ASBESTOS

By Robert L. Virta

Asbestos is a generic name given to six fibrous minerals that have been used widely in commercial products. The six types of asbestos are chrysotile, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, and actinolite asbestos. The most widely used variety is chrysotile. 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 issued a notice amending its asbestos standard covering general industry, construction, and the shipyard industry. The notice provided corrections and clarifications concerning respirator use, signs, training, medical surveillance, and limitations for Class III and Class IV work (U.S. Department of Labor, 1996).

A variety of asbestos-containing civilian products are used by the military. Examples include friction materials (brakes and clutches), gaskets, packings, asbestos-reinforced plastics, and roofing products for use on military vehicles, ships, rockets, missiles, and in military construction. Strategic-grade asbestos is not required in the manufacture of these products and classified applications which use strategic-grade asbestos are believed to be minimal. Consequently, the Department of Defense authorized the disposal of 9,767 metric tons of strategic- and nonstrategic-grade chrysotile; 30,849 tons of amosite; and 33 tons of crocidolite from the National Defense Stockpile.

Production

Chrysotile was the only variety of asbestos produced in the United States. It was mined in the United States by one company, KCAC Inc., in San Benito County, CA. KCAC operated a mine in a highly sheared serpentinite composed of matted, short fiber chrysotile and unfractured serpentinite (also called a mass fiber deposit). The ore was stripped and wet processing was used to beneficiate the fiber. Domestic production (sales) increased slightly to 9,550 tons. *(See 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 remained essentially unchanged at 21,700 tons in 1996. The three leading domestic markets were friction products, packings, and roofing products with 33%, 12%, and 50% of the asbestos market, respectively.

More than 99% of the asbestos consumed domestically was chrysotile. The remainder was crocidolite. Ninety-four percent of the chrysotile consumed in the United States was grade 7, followed by grades 5, 6, 4, and 3. *(See table 2.)* Markets for crocidolite were very limited and consumption was estimated to be less than 5 tons despite reported imports of 197 tons.

Prices

The average unit value of domestically produced asbestos decreased slightly from that of 1995. Unit values for all varieties of imported asbestos ranged from $147 per ton to $2,274 per ton and averaged $226 per ton. Unit values for all varieties of exported asbestos ranged from $173 per ton to $4,883 per ton and averaged $345 per ton.

The customs unit value for imported chrysotile ranged from $147 per ton to $2,274 per ton. The average unit value for imported crude chrysotile was $1,717 per ton. The average unit values for spinning grade chrysotile and other chrysotile types were $277 per ton and $219 per ton, respectively. Higher unit values for chrysotile imports were associated with shipments of only a few tons or shipments of long-fiber chrysotile from Zimbabwe. The average unit value for imported crocidolite was reported to be $186 per ton. *(See table 3.)*

Approximate equivalents, in dollars per metric ton, of prices for Canadian chrysotile, f.o.b. mine, ranged between $315 per ton and $2,705 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, 1996b). 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 value of asbestos fibers and asbestos products exported and reexported decreased 10% in 1996. Japan was the largest importer of unmanufactured asbestos fiber. Canada was the largest importer of unmanufactured fibers and manufactured products from the United States, followed by Mexico, and Japan. *(See table 4.)* The only increases in export value were observed for the manufactured asbestos fiber products and the clutch facings and linings categories. Exports and reexports of brake linings and disk pads accounted for 80% of the value of all manufactured asbestos products. *(See table 5.)*

Approximately 15,400 tons of asbestos were exported in 1996. The exports included asbestos crudes, fiber, stucco, sand,

Minerals Yearbook: Asbestos Chapters, 1996
ACL Doc 11031 · Page 1 of 5
Published by AsbestosClaims.Law
asbestosclaims.law/library/11031/1

and refuse. It is likely that some manufactured asbestos products, nonasbestos fiber, and/or nonasbestos mineral exports also were included in the export total. Exports of processed asbestos fiber (excluding stucco, sand, etc.) were estimated to be less than 10,000 tons in 1996.

Canada supplied nearly all of the asbestos imported by the United States. Most of this asbestos fiber was chrysotile. *(See table 6.)* Approximately 197 tons of asbestos imports were reported as crocidolite in 1996. Based on the lack of any significant markets in the United States, most of the imports reported as crocidolite probably were chrysotile. Although Canada was listed as the source of crocidolite imports, the crocidolite was mined in South Africa and transshipped through Canada.

