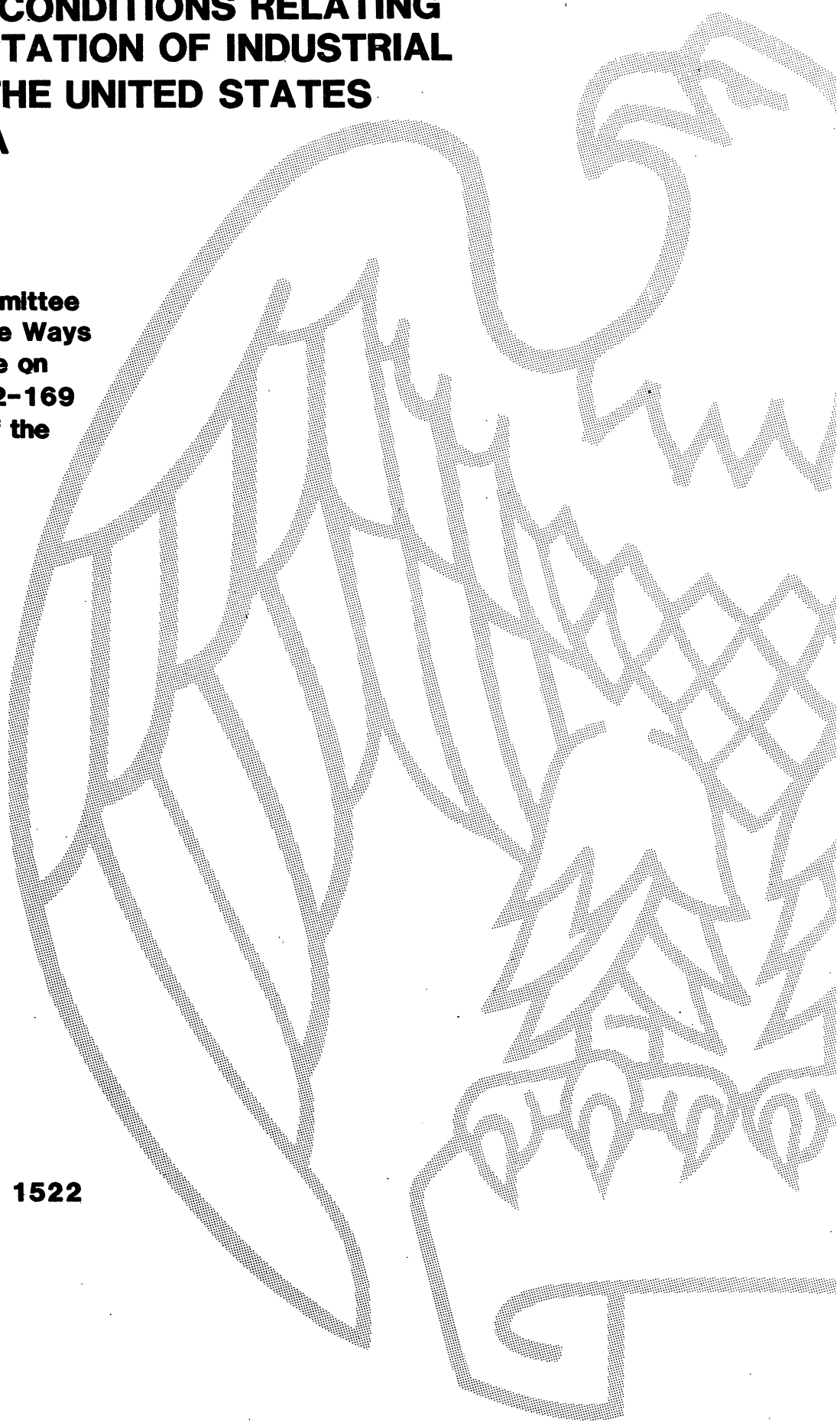
COMPETITIVE CONDITIONS RELATING TO THE IMPORTATION OF INDUSTRIAL MOLDS INTO THE UNITED STATES FROM CANADA

