Industry & Trade Summary

Cordage

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UNITED STATES INTERNATIONAL TRADE COMMISSION

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PREFACE

In 1991 the United States International Trade Commission initiated its current *Industry and Trade Summary* series of informational reports on the thousands of products imported into and exported from the United States. Each summary addresses a different commodity/industry area and contains information on product uses, U.S. and foreign producers, and customs treatment. Also included is an analysis of the basic factors affecting trends in consumption, production, and trade of the commodity, as well as those bearing on the competitiveness of U.S. industries in domestic and foreign markets.[1]

This report on cordage covers the period 1989 through 1993 and represents one of approximately 250 to 300 individual reports to be produced in this series during the first half of the 1990s. Listed below are the individual summary reports published to date on the chemicals and textiles sectors.

USITC publication number	*Publication date*	*Title*
Energy and Chemicals:		
2458	November 1991	Soaps, Detergents, and Surface-Active Agents
2509	May 1992	Inorganic Acids
2548	August 1992	Paints, Inks, and Related Items
2578	November 1992	Crude Petroleum
2588	December 1992	Major Primary Olefins
2590	February 1993	Polyethylene Resins in Primary Forms
2598	March 1993	Perfumes, Cosmetics, and Toiletries
2736	February 1994	Antibiotics
2739	February 1994	Pneumatic Tires and Tubes
2741	February 1994	Natural Rubber
2743	February 1994	Saturated Polyesters in Primary Forms
2747	March 1994	Fatty Chemicals
2750	March 1994	Pesticide Products and Formulations
2823	October 1994	Primary Aromatics
2826	November 1994	Polypropylene Resins in Primary Forms
Textiles and apparel:		
2543	August 1992	Nonwoven Fabrics
2580	December 1992	Gloves
2642	June 1993	Yarn
2695	November 1993	Carpets and Rugs
2702	November 1993	Fur Goods
2703	November 1993	Coated Fabrics
2735	February 1994	Knit Fabric
2841	December 1994	Cordage

[1] The information and analysis provided in this report are for the purpose of this report only. Nothing in this report should be construed to indicate how the Commission would find in an investigation conducted under statutory authority covering the same or similar subject matter.

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INTRODUCTION

Cordage is a general term for a wide range of products including rope, twine, cords, and cables of textile fibers. These products fall into three broad subgroups, twine, rope, and netting. Much of the discussion and analysis in this report will be based upon these three subgroups. Cordage, one of the oldest industrial products, has been used for thousands of years as an end product in tying, lifting, moving, and other applications, as well as an intermediate product for making such items as nets and netting. Today almost every industry and household in the United States uses some form of cordage.

Although the fundamental principles of making cordage have remained unchanged in recent decades, one of the major influences on the industry has been the development and use of manmade fibers for making cordage and cordage products. Today, manmade fibers are the primary fibers used in making cordage. Manmade fibers became a significant raw material in cordage products only about 30 years ago; prior to that time virtually all cordage was made from natural fibers. Also in recent years, the use of braided cordage has become more prevalent and is competing more with the traditional, less-expensive, cordage of twisted construction. In the past 5 years there have been several technical advancements in the raw materials used to manufacture cordage, with the increasing development and application of certain "high-tech" or high modulus textile fibers, such as Spectra[1] and aramid for certain cordage products.

The U.S. cordage industry is comprised of many small firms that produce a limited number of items and several large firms that make a wide range of goods. The large firms account for a disproportionate share of total production. Approximately three-fourths of the roughly 200 firms in the industry employ fewer than 20 workers each and account for less than 10 percent of total output. In contrast, 20 percent of the firms generate three-fourths of the output.

The United States is the largest consumer of cordage in the world. U.S. consumption totaled $632 million and U.S. shipments were valued at $559 million in 1993. U.S. imports totaled $123 million that year and accounted for 19 percent of U.S. consumption. Rope accounted for the largest share of the value of U.S. shipments during 1989-93, followed by twine and netting. Twine accounted for the greatest part of total cordage imports during the period. Netting accounted for the smallest share of U.S. shipments, exports, imports, and apparent consumption of cordage during 1989-93. However, of the three categories, imports of netting had the highest import-to-consumption ratio, amounting to 55 percent in 1993.

This report examines recent developments in the cordage industry, particularly developments during 1989-93. It describes the principal products in the domestic market and their production processes; the U.S. and foreign industries and recent developments therein; and the recent performance of the U.S. industry in both domestic and foreign markets and recent trends in U.S. trade in cordage.

THE PRODUCT

Generally, cordage is defined as the assemblage of textile fibers, filaments, strips (slit film,[2] both fibrillated[3] and nonfibrillated), or yarns, in approximately cylindrical form and of continuous length. It is used chiefly as an end product and includes such products as twine, rope, cable, and cords. For purposes of this report the traditional demarcation between twine and rope will be used. Therefore, all cordage that measures less than 4.88 mm (3/16 inch) in diameter will be considered twine and all cordage measuring 4.88 mm or more in diameter will be considered rope. Rope and twine are the largest segments of the U.S. cordage market, as shown in figure 1. Netting, which is made from yarn, twine, or rope, is also considered a cordage product and is an intermediate article in the construction of a net. All netting[4] and nets[5] (regardless of the end use) will be discussed as netting.

[1] Spectra, a high-density polyethylene fiber, is reportedly 10 times stronger than steel. The superior strength of Spectra relative to nylon, the strongest of the traditional manmade fibers used in cordage, allows the use of smaller size yarn or twine. However, the cost of Spectra is about 10 times greater than nylon. As a result, the use of Spectra in the production of cordage has been limited.

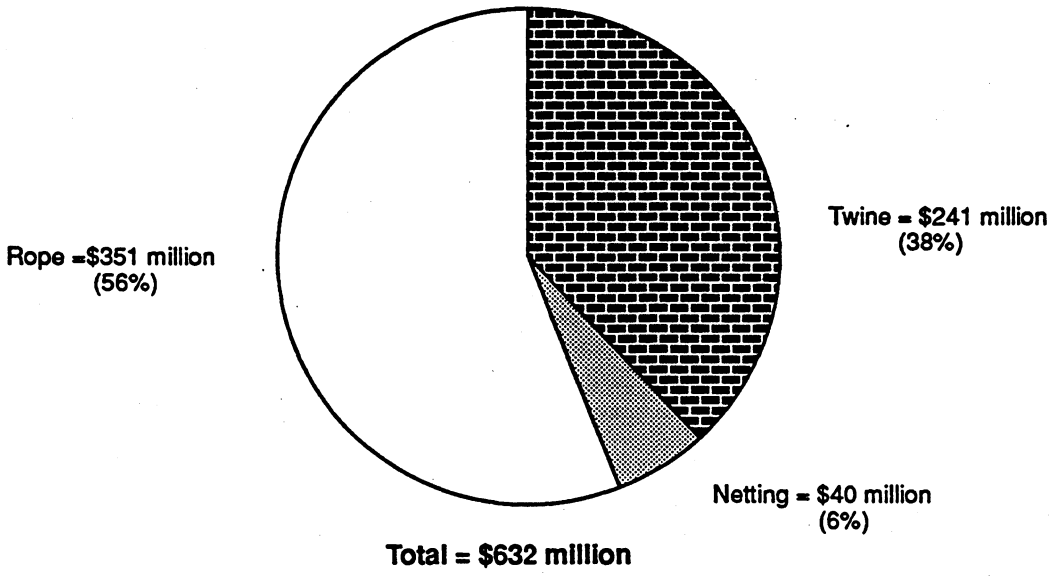
[2] Slit film, usually of polypropylene, is a less expensive raw material than manmade monofilament for manufacturing cordage. Rope made from film will usually hold a knot better than rope made of monofilament; however, monofilament rope is easier to splice.

[3] A fibrillated strip has been vertically slashed or cut to form fibers. For tariff purposes the term "of wide nonfibrillated strip" as applied to twine and rope means those products which contain more than 65 percent by weight of nonfibrillated polyethylene or polypropylene strip (whether folded, twisted, or crimped) measuring more than 25.4 mm (1 inch) in width in unfolded, untwisted, and uncrimped condition.

[4] Fish netting is by far the predominant type of netting consumed. Netting used for other purposes, such as sports, recreational, safety, construction, and industrial, accounts for a very small share of total U.S. consumption of netting. Netting that is used for other than commercial fishing purposes is often netting that is originally produced as fish netting or made to specifications of certain fish netting.

[5] Nets used for sports and recreational purposes such as soccer goal nets, tennis nets, fish landing nets, and similar nets are not covered in this summary. These items are included in HTS chapter 95 and will be discussed in another summary.

Figure 1
Cordage: U.S. consumption by type, 1993



Source: Estimated by the staff of the U.S. International Trade Commission.

Manmade fibers such as nylon, polypropylene, polyethylene, and polyester are the dominant raw materials used to produce cordage. Paper, silk, "high-tech" fibers (Spectra and aramid), and vegetable fibers such as cotton, jute, abaca (Manila hemp), sisal, henequen, flax, and coir, are also used but to a lesser extent. The industrialized countries use mostly manmade fibers to make cordage. Cordage of non-cotton natural fibers is generally made in the few countries where these fibers are grown, as discussed in the "foreign industry" section of this report.

All manufacturers of cordage products use the same basic production processes. The initial manufacturing stages for twine, rope, and netting are similar. However, the manufacture of rope and netting requires additional stages. The first step of cordage manufacturing consists of twisting or braiding fibers, yarns, strands,[6] or strips. Braiding requires more labor input and machine hours than twisting. As a result, braided cordage usually costs more than twisted cordage. Also, braided cordage generally has greater tensile strength and abrasion resistance and will hold a knot better and will not unravel as easily when scraped or chafed. To manufacture netting, numerous ends of twine or rope are fed simultaneously into a netting machine or loom,[7] which produces a predetermined number of meshes in its width of a particular size.

Cordage is often coated or treated to increase its properties. Coating with tar or asphalt will provide waterproofing, while treating with polyurethane will provide additional abrasion resistance. Cordage is made more durable when coated to prevent water penetration; this allows the product to maintain its maximum strength longer. Certain other treatments will serve as a lubricant for both the inside and surface of the product and improve abrasion resistance.

Although all cordage is sold by the pound, marketing and packaging methods vary. Twine is usually sold commercially in a five pound ball, whereas rope is sold on a reel or coil, usually in 1,800 foot lengths. Netting is shipped in bales, usually weighing from approximately 200 to 500 pounds each. Each bale will usually have a different weight because of the various types and sizes of netting ordered. Rope and twine are usually unbleached, but may be dyed or formed of different colored strands. Some rope

[6] Strands consist of twisted yarns, which in turn are twisted together in the opposite direction to form the cordage. Twine consists of one or more yarns twisted, wound, or braided to form a structure of continuous length. Twisted rope usually consists of three or more strands and braided rope generally consists of four or more strands in multiples of two.

[7] The United States and numerous other countries make most types of cordage manufacturing equipment, except for looms to make fish netting, which are made almost exclusively in Japan.

producers incorporate a "marker," or a yarn or strand of a different color in their rope for identification purposes. Most netting consumed in the United States is for the production of fishing nets. Fishing nets are usually made to order because their basic construction differs by species of fish and the location of the catch.[8]

Cordage products often derive their name or identity from their intended end use, as shown in table 1. Baler twine for the hay crop is the main use for twine. Most large-diameter ropes are for use in the commercial marine industry as tow and mooring lines. Smaller ropes (less than 1 inch in diameter) are usually for various niche markets such as water skiing and climbing.

U.S. INDUSTRY PROFILE

The U.S. cordage industry consists of establishments classified in Standard Industrial Classification (SIC) 2298, Cordage and Twine. These establishments account for virtually all U.S. cordage production. U.S. cordage production consists almost entirely of twine and rope; netting accounts for approximately 5 percent of total U.S. cordage production.

The U.S. cordage industry is considered to be a mature industry in terms of products and manufacturing processes and technologies. Although the industry is dominated by several large producers, most of the firms in the industry are small operations and serve niche markets. Product specialization is very high among the small producers. The industry is somewhat capital intensive, although the use of used machinery, especially by smaller firms, helps minimize capital outlays. There are few barriers to entry in the industry, given the ready access to production equipment and broad availability of raw materials. The production process for cordage poses few environmental risks and the industry's waste and scraps are often recycled.

Industry Structure

The domestic cordage industry consists of an estimated 200 manufacturers with a total workforce of 6,700 persons. Three-fourths of these companies employ fewer than 20 persons and sell less than $1 million worth of products annually. These small firms manufacture a limited number of product types and specifications and largely serve niche markets. The medium-size (20 to 49 employees) and large-size (50 employees or more) companies tend to offer a wider range of products geared to different markets. In 1992 the medium- and large-size companies accounted for about 90 percent of domestic output and the smaller companies generated less than 10 percent (figure 2). All but a small number of the firms in the industry produce twine and rope. Less than a dozen firms manufacture netting, with most producing netting for a particular geographic area or for catching a specific type of fish.

The larger manufacturers usually dominate or share a segment (e.g., agricultural, fishing, or marine) of the market. The small manufacturers often dominate or share an entire market niche (e.g., clothes lines, sash cords, or furniture and hammock twines). The medium-size manufacturers usually have characteristics of both the small and large manufacturers. The larger manufacturers usually market a complete line of products, producing those products in which they have a competitive advantage, as well as some items that are not as profitable, and purchasing other items from foreign or other domestic sources. The rope segment of the cordage industry varies greatly in size, output, and product diversity. According to one industry source, rope producers can be classified into one of three general categories based on annual sales: 1) over $25 million each (5 or 6 producers), 2) ranging between $5 to $10 million each (6 to 8 producers), and 3) less than $1 million each (more than 150 producers). The dozen large and medium-sized producers account for the majority of the industry's rope sales.

