ASBESTOS

By Robert L. Virta

Domestic survey data and tables were prepared by Shantae F. Hawkins, statistical assistant, and the world production table was prepared by Regina R. Coleman, international data coordinator.

Asbestos is a generic name for six fibrous minerals that have been used in commercial products. The six types of asbestos are chrysotile, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, and actinolite asbestos. Several 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. Nearly all of the asbestos produced worldwide is chrysotile.

Legislation and Government Programs

The Occupational Safety and Health Administration (OSHA) solicited public comments on its information-collection requirements under its asbestos in general, shipyards, and construction standards. At issue are the quality of the information, ways to minimize the burden on employers, and whether or not the information collection is necessary and the burden has been correctly estimated (U.S. Department of Labor, 2000a, b, c).

The Environmental Protection Agency (EPA) increased coverage of State and local government employees under its asbestos worker protection rule (WPR) by incorporating OSHA's asbestos standards into the WPR. State and local government employees performing construction work, custodial work, and automotive brake and clutch repair work now are covered to the same extent as private sector workers. The WPR is cross-referenced to the OSHA asbestos standards for construction and for general industry so future amendments to the OSHA rules will also amend the WPR. Also, EPA's asbestos-in-schools rule was amended so that employees of local public education agencies who perform operations, maintenance, and repair activities under the asbestos-in-schools rule now are covered under the WPR (U.S. Environmental Protection Agency, 2000).

The EPA continued to test for the presence of asbestos in and around a vermiculite mine in Libby, MT. The agency has sampled indoor air, soil, dust, and insulation for asbestos. It began conducting more extensive sampling in March 2001. The agency also has completed some preliminary health studies on local residents and former workers at the vermiculite operation (U.S. Environmental Protection Agency, February 22, 2001, Libby Community Advisory Group, accessed March 8, 2001, at URL http://www.epa.gov/region8/superfund/libby/cag2-22.html#drl).

Following the controversy over Libby, MT, the Mine Safety and Health Administration inspected Virginia Vermiculite Co.'s mine in Virginia to determine asbestos levels. Air monitoring was conducted, and asbestos was not detected using the required sampling and analysis protocol. There remains a controversy, however, over how the samples were analyzed and

Asbestos in the 20th Century

Prior to 1900, U.S. demand for asbestos was less than 10,000 metric tons per year because technological development had not yet created large markets for asbestos. In 1900, though, U.S. demand had reached 20,000 tons and was growing. The expanding automotive and building industries provided ready markets for asbestos in the early 1900s. Demand for such items as asbestos brake shoes and clutches, asbestos-cement products, asbestos flooring, asbestos packings and gaskets, and asbestos thermal and electrical insulation grew rapidly. By 1950, 660,000 tons of asbestos was used by domestic manufacturers, making the United States the largest user of asbestos in the world. With the expansion of the economy after World War II, demand for asbestos continued to increase, reaching 801,000 tons by 1973.

In 2000, U.S. demand for asbestos returned to levels achieved in the late 1800s, about 14,600 tons or only 1.8% of the 1973 demand. The collapse in U.S. markets for asbestos began in the early 1970s in response to health and liability issues. First, it became well established that excess exposures to asbestos could result in the development of asbestosis and lung cancer, prompting the filing of large class-action suits against mining companies and manufacturers of asbestos products on behalf of workers suffering from these diseases. Second, strong public opposition to the use of asbestos began to affect sales of asbestos products and influence legislation dealing with asbestos. As a result, U.S. demand for asbestos plummeted as manufacturers either ceased production of asbestos-containing products, began using asbestos substitutes, or replaced asbestos-containing products with ones that did not contain asbestos. Asbestos markets, which took more than 100 years to peak, completely reversed themselves in less than 25 years. The decline in demand resulted in major shifts in the use of asbestos. The major uses for asbestos in 2000 were roofing products, gaskets, and frictions products, with 62%, 21%, and 12% of the market, respectively compared with 1973 when major markets were asbestos-cement pipe (24%), flooring (22%), roofing (9%), friction products (brakes and clutches) (8%), and packing and gaskets (3%).