Report to the Subcommittee on Trade of the House Ways and Means Committee on Investigation No. 332-169 Under Section 332 of the Tariff Act of 1930



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PREFACE

Following receipt of a request dated August 19, 1983, from the Chairman of the Subcommittee on Trade of the Committee on Ways and Means of the U.S. House of Representatives (app. A), the U.S. International Trade Commission, on its own motion, instituted investigation No. 332-169, under section 332(b) of the Tariff Act of 1930, for the purpose of gathering and presenting information on competitive conditions relating to the importation of industrial molds into the United States from Canada. As requested by the Subcommittee on Trade, the study presents (1) a profile of the U.S. and Canadian industries, including both a descriptive view of the industries and an analysis of the various strengths and weaknesses of each industry in terms of such factors as raw material, capital, labor availability and cost, and technology level; (2) an analysis of key economic factors in the U.S. market, including U.S. consumption, production, trade, and other relevant factors; (3) a discussion of U.S. and Canadian Government policies and regulations and their influence on the industrial mold industry; and (4) an analysis of the conditions of competition in the U.S. market between domestic and Canadian products, including factors such as price, quality, marketing techniques, and after-sales service. Notice of the investigation was given by posting copies of the notice of investigation at the Office of the Secretary, U.S. International Trade Commission, Washington, D.C., and by publishing the notice in the Federal Register (48 F.R. 43109, September 21, 1983) (app. B).

In the course of this investigation, the Commission collected data from questionnaires sent to 260 producers and 271 purchasers of industrial molds. Responses were received from 82 producers, representing 12 percent of the value of U.S. shipments in 1983 and from 163 purchasers accounting for 13 percent, by value, of apparent U.S. consumption that year. Responses from U.S. purchasers of Canadian molds accounted for almost 20 percent of total imports, by value, from Canada in 1983. Responses received from the 163 purchasers account for a large cross section of the user industries and included responses from all of the U.S. automobile producers.

Information was also received in the form of testimony presented by U.S. and Canadian producers of industrial molds (app. C) at a public hearing held by the Commission on February 2, 1984. Further information was obtained from agencies of both the Canadian and U.S. Governments, from industry associations, and from interviews with corporate executives representing purchasers, producers, and importers, and from other sources.

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EXECUTIVE SUMMARY

Industrial molds are basic tools used by over 100,000 firms in the United States to produce industrial parts from such materials as plastics, nonferrous alloys, rubber, glass, and other materials. Molds are used in producing diverse articles such as plastic and metal parts for motor vehicles; plastic and metal parts for electrical appliances and electronic products; plastic toys and containers; rubber shoes and tires; concrete blocks, pipes, and poles; ceramic tiles and plumbing fixtures; glass bottles; and other parts for machinery and transportation equipment.

Demand for industrial molds is particularly sensitive to the economic health of other manufacturing sectors, particularly the motor vehicle industry, which accounts for the largest volume of mold purchases. Declining manufacturing production in 1982 was accompanied by lower U.S. export levels and slight production increases of industrial molds. At the same time, however, imports of such products continued their steady increase, raising concern in the U.S. industrial mold industry over their competitive position in the U.S. market vis-a-vis that of Canadian producers, the primary foreign suppliers of imported molds.

This study describes and analyzes the trends that contributed to the present economic condition of the U.S. industry and compares the U.S. industry's competitive position with that of Canada's. The major findings of the study are summarized below.

1. THE U.S. INDUSTRIAL MOLD INDUSTRY

- o The number of establishments in the industrial mold industry increased slightly during 1979-83, but employment declined.

Currently, about 4,000 establishments produce molds in the United States, slightly above the level of 1977 (according to one estimate from the National Tooling & Machining Association). The majority of these firms are located in the East North Central States, with Ohio, Michigan, and Illinois especially important, and in the Middle Atlantic States, including Pennsylvania, New Jersey, and New York. The industry is made up mainly of small- to medium-sized firms, whose average annual sales range between $500,000 and $2.5 million. Estimated employment in the U.S. industrial mold industry rose from 36,000 in 1979 to 37,800 in 1980, and then declined annually to 33,700 in 1983, 88 percent of whom were production workers. This decline in total estimated employment of 8 percent during the period compares with a 3 percent decline reported in the Commission's survey. Many small firms entered and left the industry during 1979-83. According to certain industry and U.S. government sources, more firms entered the industry than left during this period.