The twine segment of the cordage industry also includes many different producers, most of which are predominantly rope manufacturers. Two large producers dominate the U.S. twine segment, the output of which consists mostly of manmade-fiber agricultural twine. One of these producers is a large multinational oil firm that makes twine from internally produced filaments and yarns.

Most domestic cordage manufacturers are vertically integrated back to the yarn or resin stage, obtaining their raw materials from a variety of sources. Some also produce related downstream products that compete with their primary customers. Figure 3 illustrates the interrelationship of the cordage industry with its suppliers and customers.

Industry Trends

The number of companies in the U.S. cordage industry has increased over the past 2 decades, reflecting the entry of many new small firms that specialize in the production of a limited number of products. During the past 5 years, the number of firms has remained fairly stable, as new entries into the industry offset firms eliminated through mergers or acquisitions. Industry shipments and employment have declined in recent years. Between 1989 and 1993,

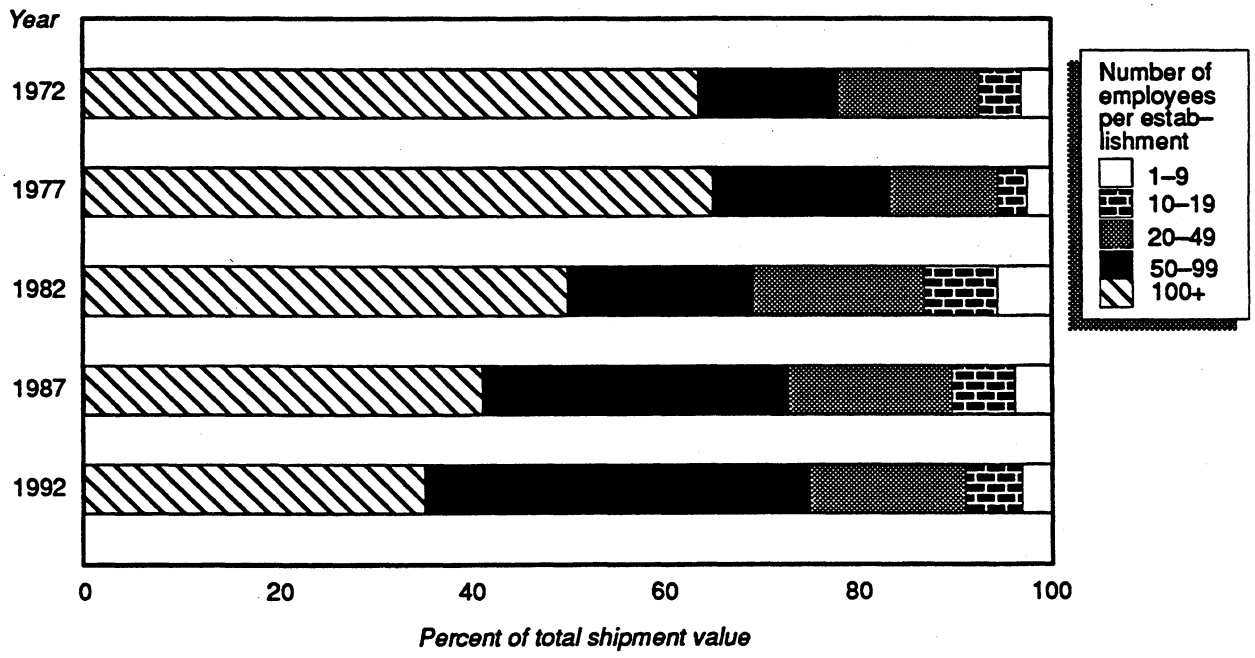
[8] Specifications for fishing nets are often set by State governments in an effort to regulate the catch of fish in inland waters and waters up to 3 miles off the U.S. shore. The Federal Government regulates the catch in waters between 3 and 200 miles off the U.S. shore.

Table 1
Cordage: Principal types of cordage products

Twine	Rope	Nets and netting
Baler	tow lines	seine (fishing)
Wrapping	mooring lines	trawl (fishing)
General tying	anchor lines	hoop (fishing)
Sash cord	winch/hoist lines	trammel (fishing)
Welt cord	slings	gill (fishing)
Chalk line	climbing	safety
Drapery cord	water ski	cargo
Awning cord	cargo tie-down	construction barriers
Masonry cord	lariat	sports (batting cages)
Macrame	safety line	recreational (tennis court enclosures)
Garden	rescue line	

Source: Compiled by the staff of the U.S. International Trade Commission from industry sources.

Figure 2
Cordage: Distribution of U.S. shipments by establishment size (SIC 2298), specified years 1972 to 1992[1]

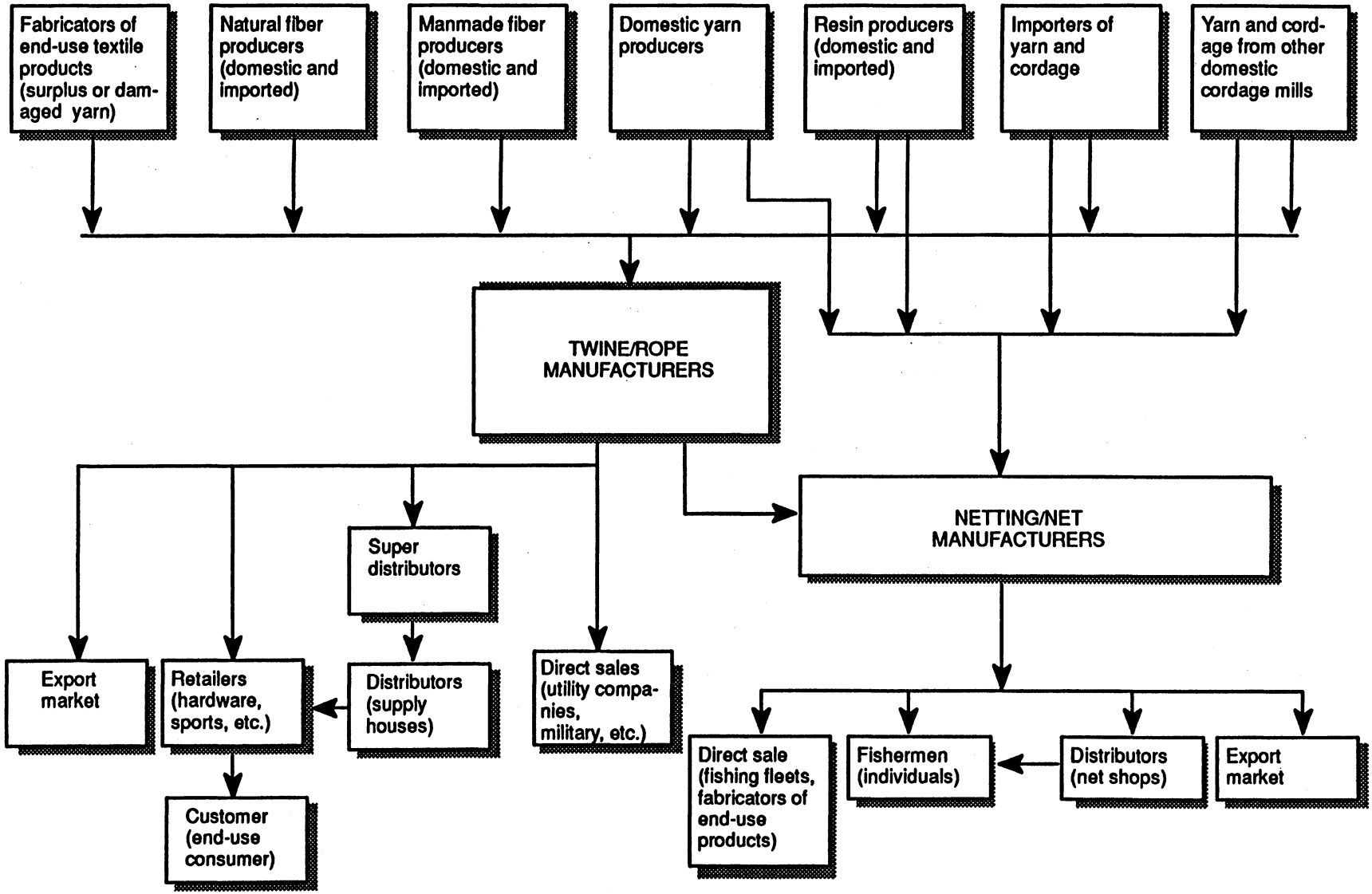


[1] Data for 1992 were estimated by the staff of the U.S. International Trade Commission.

Note.—These data represent establishment size and not firm size. A firm may own more than one establishment.

Source: U.S. Bureau of the Census, *Census of Manufactures*, 1972; 1977; 1982; and 1987, except as noted.

Figure 3
Structure of the U.S. cordage industry and markets



Source: Compiled by the staff of the U.S. International Trade Commission.

industry shipments declined by 5 percent and its workforce fell by 7 percent, as shown in table 2.

The modernization of production operations has also contributed significantly to the decline in employment, especially among the largest producers. Establishments employing more than 100 persons each have declined in relative importance since 1977, whereas those employing less than 20 employees have increased, as shown in figure 4. In 1993, only 8 percent of the mills in the industry employed more than 100 workers each, whereas 62 percent employed fewer than 20 workers each. Many of the larger establishments reduced employment to levels that pushed them into the smaller class of establishments. Most producers operate only one manufacturing establishment. Several of the larger firms operate multiple plants either in the United States or in both the United States and other countries.

Major Factors of Production

The major factors of production in the cordage industry are raw materials, capital, and labor. In addition, product certification and standards influence production decisions for articles such as ropes for safety and industrial purposes. These factors vary in significance depending on the type, specifications, and application of the cordage product.

Raw materials account for the largest share of production costs in the U.S. cordage industry. In 1993 the cost of materials accounted for an estimated 55 percent of the total value of U.S. producers' shipments (figure 5). Labor costs and all other expenses (including capital) accounted for about 23 percent each.

Raw materials

All but a small part of the raw materials used by the U.S. cordage industry today are synthetic, whether in fiber or yarn form. Industry sources indicate that many cordage producers are unable to purchase raw materials to their specifications or in the desired quantities because the size of their orders fall far short of the minimum order size maintained by the suppliers. As a result, many cordage firms purchase fibers and yarns that are engineered for use in other products, such as tire cord fabrics and air bags, or that are the waste and scrap of other segments of the textile sector, such as carpet and automotive fabric mills. Industry sources state that for most cordage products, the quality of these raw materials far exceeds that which is necessary to produce cordage of acceptable quality, and that in general, the quality of cordage depends more on the type of construction than on the quality of the raw materials.

Capital

To maintain its competitiveness with foreign suppliers and meet the needs of its customers, the U.S. cordage industry increased its capital expenditures in the late 1980s.[9] Total capital expenditures increased irregularly from $11.9 million in 1987 to an estimated $16.9 million in 1992, and were highest, at $23.2 million, in 1990 (figure 6). Capital expenditures have traditionally consisted mostly of machinery and equipment, with buildings usually accounting for 20 percent or less of the total.

Some U.S. cordage producers have invested in new capital equipment to increase labor productivity and product quality. Although growth is limited in the cordage market, many manufacturers have justified the cost of new machinery by increasing productivity from operating newer, faster and more efficient machinery and by improving the quality and uniformity of their product.[10]

The larger cordage producers usually replace one or two machines at a time. They generally dispose of the old machinery in one of several ways: (1) by selling it to another domestic cordage manufacturer, usually a new producer starting up or an established producer wanting to expand production, (2) by transferring it to another facility, such as an overseas operation, or (3) by scrapping it.[11]

Labor

The greater efficiency of the new machinery installed by the industry in recent years, and a decline in cordage production have contributed to a decline in the size of the industry workforce and the average number of production workers per establishment since 1972. Traditionally, most production jobs in the cordage industry are considered entry-level positions. In general, workers in the industry need about 3 weeks of training in order to perform at a semi-skilled level. Production workers in the cordage industry are usually paid hourly rates that are lower than the average rate for the overall textile mill sector. However, when a type of cordage being produced involves stringent safety standards, workers often receive a higher hourly wage. In 1993, the average hourly wage of production workers in the textile mill sector (excluding SIC 2298) was an estimated $8.72, or 17 percent higher than the $7.48 average rate for production workers in the cordage industry (table 3).

Table 4 shows that productivity in the cordage industry, based on value-added per production worker hour, declined from $26.34 in 1988 to an estimated

[9] Staff interview with industry officials on February 15, 1994.
[10] Ibid.
[11] Ibid.