World Review

World production of asbestos was estimated to be 2.29 million tons. Russia continued to be the largest producer of asbestos, followed by Canada, China, Kazakstan, Brazil, and Zimbabwe. These countries accounted for 90% of the world production. *(See table 7.)* Turner and Newell PLC sold its share of its asbestos mines and mills in Zambia and Zimbabwe to Africa Resources. Africa Resources was established by Zimbabwean industrialists (Industrial Minerals, 1996c). The French Government issued a ban on the use of asbestos. The ban went into effect January 1, 1997 (Industrial Minerals, 1996a). In 1994, MDS of Germany agreed to invest $4.1 million in money or equipment in JSC Uralasbest in return for the right to purchase 15% of JSC Uralasbest. MDS, however, did not meet the terms of the agreement so an arbitration court decided that the 15% share of JSC Uralasbest would revert back to state ownership (Industrial Minerals in the CIS, 1996). JM Asbestos Inc. began development of an asbestos mine in Quebec. The mine will have an annual capacity of 250,000 tons. Partners in the development are Groupe Minier Asbestos-Estrie, an employees' cooperative, and Capital d'Amerique (North American Minerals News, 1996).

Outlook

Domestic asbestos consumption will decrease in response to opposition to its use in consumer goods and building products. The decrease should be much smaller than in previous years based on the large amount of substitution for asbestos that has already taken place within the U.S. manufacturing sector. A similar trend is expected to be followed for world production. Besides the health and environmental issues, economic problems have hampered production within the former Soviet Union, the leading producer of asbestos. Declines in world production of 4% to 7% per year can be expected based on the performance of the industry over the past 3 years.

References Cited

Industrial Minerals, 1996a, France bans asbestos: Quebec producers nervous: Industrial Minerals, no. 347, p. 13.

———1996b, Prices: Industrial Minerals, no. 351, p. 72.

———1996c, T&N dusts off last links with asbestos: Industrial Minerals, no. 343, p. 22.

Industrial Minerals in the CIS, 1996, Asbestos: Industrial Minerals in the CIS, no. 2, p. 12.

North American Minerals News, 1996, New asbestos mine in Quebec: North American Minerals News, no. 19, p. 3.

U.S. Department of Labor, Occupational Safety and Health Administration, 1996. Occupational exposure to asbestos, tremolite, anthophyllite and actinolite: Federal Register, v. 61, no. 165, August 23, 1996, p. 43454-43459.

SOURCES OF INFORMATION

USGS Publications

Asbestos. Ch. in Mineral Commodity Summaries, annual.

Asbestos. Ch. in Mineral Facts and Problems, 1985, U.S. Bureau of Mines Bulletin 675.

Asbestos. Ch. in United States Mineral Resources, U.S. Geological Survey Professional Paper 820.

Other

Asbestos Information Association/North America.

The Asbestos Institute.

Asbestos Cement Pipe Producers Association.

Published by AsbestosClaims.Law

asbestosclaims.law/library/11031/2

TABLE 1
SALIENT ASBESTOS STATISTICS 1/

(Metric tons unless otherwise specified)

		1992	1993	1994	1995	1996
United States:						
Production (sales):						
Quantity		15,600	13,700	10,100	9,290	9,550
Value 2/	thousands	$6,140	$5,960	$5,120	W	W
Exports and reexports 3/ (unmanufactured):						
Value	thousands	$6,720	$8,440	$6,550	$6,010	$5,310
Exports and reexports of asbestos products:						
Value	thousands	$134,000	$141,000	$177,000	$180,000	$163,000
Imports for consumption 4/ (unmanufactured):						
Quantity		31,600	30,800	25,800	21,900	21,600
Value	thousands	$7,210	$6,960	$5,390	$4,810	$4,880
Consumption, apparent 5/		32,800	31,600	26,800	22,000	21,700
World: Production		3,350,000 r/	2,710,000 r/	2,510,000 r/	2,420,000 r/	2,290,000 e/

e/ Estimated. 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
1995	71	294	542	364	20,400	21,600	192	22,000 4/
1996:								
Coatings and compounds	--	--	--	--	245	245	--	245
Friction products	1	3	396	240	6,450	7,090	--	7,090
Packing	--	4	105	70	2,380	2,560	--	2,560
Paper	--	--	--	--	136	136	--	136
Plastics	40	1	--	--	--	41	--	41
Roofing products	--	2	--	--	10,800	10,800	--	10,800
Other	48	134	156	--	293	632	197	829
Total	89	145	657	310	20,300	21,500	197	21,700

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.
4/ Includes 162 tons for which the end use breakout is unknown.