- o U.S. firms using molds are also important mold producers.

Purchasers of molds responding to the Commission's survey indicated that during 1979-83, the number of molds they produced ranged from a low of 2,004

molds (1982) to a high of 2,625 molds (1983). This compares with nonpurchaser mold production in the United States of 7,711 molds in 1982 and 7,279 molds in 1983. Purchasers produce their own molds to keep workers fully utilized, to protect proprietary interests, and, in some cases, because they have developed large, efficient mold shops that can produce at competitive prices, with the advantage of close control over quality and delivery.

- o Despite an upward trend in the value of U.S. shipments during 1979-83, industry earnings declined throughout the period.

Shipments rose from $1.28 billion in 1979 to $1.54 billion in 1981, then increased slightly to an estimated $1.57 billion in 1982 and an estimated $1.60 billion in 1983. Net profits (before taxes) as a share of net sales decreased annually during 1979-83, from 11.1 percent in 1979 to 4.1 percent in 1983, according to the Commission's survey. Excess capacity and lower demand than expected encouraged producers to lower prices in order to obtain sales.

- o U.S. industry added capacity during 1979-83, but capacity utilization declined.

The U.S. industrial mold industry, as reported by respondents to the Commission's survey, increased capacity more rapidly than shipments during 1979-83. Many of these responding firms are large concerns that added more automated machinery than others within the industry. It is probable that delivery of these machines after 1980 contributed to the lower capacity utilization ratios experienced by the industry during 1981-83, when demand rose only slightly. Such ratios declined annually, from 80 percent in 1979 to 66 percent in 1983.

- o Exports of industrial molds and parts by the United States, the world's second largest exporter, increased during 1979-81 but declined in 1982 and 1983.

During 1979-83, the United States was the world's second largest exporter of industrial molds, with West Germany the largest. U.S. exports of industrial molds and parts increased from $103 million in 1979 to $173 million in 1981 and then decreased to $169 million in 1982 and $163 million in 1983, representing an overall increase of 58 percent during 1979-83. U.S. exports as a share of U.S. shipments rose annually during 1979-82, from 8 percent in 1979 to an estimated 14 percent in 1982, and then declined to 12 percent in 1983. The principal types of molds exported during 1979-83 were molds used for rubber and plastics materials. Canada was the largest foreign market for U.S.-produced molds and parts, receiving 41 percent of U.S. exports of such products in 1983.

2. THE CANADIAN INDUSTRIAL MOLD INDUSTRY

- o <u>According to industry sources in Canada, there are approximately 246 moldmaking shops in Canada</u>.

The Commission staff has identified 196 Canadian mold producers, with as many as 50 additional firms occasionally producing industrial molds. Current information available indicates that of the 196 mold producers, 170 are located in the Province of Ontario and 21 are located in the Province of Quebec. The remaining Canadian mold firms are located throughout the other Provinces of Canada, but not in any significant concentration.

- o <u>Canadian mold shops tend to be privately held, and current data indicates few foreign subsidiaries</u>.

According to industry sources, Canadian mold shops are primarily private corporations controlled principally by Canadian interests. Canadian industry sources indicated that only one firm is now under the control of U.S. interests.

- o <u>Canadian shipments of industrial molds increased during 1979-82</u>.

Total Canadian shipments of industrial molds increased annually from $117 million in 1979 to $161 million in 1982; this is attributed to an increase in consumption of Canadian-produced molds in the United States and Canada by the automotive industry. During 1979-83, molds for plastics machinery accounted for 64 percent of total Canadian mold shipments (including Canadian export shipments). Such molds maintained a large, but declining, share of Canadian shipments throughout the period, amounting to 64 percent in 1979 and 56 percent in 1983.

- o <u>Canadian exports of dies and molds for plastics machinery increased during 1979-83. The largest market for these exports is the U.S. automotive industry</u>.