Minerals Yearbook: Asbestos Chapters, 2000
ACL Doc 11035 · Page 1 of 6
Published by AsbestosClaims.Law
asbestosclaims.law/library/11035/1

whether the current methodology and exposure levels adequately protect the workers from exposure to asbestos (Industrial Minerals, 2000d; North American Minerals News, 2000b).

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 minimal. The U.S. Department of Defense disposed of alls of the strategic- and nonstrategic-grade amosite, chrysotile, and crocidolite from the national defense stockpile in 2000.

Production

KCAC Inc. in San Benito County, CA, was the only company mining asbestos in the United States in 2000. The company mined a highly sheared serpentinite containing matted, short-fiber chrysotile and unfractured serpentinite (also called a mass-fiber deposit). Domestic production (sales) decreased by 27% to 5,260 metric tons (t) in 2000 from 7,190 t in 1999 (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 was 14,600 t, 8% less than that of 1999. The three leading domestic markets were roofing products, gaskets, and friction products, with 62%, 22%, and 12%, respectively, of the asbestos market. Essentially all of the asbestos used in manufacturing in the United States was chrysotile; 94% was grade 7, followed by grades 6, 5, 4, and 3, in decreasing order of consumption. A few tons of crocidolite may still be used for specialized applications, but this cannot be verified (table 2).

Prices

The average unit value of domestically produced asbestos increased from that of 1999. The average U.S. customs unit value for imported crude chrysotile decreased by 14% to $118 per metric ton in 2000. The average unit value for imports of spinning-grade chrysotile was $1,470 per ton, a 13% increase from that of 1999. Low-tonnage, high-value imports from South Africa and Zimbabwe caused the increase in the unit value. The unit value of the other grades of chrysotile decreased by 2% to $163 per ton in 2000. Imports of chrysotile from South Africa and Zimbabwe had the highest unit values. The average unit value of chrysotile imported from South Africa was $1,930 per ton and from Zimbabwe was $2,050 per ton (table 6).

The U.S. customs unit value for the crude and spinning grades of chrysotile fiber from Canada were $118 and $184 per ton, respectively (tables 3 and 6). Imports of "Other, chrysotile" from Canada were valued at $159 per ton (tables 3 and 6). Crocidolite imports reported by the U.S. Census Bureau were valued at $108 per ton (see discussion under Foreign Trade concerning crocidolite imports).

Prices ranged from $135 to $1,168 per ton for Canadian chrysotile and $200 to $440 per ton for South African chrysotile, depending on the grade (Industrial Minerals, 2000b). 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

The export free alongside ship (f.a.s.) value of asbestos fibers and products containing asbestos or asbestos substitutes increased by 21% to $296 million in 2000 from $245 million in 1999. Exports of brake linings, pads, and mounted brake linings accounted for most of this increase.

Mexico and Japan were the leading importers of asbestos fiber from the United States. Canada was the leading importer of U.S. products manufactured using asbestos or asbestos substitutes, followed by Germany, Mexico, Japan, and the United Kingdom (table 4). These five countries accounted for 81% of the value of asbestos products exported from the United States.

Exports and reexports of brake linings, disk pads, and mounted brake linings accounted for 87% of the value of all manufactured asbestos products (table 5). Products in these categories composed 94% of the value of goods manufactured using asbestos and asbestos substitutes that were exported to Canada, 95% of that exported to Mexico, 99% of that exported to Germany, and 91% of that exported to Japan.

In 2000, approximately 18,800 t of asbestos was exported, according to the U.S. Census Bureau. The exports included asbestos crudes, fiber, sand, refuse, and stucco. Exports of domestic origin were estimated to be approximately 5,000 t. Reexports of Canadian fiber accounted for the bulk of the remaining exports (mainly through New York), although some manufactured products and nonasbestos mineral exports may have been included in the 18,800 t.

In 2000, Canada supplied 99% of the asbestos imported by the United States. Imports also were reported from South Africa (53 t) and Zimbabwe (54 t) (table 6). The U.S. Census Bureau reported 67 t of crocidolite imported in 2000. Based on its unit value and country of origin (Canada), it is likely that the asbestos was chrysotile rather than crocidolite. Chrysotile composed more than 99% of the asbestos imported into the United States in 2000.