Table 2
U.S. cordage industry (SIC 2298), specified years 1972-93

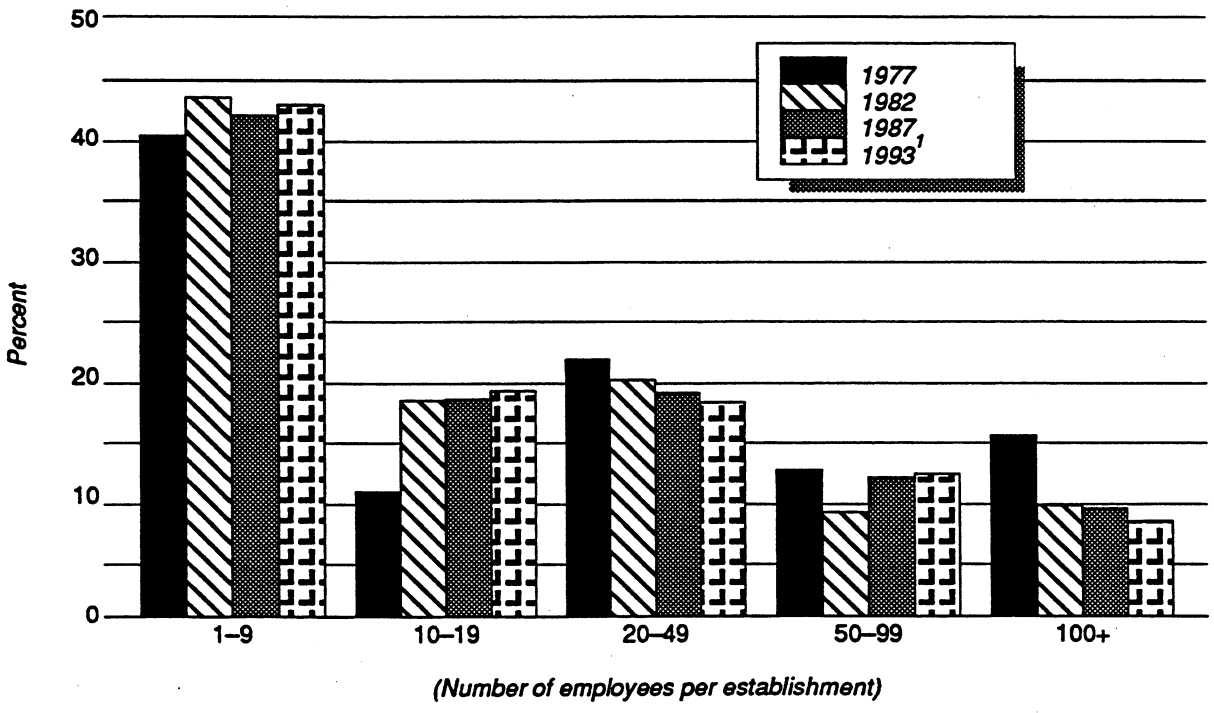
Item	1972	1977	1982	1987	1988
Number of companies	134	151	164	181	[1]190
Number of establishments	156	171	181	197	[1]200
Number of employees	9,000	9,500	6,600	6,900	6,900
Number of production workers	7,600	7,900	5,200	5,500	5,400
Value of product shipments:					
Nominal value (million dollars)	175	292	336	475	489
Constant 1985 value (million dollars)	([2])	([2])	([2])	475	[1]464
	1989	**1990**	**1991**	**1992**	**1993**
Number of companies[1]	195	190	188	204	200
Number of establishments[1]	205	200	198	215	210
Number of employees	7,200	7,000	6,800	6,800	6,700
Number of production workers	5,600	5,300	5,300	5,300	5,200
Value of product shipments:					
Nominal value (million dollars)	591	576	566	[1]564	[1]559
Constant 1985 value (million dollars)[1]	532	518	511	508	503

[1] Estimated by the staff of the U.S. International Trade Commission.

[2] Not available.

Source: U.S. Bureau of the Census, "Miscellaneous Textile Goods," 1987 *Census of Manufactures,* MC87-I-22E, Jan. 1990, table 1a-1, p. 22E-5, and table 6c, p. 22E-19, and "Value of Product Shipments," 1991 *Annual Survey of Manufactures,* M91 (AS)-2, Nov. 1992, table 1, p. 2-5, except as noted.

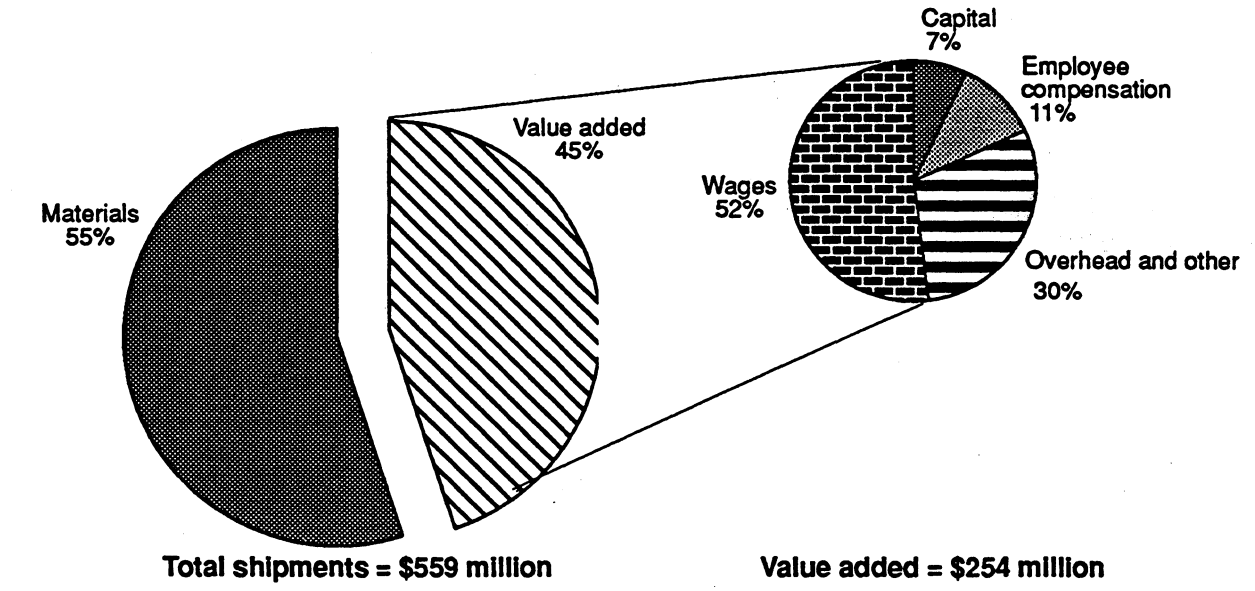
Figure 4
Cordage: Distribution of U.S. establishments by number of employees (SIC 2298), 1977, 1982, 1987, and 1993[1]



[1] Data for 1993 were estimated by the staff of the U.S. International Trade Commission.

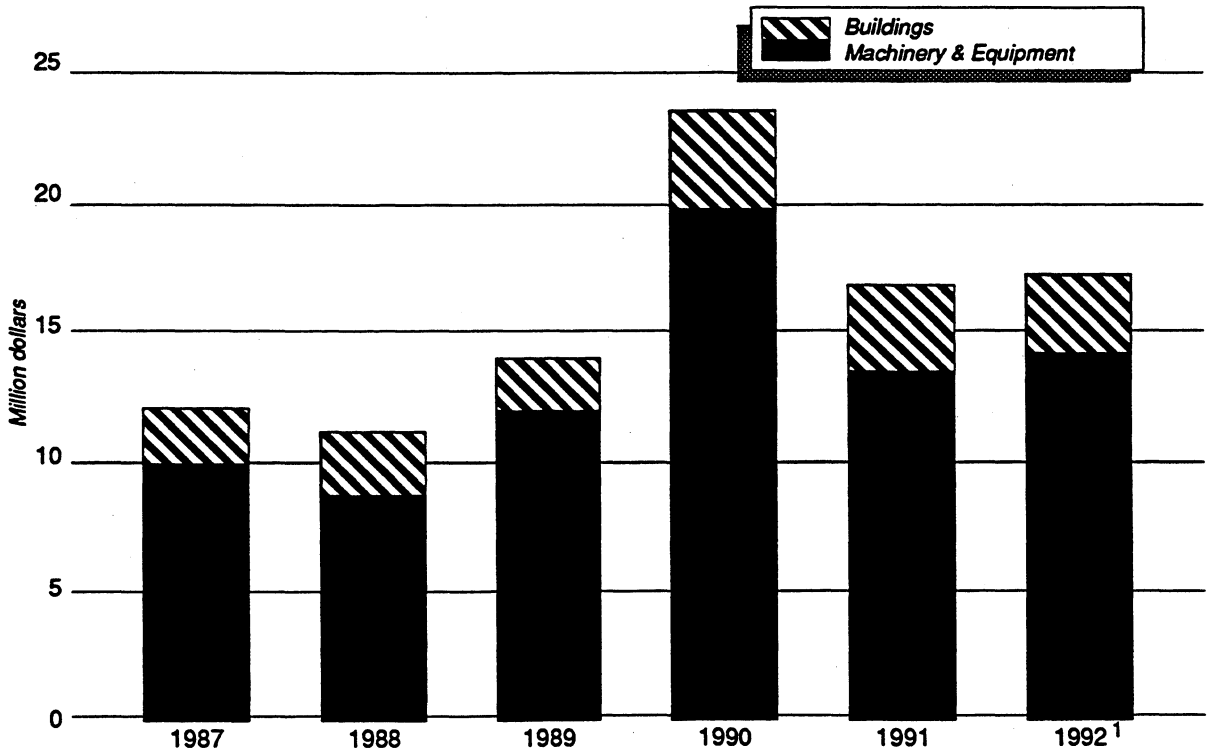
Source: U.S. Bureau of the Census, "Industry Statistics by Employment Size of Establishment," *Census of Manufactures,* 1977, 1982, and 1987, except as noted.

Figure 5
Cordage: Percentage distribution of U.S. production costs, 1993



Source: Estimated by the staff of the U.S. International Trade Commission based on official statistics of the U.S. Bureau of the Census, *Annual Survey of Manufactures*, 1991.

Figure 6
Capital expenditures by U.S. cordage producers (SIC 2298), 1987-92



[1] Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 3
Average number of production workers per establishment for SIC 2298 (cordage and twine) and average hourly earnings of production workers for SIC 2211-2297 and 2299 (other textile mill products) and SIC 2298, specified years 1972-93

Year	Production workers per establishment	Average hourly earnings		
		Cordage and twine	Other textile mill products	Increase of other textile mill products over SIC 2298
				Percent
1972	49	$2.69	$2.79	4
1977	46	3.78	4.08	8
1982	29	5.50	5.99	9
1987	28	7.00	7.43	6
1988	[1]27	7.29	7.62	5
1989	[1]27	7.38	7.94	8
1990	[1]27	7.30	7.91	8
1991	[1]27	7.19	8.09	13
1992[1]	25	7.37	8.50	18
1993[1]	25	7.48	8.72	16

[1] Estimated by the staff of the U.S. International Trade Commission.

Source: U.S. Bureau of the Census, "Miscellaneous Textile Goods," 1987 *Census of Manufactures,* MC87-I-22E, Jan. 1990, table 1a-1, p. 22E-5, and table 6c, p. 22E-19, and "Value of Product Shipments," 1991 *Annual Survey of Manufactures,* M91 (AS)-2, Nov. 1992, table 1, p. 2-5, except as noted.

Table 4
Cordage: Average value-added per production worker hour for SIC 2298 (cordage and twine) and SIC 2211-2297 and 2299 (other textile mill products), 1987-93

Year	Value added—		Production worker hours—		Average value added per production worker hour—	
	Cordage and twine	Other textile mill products	Cordage and twine	Other textile mill products	Cordage and twine	Other textile mill products
	Million dollars		*Millions*		*Dollars*	
1987	284.8	25,375.3	10.8	1,164.8	26.28	21.79
1988	281.8	26,000.2	10.7	1,148.9	26.34	22.63
1989	258.7	27,109.4	10.7	1,136.9	24.18	23.84
1990	248.8	26,292.8	11.3	1,106.4	22.02	23.76
1991	248.1	26,676.9	11.4	1,055.5	21.76	25.27
1992[1]	250.1	26,984.9	11.4	1,025.5	21.94	26.31
1993[1]	254.1	27,470.9	11.4	1,005.5	22.29	27.32

[1] Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from official statistics of the U.S. Bureau of the Census, *Annual Survey of Manufactures,* 1987-91 editions, except as noted.

$22.29 in 1993. In contrast, productivity for the overall U.S. textile mill sector (excluding SIC 2298) increased from $22.63 to an estimated $27.32 during the period. As a result, the average productivity in the cordage industry was 16 percent higher than the overall textile mill sector (excluding SIC 2298) in 1988, whereas it was 18 percent lower in 1993. Some industries in the U.S. textile mill sector, such as coated fabrics and nonwoven fabrics, have improved labor productivity with far greater technological advances than the cordage industry. Although the cordage industry has adopted some new technologies, the advances have been mostly in the use of certain raw materials.

Certification and liability

Industry sources state that product certification requirements, test standards, liability, and safety for the user of the product also affect the cordage industry. Industry sources state that product liability, especially for the rope segment of the cordage industry, is a particular concern. Ropes for use in sectors such as construction, industrial, marine, utility, and certain sports must meet rigid product standards. Quality assurance of both the raw materials and the finished product is becoming an increasingly important factor in the production process. Many cordage producers are becoming more aware of their manufacturing and quality control procedures, especially in the standards area.[12]

FOREIGN INDUSTRY

World exports of cordage have shown little growth in recent years, largely because economic activity in major global markets has slowed appreciably. As shown in figure 7, world cordage exports grew from $847 million in 1989 to $928 million in 1992, an increase of 10 percent. Twine and rope accounted for two-thirds of the exports during the period and nets and netting the remainder.

