. value.
3/ Includes exports of crudes, fibers, stucco, sand, and refuse. May also include nonasbestos materials.
4/ Also includes products manufactured using asbestos substitutes.

Source: Bureau of the Census.

TABLE 5
U.S. EXPORTS AND REEXPORTS OF ASBESTOS AND ASBESTOS PRODUCTS 1/

	1997		1998	
	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)
Unmanufactured, asbestos 3/	20,300	$5,690	18,100	$6,410
Manufactured:				
Asbestos fibers	NA	1,040	NA	1,320
Brake linings and disk brake pads 4/	NA	165,000	NA	165,000
Clutch facings and linings 5/	NA	11,800	NA	12,900
Clothing, cord, fabric, yarn	NA	1,920	NA	1,610
Gaskets, packing and seals	NA	3,590	NA	2,540
Panel, sheet, tile, tube 6/	NA	6,430	NA	4,790
Paper and millboard	NA	1,030	NA	718
Other articles 7/	NA	6,050	NA	5,070
Total	XX	197,000	XX	194,000

NA Not available. XX Not applicable.
1/ Data are rounded to three significant digits; may not add to totals shown.
2/ F.a.s. value.
3/ Includes crudes, fibers, stucco, sand, and refuse. May also include nonasbestos materials.
4/ Includes asbestos and cellulose fiber brakes and similar materials.
5/ Includes clutches and other friction materials, excluding brakes and brake pads.
6/ Includes asbestos cement and cellulose fiber cement products.
7/ Includes asbestos and cellulose fiber products.

Source: Bureau of the Census.

Published by AsbestosClaims.Law
asbestosclaims.law/library/11033/4

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF ASBESTOS FIBERS, BY TYPE, ORIGIN, AND VALUE 1/ 2/

Type	Canada		South Africa		Other		Total	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
1997:								
Chrysotile:								
Crude	1,590	$263	--	--	--	--	1,590	$263
Spinning fibers	80	15	--	--	--	--	80	15
All other	18,100	3,630	14	$32	249	$491	18,300	4,150
Crocidolite (blue) 3/	238	72	--	--	--	--	238	72
Other (unspecified asbestos type)	692	159	--	--	--	--	692	159
Total	20,700	4,140	14	32	249	491	20,900	4,660
1998:								
Chrysotile:								
Crude	2,980	438	--	--	--	--	2,980	438
Spinning fibers	112	12	--	--	--	--	112	12
All other	11,300	2,080	10	33	109	255	11,500	2,370
Crocidolite (blue) 3/	228	56	--	--	--	--	228	56
Other (unspecified asbestos type)	1,050	366	--	--	--	--	1,050	366
Total	15,700	2,950	10	33	109	255	15,800	3,240

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ U.S. Customs declared value.
3/ Reported by the Bureau of the Census. Its source suggests the imports labeled as crocidolite probably were a combination of chrysotile imports and transshipment of crocidolite through Canada.

Source: Bureau of the Census.

TABLE 7
ASBESTOS: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country 3/	1994	1995	1996	1997	1998 e/
Argentina	260	300 e/	446	400 e/	350
Bosnia and Herzegovina e/	300	--	--	--	--
Brazil	192,050	170,000	170,000 e/	170,000 e/	170,000
Bulgaria	500	100	400	300 r/	300
Canada	531,000	515,587	521,000 e/	447,000	330,000
China e/	303,000	263,000	293,000 r/	245,000	250,000
Egypt	514 r/	427 r/	1,836 r/	2,000 r/ e/	2,000
Greece	55,502	76,003	80,213	80,000 e/	70,000
India	29,824	25,065	23,215	25,000 e/	24,000
Iran e/	4,500	4,500	4,500	4,500	4,500
Japan e/	21,000	20,000	18,000 r/	18,000 r/	18,000
Kazakstan	130,000 e/	128,400	128,700	125,000 e/	125,000
Russia e/	700,000 r/	680,000 r/	615,000 r/	710,000 r/	650,000
Serbia and Montenegro	498	497	509 r/	360 r/	550
South Africa	92,130	88,642	57,120	49,986 r/	20,000
Swaziland	26,720	28,570	26,041	25,888	28,000
United States (sold or used by producers)	10,100	9,290	9,550	6,890	5,760 4/
Zimbabwe	151,905	169,256	165,494	145,000 r/	140,000
Total	2,250,000 r/	2,180,000 r/	2,120,000 r/	2,060,000 r/	1,840,000

e/ Estimated. r/ Revised.
1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.
2/ Marketable fiber production. Table includes data available through April 8, 1999.
3/ In addition to the countries listed, Afghanistan, North Korea, Romania, and Slovakia also produce asbestos, but output is not officially reported, and available general information is inadequate for the formulation of reliable estimates of output levels.
4/ Reported figure.

Published by AsbestosClaims.Law
asbestosclaims.law/library/11033/5