The United States also imported $166 million of asbestos products. This includes approximately 51,500 t valued at $26.3 million of asbestos- and cellulose-fiber cement products (A/C), including panels, pipe, and tile. The bulk of the A/C products was imported in the form of flat sheets and panels (92%), followed by corrugated sheet (3%), pipe (1%), and other (4%).

World Review

World production of asbestos was estimated to be 1.9 million metric tons. Russia continued to be the leading producer of asbestos, followed by Canada, China, Brazil, Kazakhstan, and

Minerals Yearbook: Asbestos Chapters, 2000 Published by AsbestosClaims.Law
ACL Doc 11035 · Page 2 of 6 asbestosclaims.law/library/11035/2

Zimbabwe. These countries accounted for 93% of the world production (table 7).

The controversy over the use of asbestos continued to be the focus of attention worldwide. Bans have already been enacted in many European countries. In 2000, Saõ Paulo became another of several Brazilian cities that enacted an asbestos ban. Chile began drafting legislation to ban the use of asbestos, with certain exceptions. This was subsequently enacted in 2001 (International Ban Initiative Secretariat, February 15, 2001, Chile bans asbestos, accessed March 27, 2001, at URL http://www.btinternet.com/~ibas/Frames/F_LKA_Chile_Ban.htm).

Canada.—Production of chrysotile from the Cassiar Magnesium Inc. operation in British Columbia, which began in January 2000, has been suspended following a fire in the mill facility. Damage is being evaluated but a date for resuming operations has not been set. The company marketed its chrysotile internationally with customers in Dubai, India, Indonesia, Iran, Japan, Sri Lanka, and Thailand. Plans are in place for the installation of a wet-processing plant that would bring annual capacity to 50,000 metric tons per year (t/yr). Cassiar Magnesium is proceeding with its development of a facility to process serpentine tailings for magnesium. Metal production is not anticipated until 2003 or 2004 (North American Minerals News, 2000a; Canada NewsWire, December 27, 2000, Cassiar mill damaged by fire, accessed December 30, 2000, at URL http://www.newswire.ca/releases/December2000/27/c6332.html).

France.—The World Trade Organization (WTO) upheld France's decision to ban asbestos use. The ruling was based on WTO guidelines for health protection, which superseded its free trade rules. The Canadian Government announced that it will appeal the decision on grounds that the ban may not comply with trade agreements (Industrial Minerals, 2000a; Morrison and Williams, 2000).

Russia.—Uralasbest, the leading Russian asbestos producer, announced plans for installing a 50,000 t/yr magnesium plant at its operation in Sverdlovsk. The plant will cost $300 million and will process serpentine tailings from the asbestos operation. Uralasbest will use the technology developed by Solikamsk Magnesium Plant, a leading Russian magnesium producer. Solikamsk, which has been producing magnesium from carnallite, announced plans to use asbestos tailing from Uralasbest's Bazhenovskoye asbestos mine (Mining & Metals Report, 2000).

Uralasbest sought an exclusion from new import custom duties on asbestos from the Russian Parliament. The new rate will be 30% higher than previously. Uralasbest, which payed its wages in arrears and reduced its tax indebtedness in 1999, also faces opposition to the use of asbestos and erratic production resulting from power outages (Industrial Minerals, 2000c).

Outlook

Domestic markets for asbestos probably will remain unchanged or decline only slightly over the next few years. Friction products, gaskets, and roofing products will continue to be the only significant domestic markets of asbestos for the foreseeable future in the United States. The slow recovery of the Southeast Asian economies and continued efforts to ban asbestos use worldwide are likely to result in a slight downturn in sales worldwide.

References Cited

Industrial Minerals, 2000a, France's asbestos ban hits Canada: Industrial Minerals, no. 396, September, p. 90.

———2000b, Prices: Industrial Minerals, no. 399, December, p. 74.

———2000c, Uralasbest asks for freeze on asbestos export duty: Industrial Minerals, no. 393, June, p. 25.

———2000d, Virginia Vermiculite in the hot seat: Industrial Minerals, no. 398, November, p. 19-20.

Mining & Metals Report, 2000, Uralasbest to add magnesium plant: Mining & Metals Report, v. 9, no. 15, April 7-13, p. 11.