The leading world producers of cordage are the developed countries, led by the United States, Japan, and the European Union (EU). These countries also rank among the world's largest exporters of cordage (figures 8 and 9). However, they produce cordage mainly for their large domestic markets, with exports usually accounting for only a small share of their production. In contrast, the major producers in the developing world, led by Brazil, Mexico, Korea, Singapore, Taiwan, and the Philippines, export most of their cordage output.[13] Although the processes and technologies used to produce cordage are similar throughout the world, the fibers used differ by country. Manmade fibers are the primary fibers used in the developed countries and the newly industrialized countries (NICs) of Hong Kong, Taiwan, Singapore, and Korea. Natural fibers are the major ones used by other major producers among developing countries. The natural fibers most commonly used in cordage, namely sisal, henequen, abaca, and jute, are indigenous to a few countries. These countries use the fiber they produce to make most of their cordage. As shown in table 5, Mexico is the main source of henequen and Brazil is the largest producer of sisal, with Tanzania a distant second. India, along with Bangladesh, is the major source of jute and the Philippines is the main producer of abaca (i.e., Manila hemp). A few other developing countries such as Costa Rica produce and export cordage of natural fibers and manmade fibers.

Foreign cordage manufacturers in developed countries produce mostly "commercial" cordage for industrial and marine applications, such as large diameter ropes, specialty twine, and netting. Commercial cordage usually requires a greater degree of consistency and quality assurance than cordage for agricultural and household uses and, therefore, often costs more.[14] In contrast, the developing countries primarily manufacture low-cost twine and rope, usually in smaller sizes than the developed nations. Such cordage is mainly for household and agricultural applications in which slight variations in specifications or small imperfections do not significantly affect the product's effectiveness.[15] Korea, Singapore, and Hong Kong produce mostly the smaller diameter, manmade-fiber ropes, and Taiwan is a major producer of manmade-fiber netting.

Japan is the world's leading producer of netting, manufacturing about 22,000 metric tons yearly. Japan also produces about 32,000 metric tons of twine and rope a year. Two-thirds of Japanese twine and rope is of polypropylene, with most of the remainder divided almost equally between nylon and polyester. About one-half of Japan's netting production is of nylon, followed closely by polypropylene and small quantities of polyester.[16]

The EU annually produces about 28,000 metric tons of twine and rope and about 12,000 metric tons of netting. Manmade fibers, especially nylon, account for about three-fourths of EU production of twine and rope and virtually all of the netting. Cotton accounts for about 10 percent of EU twine and rope output. EU

[12] Ibid.

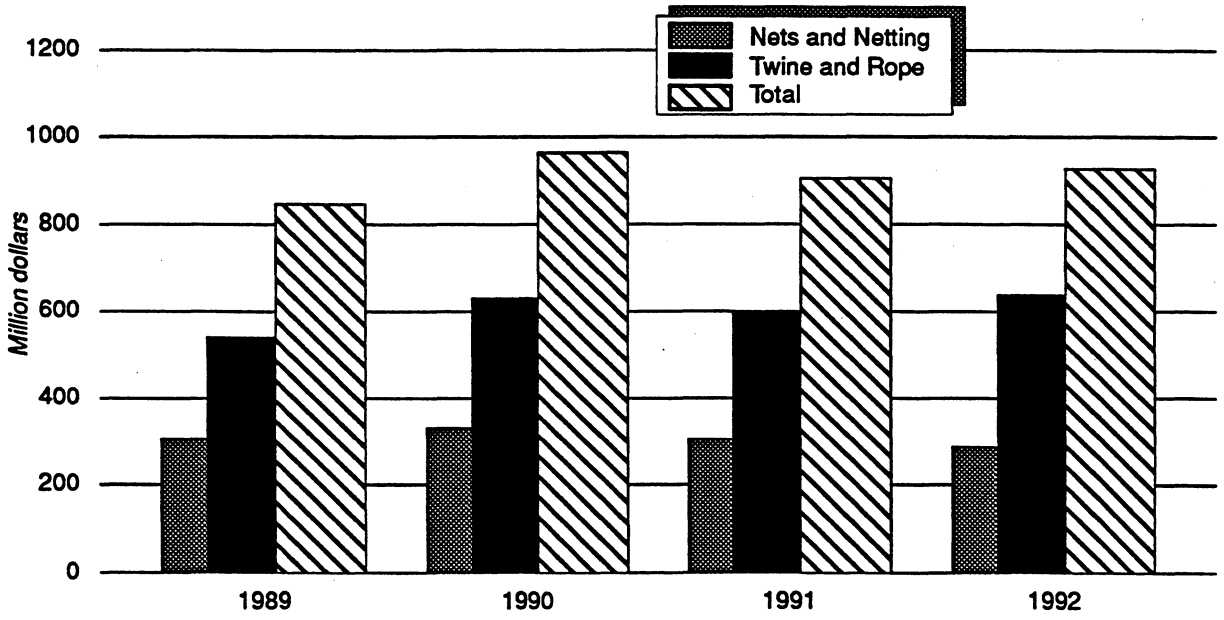
[13] Most of these exports consist of relatively inexpensive natural fiber twine and inexpensive manmade fiber rope.

[14] Staff interview with industry officials, February 16, 1994.

[15] Ibid.

[16] The Economist Intelligence Unit, "Statistics: Technical Textiles in Japan," *Technical Textile Markets* (Cheshire, the United Kingdom: Apr. 1994).

Figure 7
Twine, rope, nets, and netting: World exports, by types, 1989-92



Source: Compiled from official statistics of the United Nations.

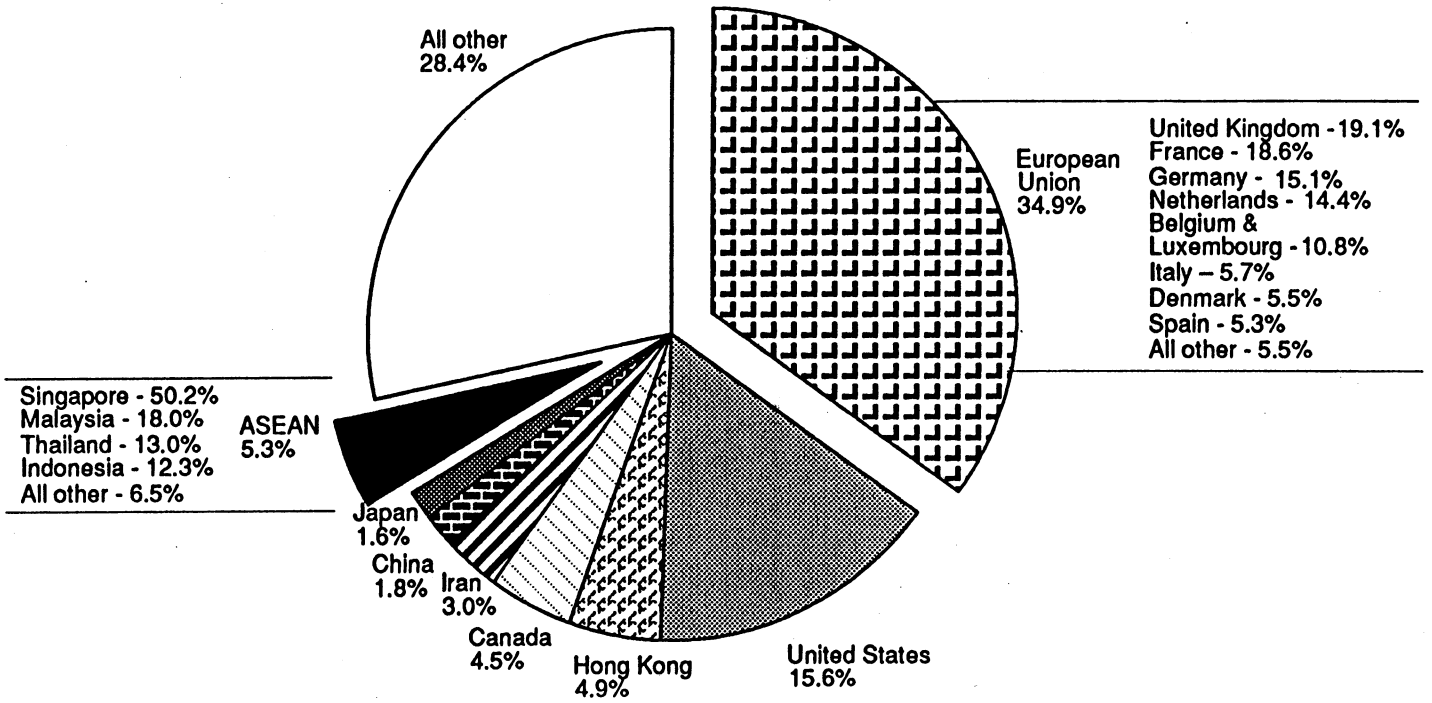
Table 5
Twine, rope, and fibers of abaca, sisal, and henequen: Production and exports, by major producers, 1989-93

(1,000 metric tons)

Source	1989	1990	1991	1992	1993
Abaca:					
Philippines:					
Fiber production	64.7	58.5	62.9	62.2	63.5
Fiber exports	22.8	23.0	19.9	17.6	17.0
Twine/rope exports	10.1	10.7	9.5	8.3	8.6
Sisal:					
Brazil:					
Fiber production	230.5	225.0	220.0	195.0	150.0
Fiber exports	95.4	73.0	44.8	30.5	40.0
Twine/rope exports	96.4	64.1	77.8	70.3	68.0
Tanzania:					
Fiber production	31.9	33.4	36.0	24.3	33.4
Fiber exports	8.1	6.2	3.8	3.5	6.0
Twine/rope exports	14.0	15.5	17.2	13.8	17.5
Henequen:					
Mexico:					
Fiber production	50.0	51.0	45.0	38.0	38.0
Fiber exports	0	0	0	0	0
Twine/rope exports	16.5	16.3	9.0	7.2	7.2

Source: Compiled from official statistics of the Food and Agricultural Organization of the United Nations.

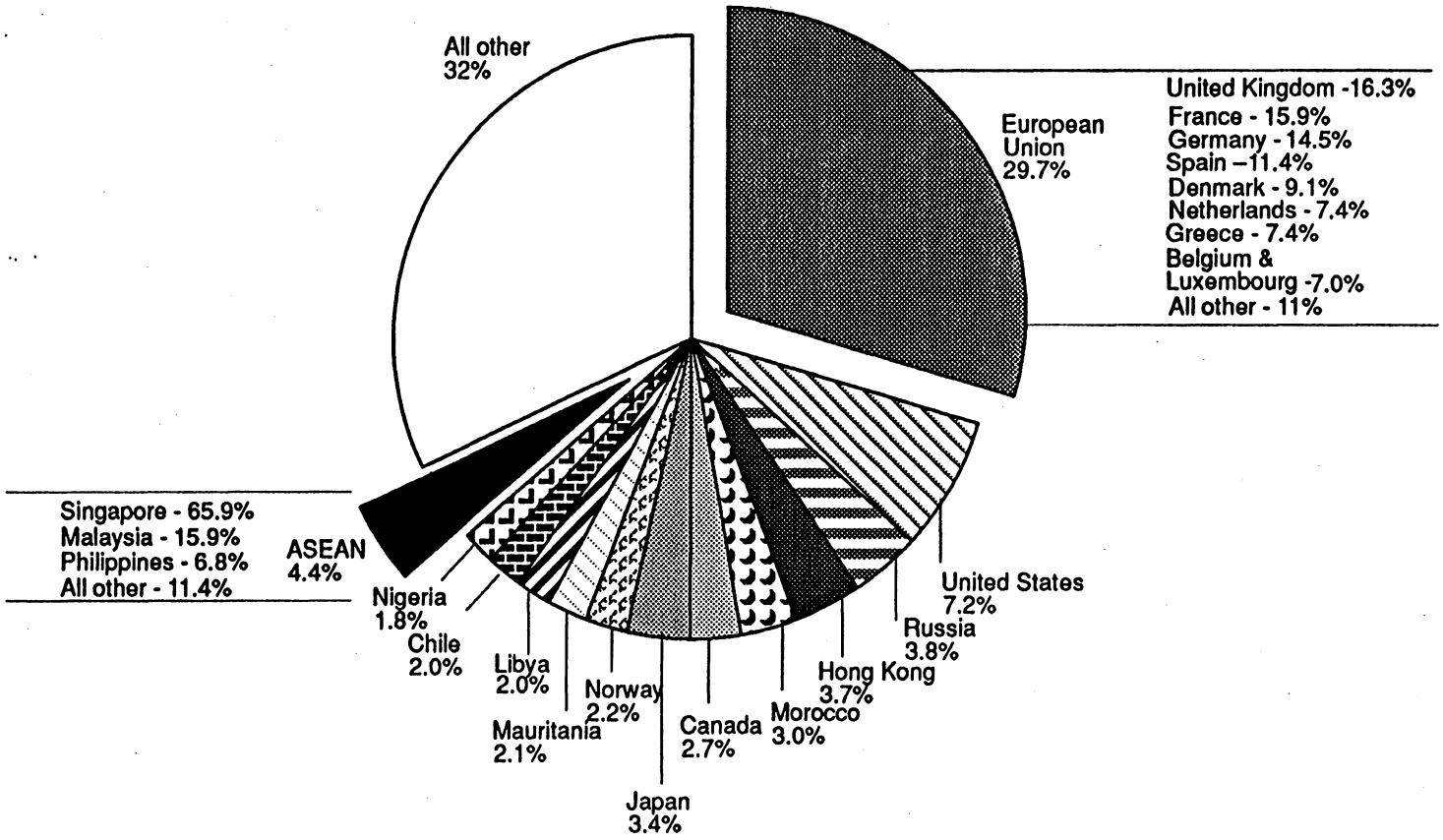
Figure 8
Twine and rope: Share of world exports by principal countries, 1992



ASEAN countries = $33.6 million **Total = $639.9 million** **European Union = $223.3 million**

Note.—Brazil, Korea, Mexico, the Philippines, and Taiwan, each accounted for one percent or less of the total.
Source: Compiled from official statistics of the United Nations.