TABLE 3
CUSTOMS UNIT VALUE OF IMPORTED ASBESTOS

(Dollars per metric ton)

	1995	1996
Canada:		
Chrysotile:		
Crude	232 r/	352
Spinning	235 r/	277
Other	203 r/	204
South Africa: Crocidolite 1/	196	186

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

Source: Bureau of the Census.

Published by AsbestosClaims.Law
asbestosclaims.law/library/11031/3

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

(Thousand dollars)

Country	1995			1996		
	Unmanufactured fiber 3/	Manufactured products 4/	Total	Unmanufactured fiber 3/	Manufactured products 4/	Total
Australia	23	1,300	1,320	25	2,100	2,130
Brazil	229	463	692	589	1,250	1,840
Canada	152	98,100	98,200	102	93,500	93,600
Germany	--	3,190	3,190	--	2,130	2,130
Japan	3,370	4,820	8,200	3,300	6,130	9,440
Korea, Republic of	212	4,050	4,260	116	1,290	1,400
Kuwait	--	78	78	--	395	395
Mexico	750	17,300	18,000	707	14,300	15,000
Saudi Arabia	--	1,370	1,370	--	1,180	1,180
Thailand	22	193	215	11	362	373
Turkey	--	257	257	--	504	504
United Kingdom	9	2,830	2,840	9	3,780	3,790
Venezuela	--	5,700	5,700	--	1,660	1,660
Other	1,240	40,100	41,400	454	34,200	34,700
Total	6,010	180,000	186,000	5,310	163,000	168,000

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/

	1995		1996	
	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)
Unmanufactured: Asbestos 3/	14,600	$6,010	15,400	$5,310
Manufactured:				
Asbestos fibers	NA	744	NA	905
Brake linings and disk brake pads 4/	NA	147,000	NA	130,000
Clutch facings and linings 5/	NA	8,450	NA	11,600
Clothing, cord, fabric, yarn	NA	1,520	NA	710
Gaskets, packing and seals	NA	3,870	NA	3,140
Panel, sheet, tile, tube 6/	NA	7,330	NA	6,840
Paper and millboard	NA	3,140	NA	2,620
Other articles 7/	NA	7,910	NA	7,120
Total	XX	180,000	XX	163,000

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/11031/4

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

Type	Canada		Other		Total	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
1995:						
Chrysotile:						
Crude	20	$5	75	$167	95	$172
Spinning fibers	430	101	41	116	471	217
All other	19,100	3,770	46	84	19,200	3,850
Crocidolite (blue) 3/	192	38	--	--	192	38
Other (unspecified asbestos type)	2,010	530	--	--	2,010	530
Total	21,800	4,440	162	367	21,900	4,810
1996:						
Chrysotile:						
Crude	9	3	97	179	106	182
Spinning fibers	266	74	--	--	266	74
All other	20,100	4,110	192	330	20,300	4,440
Crocidolite (blue) 3/	197	37	--	--	197	37
Other (unspecified asbestos type)	817	144	4	2	821	146
Total	21,400	4,370	293	511	21,600	4,880

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 and low value suggest the imports labeled as crocidolite were primarily chrysotile.

Source: Bureau of the Census.

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

(Metric tons)

Country 3/	1992	1993	1994	1995	1996 e/
Argentina	215	309	319 r/	250 r/	280
Bosnia and Herzegovina e/	500	500	300	--	--
Brazil	170,000	185,000	192,050	170,000 r/	170,000
Bulgaria e/	500 4/	500	500	500	500
Canada	590,641	522,967	531,000	515,587 r/	521,000
China e/	240,000	240,000	303,000 r/	263,000 r/	250,000
Colombia	7,900	--	--	--	--
Egypt	373	436	400 e/	400 e/	400
Greece	30,000 e/	50,000	50,000	75,000 e/	50,000
India	43,683	44,080	29,824 r/	24,984 r/	30,000
Iran e/	4,300	4,500	4,500	4,500	4,500
Japan e/	29,500	24,900	21,000	20,000	20,000
Kazakstan e/	400,000	325,000	300,000	250,000	225,000
Korea, Republic of	2,308	-- r/	-- r/	-- r/	--
Russia e/	1,500,000	1,000,000	800,000	800,000	720,000
Serbia and Montenegro	1,175	314	498	300 e/	300
South Africa	133,268	103,994	92,130	88,642 r/	90,000
Swaziland	32,301	33,860	26,720 r/	28,570 r/	29,000
United States (sold or used by producers)	15,600	13,700	10,100	9,290	9,550 4/
Zimbabwe	150,158	156,881	151,905	169,256 r/	165,000
Total	3,350,000	2,710,000	2,510,000 r/	2,420,000 r/	2,290,000

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 Apr. 8, 1997.
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/11031/5