Morrison, Scott, and Williams, Frances, 2000, Canada to appeal against WTO ruling on asbestos: Financial Times, September 19, p. 5.

North American Minerals News, 2000a, Cassiar changes name to reflect mag-metal business: North American Minerals News, no. 61, June, p. 6.

———2000b, Virginia Vermiculite anger over MSHA scrutiny: North American Minerals News, no. 67, December, p. 3.

U.S. Department of Labor, 2000a, Asbestos in construction standard—Extension of the Office of Management and Budget's approval of information-collection (paperwork) requirements: Federal Register, v. 65, no. 211, October 31, p. 65010-65011.

———2000b, Asbestos in general industry standard—Extension of the Office of Management and Budget's approval of information-collection (paperwork) requirements: Federal Register, v. 65, no. 211, October 31, p. 65008-65009.

———2000c, Asbestos in shipyards standard—Extension of the Office of Management and Budget's approval of information-collection (paperwork) requirements: Federal Register, v. 65, no. 211, October 31, p. 65009-65010.

U.S. Environmental Protection Agency, 2000, Asbestos worker protection: Federal Register, v. 65, no. 221, November 15, p. 69209-69217.

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Asbestos. Ch. in Mineral Commodity Summaries, annual.
Asbestos. Ch. in United States Mineral Resources, Professional Paper 820, 1973.

Other

Asbestos. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.
Asbestos Cement Product Producers Association.
Asbestos Information Association/North America.
Mining Engineering.
The Asbestos Institute.

TABLE 1
SALIENT ASBESTOS STATISTICS 1/

(Metric tons, unless otherwise specified)

		1996	1997	1998	1999	2000
United States:						
Production (sales)		9,550	6,890	5,760	7,190	5,260
Exports and reexports: 2/						
Unmanufactured, value	thousands	$5,310	$5,690	$6,410	$7,960	$7,220
Asbestos products, value	do.	$163,000	$197,000	$194,000	$237,000	$288,000
Imports for consumption, unmanufactured:						
Quantity		21,600	20,900	15,800	15,800	14,600
Value 3/	thousands	$4,880	$4,660	$3,240	$3,150	$2,510
Consumption, apparent 4/		21,700	21,000	15,800	15,800	14,600
World production		2,100,000	2,110,000	1,810,000 r/	1,830,000 r/	1,900,000

r/ Revised.
1/ Data are rounded to no more than three significant digits.
2/ F.a.s. value; includes exports of crudes, fibers, stucco, sand, and refuse. May also include nonasbestos materials.
3/ U.S. Customs declared value.
4/ 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
1999	59	73	649	205	14,800	15,800	--	15,800
2000:								
Coatings and compounds	--	--	--	--	92	92	--	92
Friction products	--	82	58	25	1,520	1,680	--	1,680
Insulation, thermal	--	--	--	--	179	179	--	179
Gaskets	--	--	20	457	2,610	3,090	--	3,090
Plastics	--	1	--	--	--	1	--	1
Roofing products	--	--	--	--	9,070	9,070	--	9,070
Other	7	84	252	--	179	522	--	522
Total	7	167	330	482	13,700	14,600	--	14,600

-- Zero.
1/ Data are rounded to no more than 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)

	1999	2000
Canada:		
Chrysotile:		
Crude	149	118
Spinning	108 r/	184
Other	149 r/	159
South Africa: Crocidolite 1/	--	108

r/ Revised. -- Zero.
1/ May include imports of chrysotile.

Source: U.S. Census Bureau.

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

(Thousand dollars)

Country	1999			2000		
	Unmanufactured fiber 3/	Manufactured products 4/	Total	Unmanufactured fiber 3/	Manufactured products 4/	Total
Australia	--	1,960	2,020	56	1,180	1,240
Brazil	55	465	520	100	2,510	2,610
Canada	4	117,000	117,000	4	112,000	112,000
Germany	24	11,600	11,700	15	71,600	71,600
Japan	2,280	6,240	8,510	1,860	12,300	14,100
Korea, Republic of	127	1,520	1,650	302	1,100	1,400
Kuwait	3	398	401	--	313	313
Mexico	5,070	60,100	65,200	4,650	32,900	37,500
Saudi Arabia	--	1,680	1,680	--	2,020	2,020
Thailand	108	12	119	4	8	12
Turkey	--	7	7	--	51	51
United Kingdom	4	4,810	4,820	3	5,780	5,780
Venezuela	--	2,770	2,770	--	2,660	2,660
Other	222	29,100	29,300	234	44,300	44,500
Total	7,960	237,000	246,000	7,220	288,000	296,000

-- Zero.
1/ Data are rounded to no more than 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: U.S. Census Bureau.