Figure 9
Nets and netting: Share of world exports by principal countries, 1992



ASEAN countries = $12.6 million **Total = $288.0 million** **European Union = $85.5 million**

Source: Compiled from official statistics of the United Nations.

production of twine and rope of imported jute and hard fibers such as abaca, sisal, and henequen is small.[17]

U.S. TRADE MEASURES

Table 6 provides the column 1-general rates of duty for the 22 subheadings in the Harmonized Tariff Schedule of the United States (HTS) providing for cordage. Only three of these subheadings provide for a most-favored-nation (MFN) rate of zero. The remaining subheadings have rates of duty ranging from 4 percent ad valorem to 27.6 cents per kilogram plus 15 percent ad valorem, with more than two-thirds of the subheadings having a rate of duty of 10 percent or less. The trade-weighted rate of duty for cordage averages 5.8 percent ad valorem, based on 1993 trade. Appendix A includes an explanation of tariff and trade agreement terms.

U.S. imports of cordage are eligible for preferential tariff treatment, as specified in the "special" subcolumn of table 6. Under the United States-Canada Free-Trade Agreement, which entered into force on January 1, 1989, the United States either eliminated or began phasing out its tariffs on cordage imports from Canada. These tariffs were incorporated and continued under the North American Free Trade Agreement (NAFTA), which entered into force on January 1, 1994. Under NAFTA the United States immediately eliminated its tariffs on almost one-half of the dutiable cordage imports from Mexico, based on 1992 trade, and will phase out most of the remaining tariffs over 6 years.

U.S. imports of textile products are subject to quota (quantitative limits) under the Arrangement Regarding International Trade in Textiles, more commonly known as the Multifiber Arrangement (MFA).[18] For quota purposes, category 201 provides for cotton or manmade fiber specialty yarns which includes some cordage. Currently, Korea is the only country subject to quota under this category. In 1993, Korea filled 63 percent of its quota for category 201 and all but a small part of these imports consisted of polyethylene and polypropylene rope and twine. The quota has not significantly affected the level of U.S. imports of cordage, because of the availability of similar cordage products (not under quota) from Korea and cordage products from other countries that are not covered by quotas. The Uruguay Round Agreement on Textiles and Clothing will require the United States and other countries with import quotas under the MFA to phase out these limits over 10 years in 3 stages.[19]

FOREIGN TRADE MEASURES

The major U.S. export markets for cordage are Canada and Mexico, which are currently phasing out their tariffs on U.S. goods under the NAFTA. Canada's MFN rates of duty for cordage range from free to 25 percent ad valorem, whereas the rates applicable to the United States presently range from free to 15 percent. Slightly more than one-half of the Canadian tariff rates that apply to U.S. cordage provide for duty-free entry, mainly for binder and baler twine. The Canadian rates for U.S. manmade-fiber twines and ropes range from 6 percent ad valorem plus 6.6 cents per kilogram to 12 percent ad valorem, while those for U.S. nets and netting range from 12 to 20 percent ad valorem.

Mexico's general tariff rates for cordage are 10, 15, or 20 percent ad valorem. Under NAFTA, Mexico eliminated tariffs on some cordage from the United States on January 1, 1994, and will phase out the remaining tariffs on U.S. cordage over a 6-year period.

Japan is a growing market for U.S. cordage exports. Japan has three different duty categories: General, Preferential, and Temporary (the latter applies to the United States). Tariff rates in all categories range from free to 20 percent ad valorem, with the tariff rates applicable to the United States ranging from 3 to 9.1 percent ad valorem. The Japanese tariff rates on imports of twine and rope from the United States range from 3 to 6.4 percent ad valorem, while the rates on netting range from 3 percent to 9.1 percent ad valorem.

The EU also is an important market for U.S. exports of twine, rope, and netting. The EU has two categories of tariff rates: Autonomous and Conventional. The tariff rates for both categories range from 6 to 19 percent ad valorem. The EU rates applicable to imports from the United States are 12 percent ad valorem for twine and rope and 11 percent ad valorem for netting. EU standards, testing, and certification procedures for cordage, such as measuring the breaking strength and the working load for various sizes and types of ropes, as well as for variation in diameter size of the yarn and finished product, usually differ from those of the United States. According to some U.S. industry officials, the need to test and certify cordage products for export to the EU to account for different national requirements has, in some cases, resulted in lengthy delays in finalizing

[17] The Economist Intelligence Unit "Statistics: Fibre Consumption for Technical Textiles in the EC, "*Technical Textile Markets* (Cheshire, the United Kingdom: Jan. 1993).

[18] See appendix A for information regarding the MFA.

[19] For a more detailed discussion of this Uruguay Round agreement, see U.S. International Trade Commission (USITC), *Potential Impact on the U.S. Economy and Industries of the GATT Uruguay Round Agreements* (investigation No. 332-353), USITC publication 2790, June 1994.

Table 6
Cordage: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1994; U.S. exports, 1993; and U.S. imports, 1993

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1994		U.S exports, 1993	U.S. imports, 1993
		General	Special[1]		
				1,000 dollars	
5607.10.00	Cordage, of jute or other similar bast fibers	4%	Free (A,CA,E,J,MX) 0.4% (IL)	1,871	5,924
5607.21.00	Binder or baler twine, of sisal or other textile fibers of genus Agave	Free		965	49,624
5607.29.00	Cordage (except binder or baler twine), of sisal, etc	7.2%	Free (A,CA,E,J,MX) 0.7% (IL)	1,591	7,343
	Cordage of abaca (manila hemp) or other hard fibers:				
5607.30.10	Of stranded construction, measuring 1.88 cm or over in diameter	Free		[2]476	2,815
5607.30.20	Of stranded construction, measuring under 1.88 cm in diameter, and of braided construction	6.8%	Free (A,CA,E,J,MX) 0.7% (IL)	[2]475	6,265
	Binder or baler twine of polyethylene or polypropylene:				
5607.41.10	Of wide nonfibrillated strip	5.3%	Free (A,CA,E,IL,J, MX)	[2]3,395	279
5607.41.30	Of any other	8%	Free (CA,MX) 0.8% (IL)	[2]3,394	1,337
	Cordage (except binder or baler twine) of polyethylene or polypropylene:				
5607.49.10	Of wide nonfibrillated strip	5.3%	Free (A,E,IL,J,MX) 2.1% (CA)	[2]1,484	3,641
5607.49.15	Other, not braided or plaited, less than 4.8 mm in diameter	8%	0.8% (IL) 7.3% (MX) 3.2% (CA)	[2]1,484	1,414
5607.49.25	Other, not braided or plaited, measuring 4.8 mm or more in diameter	27.6¢/kg + 15%	2.8¢/kg + 1.5% (IL) 11¢/kg + 6% (CA) 20% (MX)	[2]1,484	2,080
5607.49.30	Any other braided or plaited	7.2%	0.7% (IL) 2.8% (CA) 6.6% (MX)	[2]1,483	3,396
	Cordage, of manmade fibers (except polyethylene or polypropylene):				
5607.50.20	Not braided or plaited	27.6¢/kg + 15%	2.8¢/kg + 1.5% (IL) 11¢/kg + 6% (CA) 16.2% (MX)	[2]5,490	2,024
5607.50.40	Braided or plaited	7.2%	0.7% (IL) 2.8% (CA) 6.6% (MX)	[2]5,489	9,912
	Cordage, not elsewhere classified:				
5607.90.10	Of coir	Free		[2]0	146
5607.90.20	Of other material	7.2% 0.7% (IL) 2.8% (CA)	Free (E*,MX)	[2]11,336	4,541

See footnotes at end of table.

Table 6
Cordage: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1994; U.S. exports, 1993; and U.S. imports, 1993

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1994		U.S exports, 1993	U.S. imports, 1993
		General	Special[1]		
				1,000 dollars	
5608.11.00	Fishing nets, of manmade fibers	17%	1.7% (IL) 6.8% (CA) 14.1% (MX)	884	3,865
	Fish netting and other nets of manmade fibers:				
5608.19.10	Fish netting	17%	1.7% (IL) 6.8% (CA) 14.1% (MX)	[2]3,633	10,033
5608.19.20	All other nets and netting	10%	9% (MX) 4% (CA) Free (B,IL)	[2]1,210	5,918
	Nets and netting of textile materials (except manmade fibers):				
5608.90.10	Fishing nets and fish netting	17%	Free (E*,J*) 0.6% (IL) 6.8% (CA) 14.1% (MX)	[2]0	445
5608.90.23	Hammocks, of cotton	16%	Free (A,E,J,MX) 1.6% (IL) 6.4% (CA)	[2]1,942	1,227
5608.90.27	Nets and netting (except fishing, fish, and hammocks) of cotton	16%	1.6% (IL) 6.4% (CA) 13.4% (MX)	[2]1,942	295
5608.90.30	All other nets and netting of any other fiber	10%	Free (A,E,IL,J,MX) 4% (CA)	[2]0	574

[1] Programs under which special tariff treatment may be provided, and the corresponding symbols for such programs as they are indicated in the "Special" subcolumn, are as follows: Generalized System of Preferences (A); Automotive Products Trade Act (B); North American Free–Trade Agreement, goods of Canada (CA) and Mexico (MX); Caribbean Basin Economic Recovery Act (E or E*); the United States–Israel Free–Trade Area Implementation Act (IL); and the Andean Trade Preference Act (J or J*).

[2] Estimated by the staff of the U.S. International Trade Commission.

Source: U.S. exports and imports compiled from official statistics of the U.S. Department of Commerce, except as noted.

sales of exports. These industry officials contend that such differences in standards and procedures, in addition to higher rates of duty (11 and 12 percent ad valorem), often serve as a barrier for U.S. cordage exports to the EU market.

U.S. MARKET

Consumer Characteristics and Factors Affecting Demand

The U.S. cordage market can be broadly divided into two major segments, namely consumer and commercial. Consumer cordage comprises such products as tying twines, small ropes, and prepackaged goods sold at retail. Commercial cordage consists of agricultural twine, heavy or large-diameter ropes, and intermediate products for the manufacture of other goods such as fishing nets, hammocks, door mats, and sports equipment. The principal commercial consumers of cordage cover a broad spectrum of U.S. industry, ranging from agriculture, manufacturing, and mining to the fishing and marine, recreation and sports sectors. Table 7 shows the major consuming industries for cordage and specific factors that affect demand for these products.

U.S. demand for consumer and commercial cordage usually follows changes in general economic activity. Consumers often postpone or curtail spending on such end-use products as recreational and sports equipment during periods of economic uncertainty and low consumer confidence. Price is the primary factor influencing demand for consumer and commercial cordage. For certain commercial cordage like safety ropes and fish netting, product quality, required physical properties and timely delivery are also important considerations. There are also demand factors that apply specifically to each of the three groups of cordage, as discussed below.

Twine

The agricultural sector is the principal market for twine, especially baler twine. Changes in the size of the annual hay crop in the United States significantly affect demand for baler twine, which is made of either natural fibers (sisal and henequen) or manmade fibers (polypropylene). Price essentially is the sole determinant of demand for the natural-fiber twine, all of which is imported, and manmade-fiber twine, which is produced by U.S. producers. In the past, availability of the imported twine has influenced the conditions of competition. Changes in economic conditions or the political situation in supplying countries have affected the availability of twine for export, which has led to an increase in demand for domestically produced twine.

Rope

The most important factors affecting the demand for rope are the overall state of the U.S. economy and the presence of extreme weather or climatic conditions. Demand for rope usually increases when there is a natural disaster, such as a flood, hurricane, or an earthquake, or when there is an armed conflict. Although this increase in demand is temporary, it is a boost for rope manufacturers that sell to the utility, military, and industrial sectors. Changes in the popularity of certain outdoor sports, such as mountain climbing, skiing, and sailing, can also affect demand.

Netting

Several major factors influence the demand for netting, which consists almost entirely of fish netting and fishing nets. The change of the fish-catching cycle, which usually occurs every 3 to 5 years, affects the demand for netting. As noted earlier in "the product" section, the fishing industry is regulated at the Federal and state levels. Regulatory changes can lead to changes in the allowable mesh size or type of yarn to be used in a certain type of fishing net, making previously used netting less efficient, obsolete, or illegal.

Consumption

Apparent U.S. consumption of cordage declined slightly each year during 1989-93, as shown in figure 10. It decreased from $686 million in 1989 to an estimated $632 million in 1993. U.S. producers dominate the domestic cordage market, supplying about 80 percent of total consumption during 1989-93. Imports' share of the market fluctuated within a narrow range between 19 and 20 percent during the period (table 8).

Rope accounts for the largest share of domestic cordage consumption. In 1993, U.S. consumption of rope was valued at $351 million, or approximately 56 percent of total cordage sales. Twine consumption totaled $241 million, or 38 percent of cordage sales, and netting consumption amounted to $40 million, 6 percent of the total. As shown in table 9, rope is the single most important cordage product made in the United States, while twine is the most important import. However, import penetration is greatest in netting, the smallest segment of the U.S. cordage market.

Production

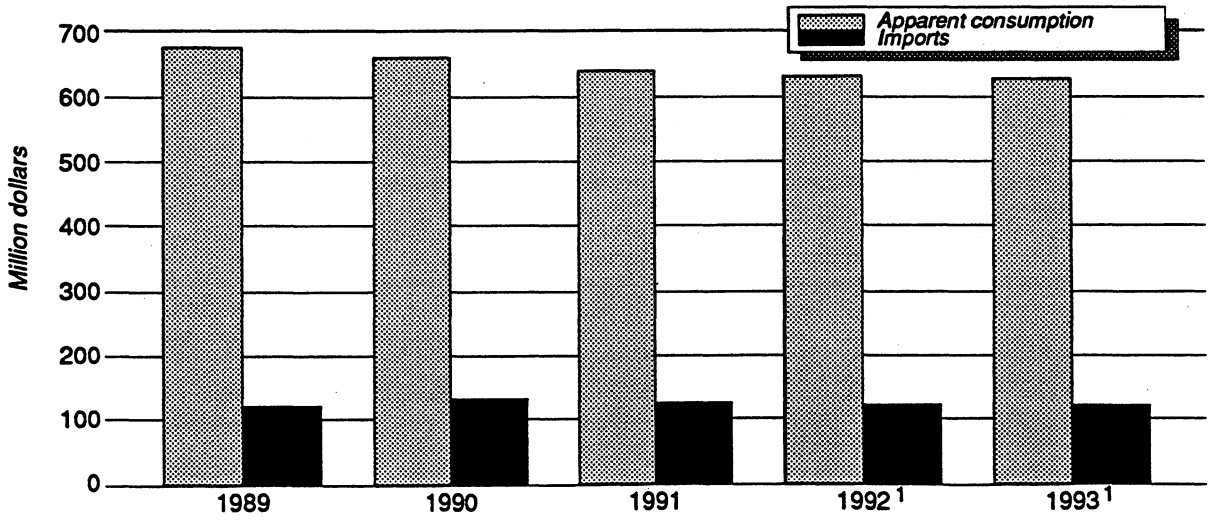
U.S. producers' shipments of cordage also declined annually during 1989-93, from $591 million to $559 million, as shown in table 8. Part of the decline in cordage production during the period reflected the decrease in demand for cordage, as well as an increase

Table 7
Cordage: Principal U.S. markets and factors affecting demand

Market	Demand factors
Agricultural	• Hay and crop size • Change in Government subsidy programs • Alternative methods to baling
Construction	• Expansion of infrastructures • Housing starts • Change in interest rates
Fishing (commercial and pleasure)	• Weather conditions • Fish catching cycle • Change in Federal and state regulations
Hardware (retail)	• Innovative merchandising • New packaging and displaying • Increase in retail mass marketing
Household	• Changes in home decorating styles • Increased popularity of crafts • Increase in home remodeling and gardening
Industrial	• New EPA regulations • Changes in overall economic activity • Change in production facilities
Marine (commercial and pleasure)	• Popularity of water-related activities • Favorable climate conditions • Change in freight rates
Military	• Shortage of required equipment • International armed conflict • Changes in number of military personnel
Mining and oil	• New discoveries • Change in oil prices • Opposition by environmental groups
Recreation/sports	• Promotion of physical fitness and individual conditioning • New sports facilities • More individual leisure and recreational time
Utility	• New safety regulations • Increase in building activity • Natural disasters

Source: Compiled by the staff of the U.S. International Trade Commission from industry sources.

Figure 10
Cordage: Apparent U.S. consumption and U.S. imports, 1989-93



[1] Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 8
Cordage: U.S. shipments, exports of domestic merchandise, imports for consumption, and apparent U.S. consumption, 1989-93

Year	U.S. shipments	U.S. exports	U.S. imports	Apparent U.S. consumption	Ratio of imports to consumption
	Million dollars				*Percent*
1989	591	32	127	686	19
1990	576	44	137	669	20
1991	566	48	127	645	20
1992	[1]564	52	124	[1]636	[1]20
1993	[1]559	50	123	[1]632	[1]19

[1] Estimated by the staff of the U.S. International Trade Commission.
Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 9
Twine, rope, and netting: U.S. shipments, exports of domestic merchandise, imports for consumption, and apparent U.S. consumption, 1993

Product	U.S. shipments	U.S. exports	U.S. imports	Apparent U.S. consumption	Ratio of imports to consumption
	Million dollars				*Percent*
Twine	196	20	65	241	27
Rope	335	20	36	351	10
Netting	28	10	22	40	55
Total	559	50	123	632	19

Source: Data on U.S. exports and imports of netting were compiled from official statistics of the U.S. Department of Commerce (DOC); all other data were estimated by the staff of the U.S. International Trade Commission based on official DOC statistics.

in production of more durable cordage. Production of cordage that is stronger, lighter, and more durable, even though more expensive, often hinders or displaces production of similar or competing cordage. Although U.S. producers manufacture many different specifications of cordage and a variety of related products, they compete in a mature market. To maintain or increase their market share, many cordage manufacturers are making efforts to be more innovative and improve their marketing techniques.[20]

Twine

Twine accounted for about one-third of the total value of shipments of U.S.-produced cordage in 1993 (table 9). The majority of domestically produced twine is of manmade fibers and is used for agricultural purposes, such as baler twine. U.S. twine producers usually have an advantage over their foreign competition when a sharp or an unexpected increase in demand for baler twine occurs, because of their proximity to their customers and a readily available supply of manmade fibers. Most of the remaining twine is for industrial and household use. Domestically produced twine for general tying purposes usually consists of cotton or of imported yarns of natural fibers such as jute, flax, or sisal.

Rope

Rope makes up the largest share of the total value of shipments of all U.S.-produced cordage, accounting for 60 percent in 1993 (table 9). Most rope produced in the United States is made of manmade fibers. A large share of U.S.-produced rope is of braided construction, which generally has a higher unit value than comparable rope of twisted construction. The production of specialty ropes, such as for climbing and safety purposes, and the production of ropes made of "high-tech" fibers, such as Spectra and aramid, usually provide the manufacturer with the largest profit margin; however, these ropes account for only a small share of total U.S. rope production. Domestic production of braided ropes and multicolor stranded ropes, and the relatively inexpensive ropes in which tensile strength and workload limits are not a primary concern, are increasing, but also account for a small share of total U.S. rope output. Rope of non-cotton vegetable fibers such as abaca (Manila hemp) and sisal is not produced in the United States. Many of the larger

[20] Staff interview with industry officials on February 15, 1994.

domestic manufacturers import such rope to complement their domestic production. Although domestically produced rope competes in all markets, many of these ropes produced for niche markets often receive the most competition from other domestically produced ropes and the least amount of competition from imported ropes.

Netting

Netting accounted for only 5 percent ($28 million) of the total value of U.S. shipments of domestically produced cordage in 1993 (table 9). Virtually all domestically produced netting is of manmade fibers, mostly nylon and polyethylene, and is primarily of knotted construction. The majority of domestic netting production is used to make fishing nets, most of which require a large quantity of netting to be produced, especially lengthy trawl and seine nets. Domestic production of the high-valued, Spectra netting represents a small share of total netting output and is limited to special uses.

Imports

Products imported

Twine represented slightly more than one-half of U.S. cordage imports in 1993, as shown in figure 11. Imports of binder or baler twine of sisal and of henequen fibers (HTS subheading 5607.21.00) were valued at $49.6 million in 1993, constituting the largest single import category with 40.3 percent of total cordage imports.

U.S. imports of rope (HTS subheadings 5607.29.00, 5607.30.10, 5607.30.20, 5607.49.10, 5607.49.25, 5607.49.30, and 5607.50.40) were valued at $35.5 million and accounted for 28.8 percent of total cordage imports in 1993. Manmade-fiber ropes accounted for the majority of the imported rope, although ropes of natural fibers were significant. Nylon rope was the largest single category of rope imported in 1993, representing 8.1 percent of total cordage imports. Ropes of abaca and of polypropylene or polyethylene accounted for 7.4 percent each, while sisal rope equalled 6.0 percent of the total. U.S. imports of nets and netting were valued at $22.4 million, or 18.2 percent of total cordage imports in 1993. The largest share of these imports consisted of manmade-fiber fish netting, mostly of nylon (HTS subheadings 5608.19.10.10 and 5608.19.10.20).

Import levels and trends

U.S. imports of cordage increased from $127.0 million in 1989 to $136.5 million in 1990, and then declined annually to $123.1 million in 1993 (table 10). The imported cordage products, mostly twine and rope, compete in the volume markets where price is usually the primary purchasing consideration. According to industry officials, most imports are priced lower than competing domestic products, generally selling for approximately 5 percent less than comparable domestic products.[21] Although the quality of imported twine and rope varies, some industry officials believe that it is generally similar to that of domestic twine and rope.[22] However, imported netting, unlike most domestic netting, often undergoes additional manufacturing steps, such as double stretching, and contains certain specifications of yarns and twines that U.S. manufacturers have difficulty obtaining.

Slightly more than 40 percent of the imported cordage entered duty-free under the column 1-general rate in 1993. Almost all of these duty-free imports consisted of sisal or henequen binder or baler twine, which enter under HTS subheading 5607.21.00. These imports came chiefly from Brazil and Mexico, and were valued at $49.6 million (40 percent of total imports) in 1993. The rest of these duty-free imports entered under HTS subheadings 5607.30.10 (abaca twine and rope of stranded construction, over 1.88 centimeters in diameter) and 5607.90.10 (coir twine and rope), which together accounted for only 2 percent ($3.0 million) of 1993 cordage imports. An additional 22 percent ($26.7 million) of the imports also entered either duty-free or at reduced rates under special programs, namely the Generalized System of Preferences (GSP), the Automotive Products Trade Act, the United States-Israel Free-Trade Area Implementation Act, the United States-Canada Free-Trade Agreement, the Andean Trade Preference Act, and the Caribbean Basin Economic Recovery Act (CBERA).

Principal import suppliers

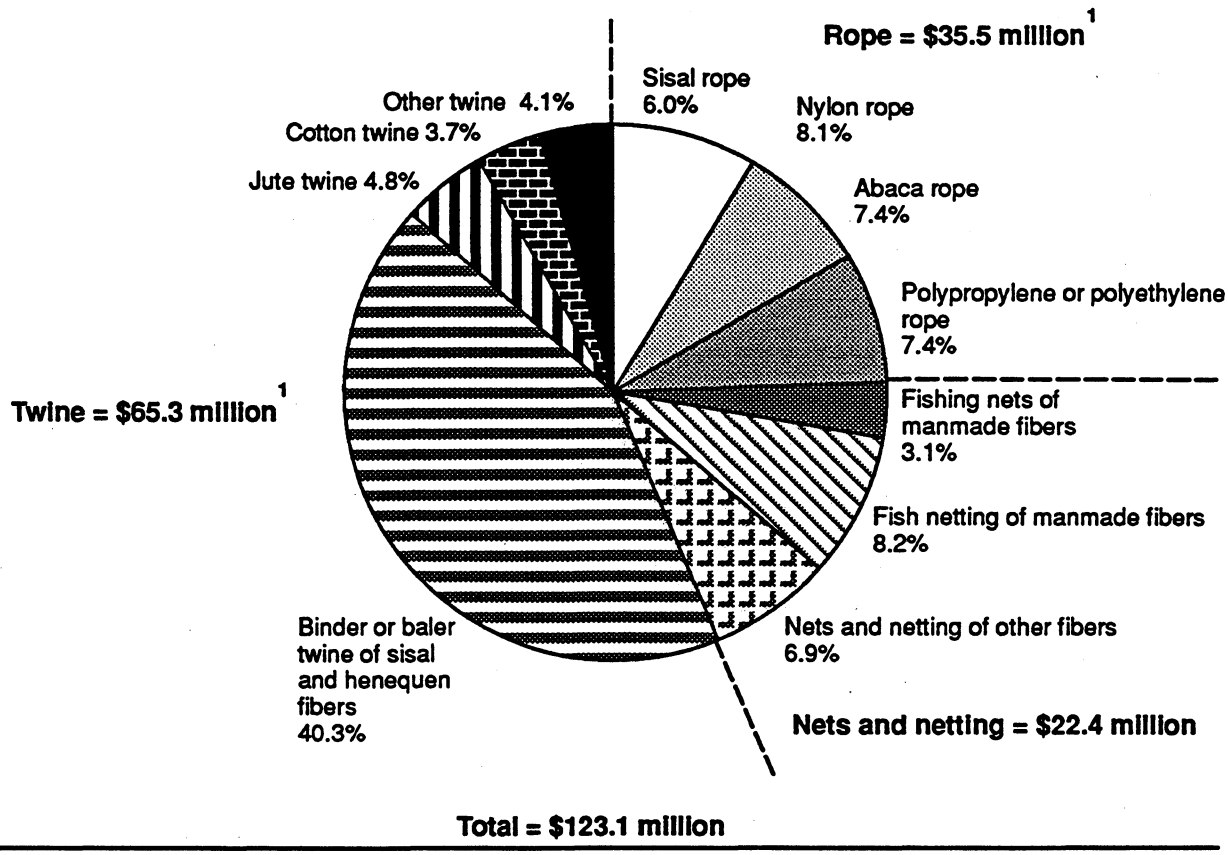
Brazil is the largest foreign supplier of cordage by far, accounting for just over 50 percent of the quantity and 35 percent of the value of total U.S. cordage imports during 1989-93. In 1993, imports from Brazil amounted to 51.9 million kilograms, valued at $41.7 million, or 34 percent of the total value, as shown in figure 12. Other important suppliers were Mexico, Canada, Japan, the Philippines, Korea, Taiwan, and Portugal, which collectively supplied 27 percent of the quantity and 44 percent of the value of total imports in 1993. The Association of Southeast Asian Nations (ASEAN),[23] as a group, supplied imports valued at

[21] Staff interview with industry officials, February 14, 1994.