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

	1999		2000	
	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)
Unmanufactured, asbestos 3/	21,700	$7,960	18,800	$7,220
Manufactured:				
Asbestos fibers	NA	2,310	NA	2,820
Brake linings and disk brake pads 4/	NA	192,000	NA	250,000
Clutch facings and linings 5/	NA	22,200	NA	9,540
Clothing, cord, fabric, yarn	NA	1,270	NA	2,300
Gaskets, packing and seals	NA	2,650	NA	2,470
Panel, sheet, tile, tube 6/	NA	9,790	NA	14,000
Paper and millboard	NA	1,410	NA	1,150
Other articles 7/	NA	5,800	NA	6,320
Total	NA	237,000	NA	288,000

NA Not available.
1/ Data are rounded to no more than 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: U.S. Census Bureau.

Published by AsbestosClaims.Law
asbestosclaims.law/library/11035/5

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

Type	Canada		South Africa		Other		Total	
	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)
1999:								
Chrysotile:								
Crude	2,350	$350	--	--	--	--	2,350	$350
Spinning fibers	65	7	284	$421	42	$82	391	510
All other	11,200	1,670	9	32	80	156	11,200	1,860
Other (unspecified asbestos type)	769	303	--	--	1,060	130	1,820	434
Total	14,300	2,330	293	453	1,180	368	15,800	3,150
2000:								
Chrysotile:								
Crude	3,350	394	--	--	--	--	3,350	394
Spinning fibers	31	6	53	102	38	71	122	179
All other	10,500	1,670	--	--	16	40	10,500	1,710
Crocidolite (blue) 3/	67	7	--	--	--	--	67	7
Other (unspecified asbestos type)	581	217	--	--	--	--	581	217
Total	14,500	2,300	53	102	54	111	14,600	2,510

-- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ U.S. customs declared value.
3/ Reported by the U.S. Census Bureau. Its source suggests the imports labeled as crocidolite probably were a combination of chrysotile imports and transshipments of crocidolite through Canada.

Source: U.S. Census Bureau.

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

(Metric tons)

Country 3/	1996	1997	1998	1999	2000 e/
Argentina e/	446 4/	400	380	350	350
Brazil e/	170,000	170,000	170,000	170,000	170,000
Bulgaria	400	300	300 e/	350 e/	350
Canada	506,000	455,000	309,000	337,366	340,000
China e/	293,000	288,000	314,000	247,000 r/	260,000
Egypt e/	1,836 4/	2,000	2,000	2,000	2,000
Greece e/	80,213 4/	80,000	70,000	60,000	50,000
India	23,215	25,051	18,751	20,000 e/	21,000
Iran e/	4,500	4,300 r/	2,258 r/ 4/	2,000 r/	2,000
Japan e/	18,000	18,000	18,000	18,000	18,000
Kazakhstan e/	128,700 4/	125,000	125,000	125,000	125,000
Russia e/	615,000	710,000	600,000	675,000 r/ 4/	750,000
Serbia and Montenegro	509	360	633 r/	361 r/	550
South Africa	57,120	49,986	27,195	18,700 r/ e/	18,909 4/
Swaziland	26,014	25,888	27,693	28,000 e/	25,000
United States (sold or used by producers)	9,550	6,890	5,760	7,190	5,260 4/
Zimbabwe	165,494	144,959	123,295	115,000 r/	110,000
Total	2,100,000	2,110,000	1,810,000 r/	1,830,000 r/	1,900,000

e/ Estimated. r/ Revised.
1/ World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.
2/ Marketable fiber production. Table includes data available through April 6, 2001.
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.