[22] Staff interview with industry officials, February 15, 1994.

[23] Includes Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Figure 11
Cordage: U.S. imports by types, 1993



[1] Estimated by the staff of the U.S. International Trade Commission.

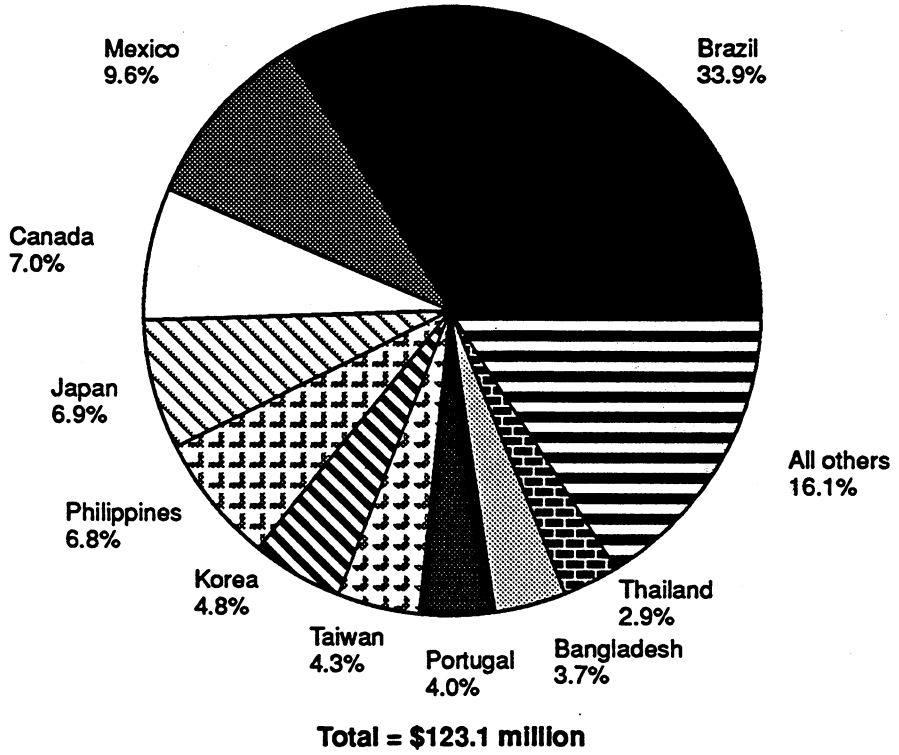
Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 10
Cordage: U.S. imports for consumption, by principal sources, 1989-93

Source	1989	1990	1991	1992	1993
	Quantity *(1,000 kilograms)*				
Brazil	54,723	51,117	51,595	50,610	51,900
Mexico	14,284	18,718	10,762	9,000	9,197
Canada	1,026	1,410	965	1,478	1,495
Japan	743	561	514	512	534
Philippines	6,365	7,611	6,152	5,686	6,460
Korea	4,204	4,133	2,847	2,769	2,993
Taiwan	1,301	1,064	1,016	835	887
Portugal	8,811	8,250	8,350	5,457	4,971
Bangladesh	164	2,066	841	5,467	6,202
Thailand	1,360	1,676	1,607	1,460	1,648
All other	14,288	14,595	11,977	11,799	11,329
Total	107,269	111,201	96,624	95,073	97,616
	Value *(1,000 dollars)*				
Brazil	43,015	46,141	47,292	46,304	41,676
Mexico	12,858	17,803	12,212	11,167	11,867
Canada	6,355	5,410	5,213	7,514	8,610
Japan	10,803	7,532	6,829	6,499	8,541
Philippines	6,730	8,229	6,412	6,374	8,430
Korea	8,967	8,107	5,756	5,569	5,855
Taiwan	6,631	5,910	5,316	4,701	5,273
Portugal	10,867	9,539	9,386	5,966	4,962
Bangladesh	122	1,555	647	4,063	4,505
Thailand	3,236	3,664	3,602	3,126	3,617
All other	17,464	22,635	24,216	22,832	19,762
Total	127,047	136,527	126,881	124,115	123,098
	Unit value *(per kilogram)*				
Brazil	$0.79	$0.90	$0.92	$0.91	$0.80
Mexico	90	.95	1.13	1.24	1.29
Canada	6.19	3.84	5.40	5.08	5.76
Japan	14.55	13.43	13.29	12.69	16.01
Philippines	1.06	1.08	1.04	1.12	1.31
Korea	2.13	1.96	2.02	2.01	1.96
Taiwan	5.10	5.56	5.23	5.63	5.94
Portugal	1.23	1.16	1.12	1.09	1.00
Bangladesh	74	0.75	.77	.74	.73
Thailand	2.38	2.19	2.24	2.14	2.19
All other	1.22	1.55	2.02	1.94	1.74
Average	1.18	1.23	1.31	1.31	1.26

Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 12
Cordage: U.S. imports by principal sources, 1993



Source: Compiled from official statistics of the U.S. Department of Commerce.

$12 million, or 10 percent of the 1993 import total. The EU supplied $11 million, or 9 percent of the total.

Brazil and Bangladesh supplied cordage that had considerably lower average unit costs than any other major supplier. Based on imports in 1993, unit costs averaged 80 cents per kilogram for Brazil and 73 cents for Bangladesh, compared with $1.95 for all other suppliers (table 10). The imports from Brazil consisted almost entirely of sisal baler twine, and those from Bangladesh were mostly jute tying twines. Japan, Taiwan, and Canada provided more expensive cordage products during 1989-93. In 1993, imports from Japan averaged just over $16 per kilogram and consisted mostly of fish netting. Imports from Taiwan averaged slightly less than $6 per kilogram and comprised mostly manmade-fiber ropes and fish netting. Imports from Canada also averaged slightly less than $6 per kilogram and consisted mostly of medium-size manmade-fiber rope and small quantities of fish netting.

FOREIGN MARKETS

Foreign Market Profile

The major foreign markets for U.S. exports of cordage are Canada and Mexico. Other countries, such as Nigeria, Chile, Japan, Colombia, Hong Kong, and the United Kingdom, are also important markets, but on a smaller scale. Although data on foreign consumption of cordage are not readily available, the EU is believed to be the second largest cordage market in the world after the United States.

Most developed and developing countries produce, export, and import various types of cordage. Many foreign manufacturers of cordage produce a limited range of cordage, generally made of raw materials that are the least expensive and most readily available to them, and import cordage of specifications that are not produced locally. As a result, the exported cordage and imported cordage in a particular foreign country usually do not directly compete with each other.

Although virtually all countries in the world are a market for cordage, developed countries usually are the principal markets for higher priced cordage. Much of the more expensive cordage is for industrial and marine purposes, where exact specifications, uniformity of standards, and safety factors are important. Many developing countries are major markets for the less expensive cordage. Price is also an important factor in the purchasing decision, especially for twines and ropes for agricultural purposes, where slight differences in quality and consistency are not of primary importance.

U.S. Exports

Products exported

U.S. exports of cordage during 1989-93 consisted mostly of twine and rope, which are reported together in official U.S. export statistics. In 1993, U.S. exports of twine and rope totaled $40.4 million and nets and netting, $9.6 million. It is believed that the $40.4 million in U.S. exports of these products in 1993 were split almost equally between twine and rope. U.S. exports of polypropylene or polyethylene twine and rope, with over half consisting of binder or baler twine, totaled $12.7 million, or 26 percent of total U.S. cordage exports in 1993 (figure 13). U.S. exports of cotton twine and rope were valued at $11.3 million, or 23 percent of total U.S. exports, and exports of nylon twine and rope were valued at $11.0 million, or 22 percent of total exports.

The types and specifications of cordage exported by the United States are not expected to change significantly in the near future. U.S.-produced cordage for certain industrial or recreational uses, when such factors as safety, certification, and performance are critical, are expected to continue to be preferred over the products of many foreign producers. However, lower priced cordage from many developing countries and some developed countries are increasing in the international market at the expense of some U.S. exports.

U.S. exporters of cordage are primarily the larger manufacturers, although some middle-size companies and some small firms that specialize in a particular niche market also export. Exports represent a small share of their total sales; none of these firms depends entirely on exports as a main source of revenue. Virtually all U.S. exports of cordage are custom ordered or presold.

Export levels and trends

U.S. exports of cordage increased from $32.3 million in 1989 to a high of $52.4 million in 1992, and then declined to $50.0 million in 1993 (table 11). U.S. exports accounted for a small but growing share of U.S. producers' cordage shipments, rising from 5.4 percent in 1989 to an estimated 9.2 percent in 1992 and 8.9 percent in 1993. Some U.S. cordage manufacturers state that the world cordage market offers domestic producers considerable potential for increased sales.

Canada is the largest export market for U.S. cordage by far, although U.S. shipments to this country have shown little growth during the past 4 years. In 1993, Canada accounted for 55 percent of the quantity and 40 percent of the value of total U.S. cordage exports. These exports had a lower average unit value than those to most other countries, largely because the shipments to Canada contained large quantities of manmade-fiber agricultural twine. As shown in figure 14, other important export markets for U.S. cordage producers in 1993 were Mexico, Nigeria, Chile, Japan, Colombia, Hong Kong, the United Kingdom, Australia, and Panama, which together accounted for 41 percent of the total value of U.S. cordage exports. The Organization of Petroleum Exporting Countries (OPEC)[24] as a whole received $5 million (10 percent) of total U.S. exports in 1993, and the EU and the Caribbean Basin Economic Recovery Act (CBERA) countries[25] as a group each received $3 million (6 percent).

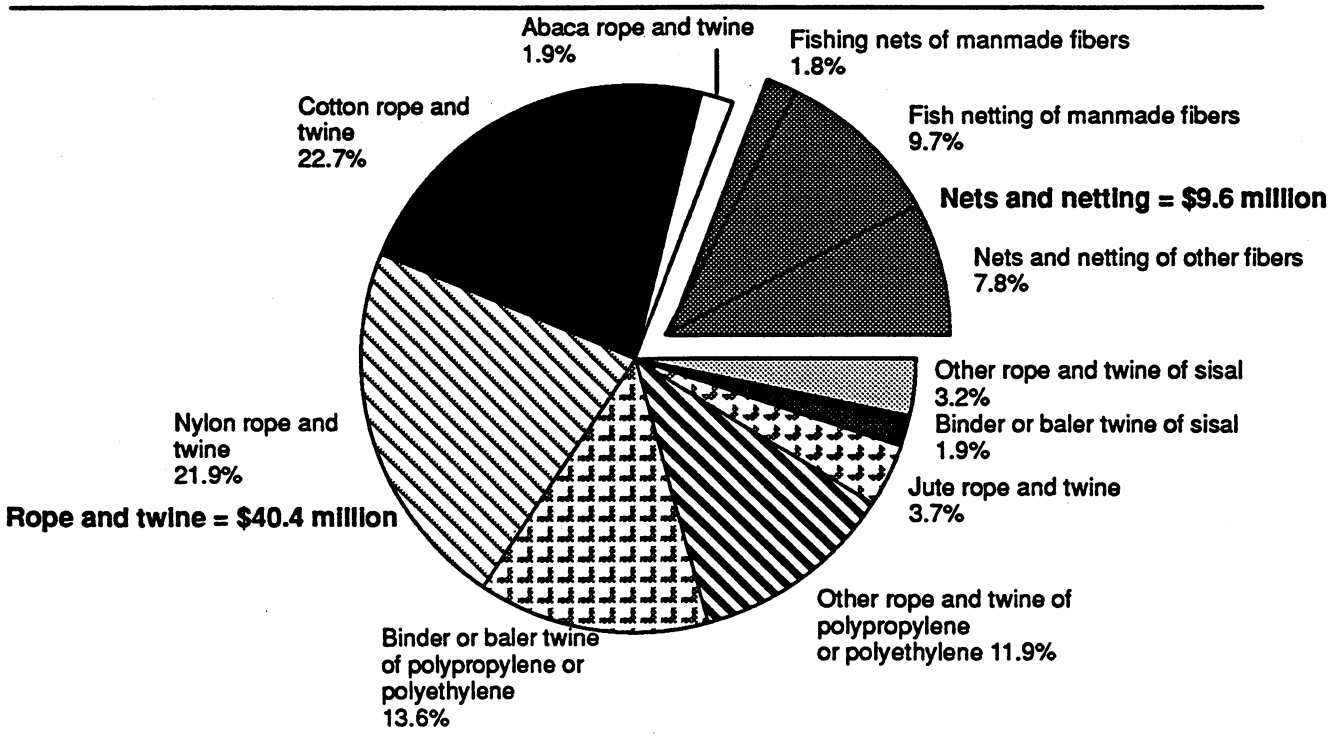
U.S. TRADE BALANCE

The United States maintained a negative trade balance for cordage each year during 1989-93. As shown in table 12, the annual trade deficit narrowed somewhat from slightly more than $90 million in 1989-90 to $72-73 million in 1992-93, reflecting an increase in U.S. exports and a slight decrease in U.S. imports. The decline in imports of sisal binder or baler twine from $60.9 million in 1989 to $49.6 million in 1993 had the greatest effect on the U.S. trade balance for cordage. The largest trade deficit was with Brazil, the major foreign supplier, which purchased only minimal amounts of U.S. cordage during 1989-93. Canada was the only major trading partner for cordage with which the United States recorded a trade surplus in cordage in the last 5 years.

[24] Includes Algeria, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

[25] Includes Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, Netherlands Antilles, Nicaragua, Panama, St. Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, and the British Virgin Islands.

Figure 13
Cordage: U.S. exports by types, 1993



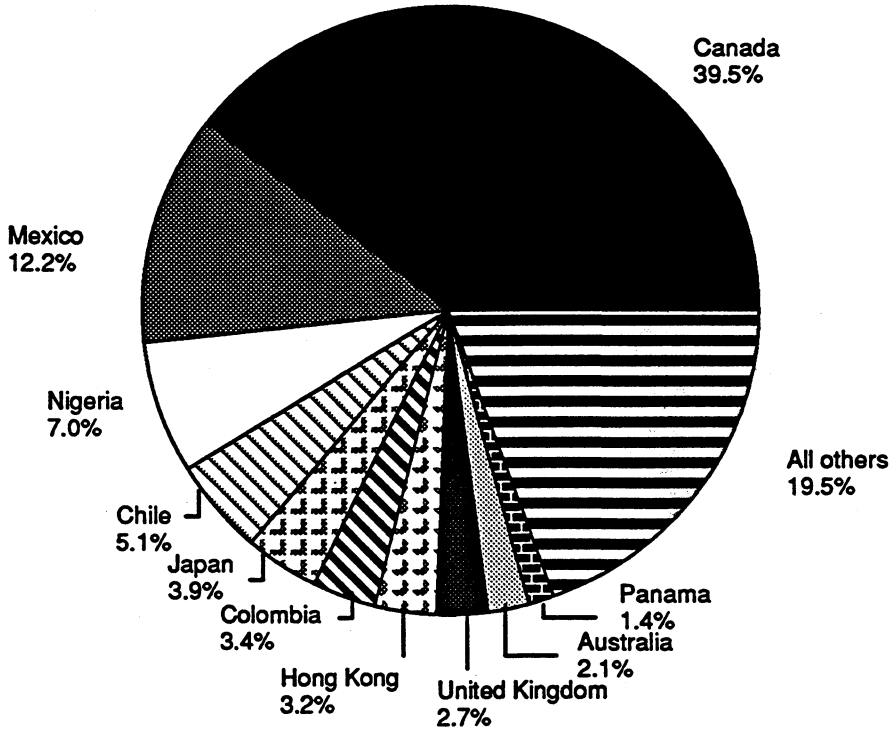
Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 11
Cordage: U.S. exports of domestic merchandise, by principal markets, 1989-93

Market	1989	1990	1991	1992	1993
	Quantity *(1,000 kilograms)*				
Canada	1,550	6,188	6,537	7,121	6,989
Mexico	552	762	787	1,045	889
Nigeria	1,429	2,019	1,222	1,848	1,773
Chile	371	154	169	361	452
Japan	31	73	106	137	202
Colombia	56	85	61	94	175
Hong Kong	3	69	194	232	130
United Kingdom	80	109	138	130	217
Australia	58	48	107	175	128
Panama	86	126	62	195	139
All other	1,711	1,959	1,977	1,999	1,532
Total	5,927	11,592	11,360	13,337	12,626
	Value *(1,000 dollars)*				
Canada	10,454	18,742	20,310	19,724	19,748
Mexico	3,525	5,011	5,741	5,788	6,081
Nigeria	2,091	3,287	2,219	2,907	3,513
Chile	2,488	877	1,138	2,304	2,571
Japan	492	1,159	1,433	1,716	1,958
Colombia	490	500	645	894	1,709
Hong Kong	29	721	2,937	3,420	1,620
United Kingdom	652	1,751	1,174	1,319	1,362
Australia	544	467	572	784	1,072
Panama	526	599	356	734	699
All other	10,979	11,353	11,671	12,815	9,696
Total	32,270	44,467	48,196	52,405	50,029
	Unit value *(per kilogram)*				
Canada	$6.75	$3.03	$3.11	$2.77	$2.83
Mexico	6.39	6.58	7.29	5.54	6.84
Nigeria	1.46	1.63	1.82	1.57	1.98
Chile	6.71	5.71	6.73	6.38	5.69
Japan	15.66	15.84	13.49	12.52	9.69
Colombia	8.72	5.91	10.58	9.51	9.75
Hong Kong	10.24	10.52	15.14	14.73	12.50
United Kingdom	8.15	16.00	8.51	10.15	6.26
Australia	9.33	9.81	5.36	4.47	8.36
Panama	6.08	4.74	5.70	3.76	5.05
All other	6.42	5.80	5.91	6.42	6.33
Average	5.44	3.84	4.24	3.93	3.96

Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 14
Cordage: U.S. exports by principal markets, 1993



Total = $50.0 million

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 12
Cordage: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries and country groups, 1989-93[1]

(Million dollars)

Item	1989	1990	1991	1992	1993
U.S. exports of domestic merchandise:					
Brazil	(2)	(2)	(2)	(2)	(2)
Canada	10	19	20	20	20
Mexico	4	5	6	6	6
Japan	(2)	1	1	2	2
Philippines	1	(2)	(2)	(2)	(2)
Korea	(2)	1	(2)	1	1
Taiwan	(2)	1	1	1	0
Portugal	0	0	(2)	0	0
Bangladesh	0	0	0	0	0
Thailand	(2)	(2)	(2)	(2)	(2)
All other	16	18	19	23	21
Total	32	44	48	52	50
European Union	4	4	4	4	3
OPEC	4	5	3	5	5
ASEAN	1	(2)	1	1	1
CBERA	3	5	3	3	3
Central Europe	(2)	(2)	(2)	(2)	(2)
U.S. imports for consumption:					
Brazil	43	46	47	46	42
Canada	6	5	5	8	9
Mexico	13	18	12	11	12
Japan	11	8	7	6	9
Philippines	7	8	6	6	8
Korea	9	8	6	6	6
Taiwan	7	6	5	5	5
Portugal	11	10	9	6	5
Bangladesh	(2)	2	1	4	5
Thailand	3	4	4	3	4
All other	17	23	24	23	20
Total	127	137	127	124	123
European Union	16	18	20	16	11
OPEC	(2)	1	(2)	(2)	(2)
ASEAN	10	12	10	10	12
CBERA	5	5	4	3	3
Central Europe	(2)	(2)	(2)	(2)	(2)
U.S. merchandise trade balance:					
Brazil	-43	-46	-47	-46	-42
Canada	4	14	15	12	11
Mexico	-9	-13	-6	-5	-6
Japan	-11	-7	-6	-4	-7
Philippines	-6	-8	-6	-6	-8
Korea	-9	-7	-6	-5	-5
Taiwan	-7	-5	-4	-4	-5
Portugal	-11	-10	-9	-6	-5
Bangladesh	(2)	-2	-1	-4	-5
Thailand	-3	-4	-4	-3	-4
All other	-1	-5	-5	(2)	1
Total	-95	-93	-79	-72	-73
European Union	-12	-14	-16	-12	-8
OPEC	4	4	3	5	5
ASEAN	-9	-12	-9	-9	-11
CBERA	-2	-1	-1	(2)	-1
Central Europe	(2)	(2)	(2)	(2)	(2)

[1] Import values are based on customs value; export values are based on f.a.s. value, U.S. port of export. U.S. trade with East Germany is included in "Germany" but not "Central Europe."

[2] Less than $500,000.

Source: Compiled from official statistics of the U.S. Department of Commerce.

APPENDIX A
EXPLANATION OF TARIFF AND TRADE AGREEMENT TERMS

The ***Harmonized Tariff Schedule of the United States*** (HTS) replaced the *Tariff Schedules of the United States* (TSUS) effective January 1, 1989. Chapters 1 through 97 are based upon the internationally adopted Harmonized Commodity Description and Coding System through the 6-digit level of product description, with additional U.S. product subdivisions at the 8-digit level. Chapters 98 and 99 contain special U.S. classification provisions and temporary rate provisions, respectively.

Rates of duty in the ***general*** subcolumn of HTS column 1 are most-favored-nation (MFN) rates; for the most part, they represent the final concession rate from the Tokyo Round of Multilateral Trade Negotiations. Column 1-general duty rates are applicable to imported goods from all nonembargoed countries except those enumerated in general note 3(b) to the HTS—Afghanistan, Azerbaijan, Cuba, Kampuchea, Laos, North Korea, and Vietnam—whose goods are dutiable at the rates set forth in ***column 2***. Goods from Albania, Armenia, Belarus, Bosnia, Bulgaria, the People's Republic of China, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan are now eligible for MFN treatment. Among goods dutiable at column 1-general rates, particular products of enumerated countries may be eligible for reduced rates of duty or for duty-free entry under one or more preferential tariff programs. Such tariff treatment is set forth in the ***special*** subcolumn of HTS column 1. Where eligibility for special tariff treatment is not claimed or established, goods are dutiable at column 1-general rates.

The ***Generalized System of Preferences*** (GSP) affords nonreciprocal tariff preferences to developing countries to aid their economic development and to diversify and expand their production and exports. The U.S. GSP, enacted in title V of the Trade Act of 1974 and renewed in the Trade and Tariff Act of 1984, applies to merchandise imported on or after January 1, 1976 and before September 30, 1994. Indicated by the symbol "A" or "A*" in the special subcolumn of column 1, the GSP provides duty-free entry to eligible articles the product of and imported directly from designated beneficiary developing countries, as set forth in general note 4 to the HTS.

The ***Caribbean Basin Economic Recovery Act*** (CBERA) affords nonreciprocal tariff preferences to developing countries in the Caribbean Basin area to aid their economic development and to diversify and expand their production and exports. The CBERA, enacted in title II of Public Law 98-67, implemented by Presidential Proclamation 5133 of November 30, 1983, and amended by the Customs and Trade Act of 1990, applies to merchandise entered, or withdrawn from warehouse for consumption, on or after January 1, 1984; this tariff preference program has no expiration date. Indicated by the symbol "E" or "E*" in the special subcolumn of column 1, the CBERA provides duty-free entry to eligible articles, and reduced-duty treatment to certain other articles, which are the product of and imported directly from designated countries, as set forth in general note 7 to the HTS.

Preferential rates of duty in the special subcolumn of column 1 followed by the symbol "IL" are applicable to products of Israel under the ***United States-Israel Free Trade Area Implementation Act*** of 1985 (IFTA), as provided in general note 8 to the HTS. Where no rate of duty is provided for products of Israel in the special subcolumn for a particular provision, the rate of duty in the general subcolumn of column 1 applies.

Preferential nonreciprocal duty-free or reduced-duty treatment in the special subcolumn of column 1 followed by the symbol "J" or "J*" in parentheses is afforded to eligible articles the product of designated beneficiary countries under the ***Andean Trade Preference Act*** (ATPA), enacted in title II of Public Law 102-182 and implemented by Presidential Proclamation 6455 of July 2, 1992 (effective July 22, 1992), as set forth in general note 11 to the HTS.

Preferential rates of duty in the special subcolumn of column 1 followed by the symbol "CA" are applicable to eligible goods of Canada, and those followed by the symbol "MX" are applicable to eligible goods of Mexico, under the ***North American Free Trade Agreement***, as provided in general note 12 to the HTS, effective January 1, 1994.

Other special tariff treatment applies to particular ***products of insular possessions*** (general note 3(a)(iv)), goods covered by the ***Automotive Products Trade Act*** (APTA) (general note 5) and the ***Agreement on Trade in Civil Aircraft*** (ATCA) (general note 6), and ***articles imported from freely associated states*** (general note 10).

The ***General Agreement on Tariffs and Trade*** (GATT) (61 Stat. (pt. 5) A58; 8 UST (pt. 2) 1786) is a multilateral agreement setting forth basic principles governing international trade among its signatories. The GATT's main obligations relate to most-favored-nation treatment, the maintenance of

scheduled concession rates of duty, and national (nondiscriminatory) treatment for imported products; the GATT also provides the legal framework for customs valuation standards, "escape clause" (emergency) actions, antidumping and countervailing duties, and other measures. Results of GATT-sponsored multilateral tariff negotiations are set forth by way of separate schedules of concessions for each participating contracting party, with the U.S. schedule designated as Schedule XX.

Officially known as "The Arrangement Regarding International Trade in Textiles," the ***Multifiber Arrangement*** (MFA) provides a framework for the negotiation of bilateral agreements between importing and producing countries, or for unilateral action by importing countries in the absence of an agreement. These bilateral agreements establish quantitative limits on imports of textiles and apparel, of cotton and other vegetable fibers, wool, man-made fibers and silk blends, in order to prevent market disruption in the importing countries—restrictions that would otherwise be a departure from GATT provisions. The United States has bilateral agreements with many supplying countries, including the four largest suppliers: China, Hong Kong, the Republic of Korea, and Taiwan.