Canadian exports of dies and molds for plastics machinery increased from $78 million in 1979 to $101 million in 1981 and then declined to $94 million in 1982 before increasing to $126 million in 1983. (Data on exports of all industrial molds are not available; however, dies and molds for plastics machinery account for the majority of Canadian exports of all industrial molds.) The United States is the largest market for Canadian-produced dies and molds for plastics machinery. Approximately 90 percent of these Canadian exports are marketed in the United States. Canadian exports of these products to the United States increased from $69 million in 1979 to $108 million in 1983. It is estimated that over one-half of Canadian shipments of dies and molds for plastics machinery are exported to the United States. The largest market for these products is the automotive industry.

- o Capacity utilization of Canadian producers has recently decreased.

According to estimates provided by Canadian industry sources, capacity utilization in the Canadian industry decreased annually, from 84 percent in 1979 to an estimated 63 percent in 1982. A number of new firms entered the field in the late 1970's. Such firms did not anticipate the U.S. downturn of demand in 1981-83.

3. THE U.S. MARKET AND WORLD TRADE

- o U.S. domestic shipments, according to the Commission's survey, are purchased principally by the automotive, appliance, electronics, and pharmaceutical industries.

In 1979, the automotive market accounted for 40 percent of total industry shipments. By 1983, the automotive market had decreased to 32 percent of total industry shipments. Other principal purchasers of industrial molds in the U.S. market in 1983 were the following industries: appliances (15 percent); electronics (16 percent); and pharmaceuticals (8 percent).

- o The value of estimated U.S. consumption increased during 1979-83, on the basis of current dollar values.

During 1979-83, apparent U.S. consumption of industrial molds rose annually, from $1.31 billion in 1979 to $1.52 billion in 1981, then increased slightly to an estimated $1.56 billion in 1982 and an estimated $1.61 billion in 1983. Demand for industrial molds held up throughout the period, despite a downturn in production by the automotive industry, the mold industry's major customer. Increased tooling requirements by the automotive industry to accomplish a major introduction of new models, including extensive downsizing, explains this sustained demand for molds in the automotive industry.

- o During 1979-82, the United States was the world's largest importer of industrial molds; such imports increased annually during 1979-83, with Canada, Portugal and Japan the largest suppliers.

During 1979-82, the United States was the world's largest importer of industrial molds, followed by West Germany. France was a distant third. During 1979-83, U.S. imports increased annually from $134 million in 1979 to $174 million in 1983, or by 30 percent. In 1983, Canada was the largest source of such imports, representing 54 percent of the value of total U.S. imports, followed by Portugal (11 percent) and Japan (8 percent). These three countries remained the major foreign U.S. suppliers throughout 1979-83. The ratio of U.S. imports to consumption decreased from 10.2 percent in 1979 to 9.3 percent in 1980, and then increased to 9.6 percent in 1981, 9.8 percent in 1982, and 10.8 percent in 1983.

4. GOVERNMENT INVOLVEMENT AND INFLUENCE.

- o Historically, U.S. tariff rates on imports of industrial molds, parts, and supplies from Canada have been lower than Canadian tariff rates on imports of these products from the United States.

U.S. rates of duty on Canadian imports of industrial molds, parts, and supplies now range from free to 4.9 percent ad valorem. The vast majority of imports are classified as industrial molds and are currently assessed a duty rate of 4.5 percent ad valorem. Imports of industrial molds from the United States are accorded most-favored-nation status and are assessed a duty rate of 11.4 percent ad valorem.

- o Nontariff barriers in the United States and Canada are not specifically identified with industrial molds; however, a number of general nontariff barriers have been identified.

Referring to trade in general, an example of a nontariff barrier mentioned for the United States was the uncertainty of the TSUS classification, its nonconformity with the CCCN, and the need for explanatory notes. For Canada, a cited nontariff barrier concerned countervailing duty investigations in which there is no requirement to determine that a Canadian industry is injured due to imports.

- o Since 1964, the preemployment institutional training program of the U.S. Department of Labor has provided funds to the U.S. precision tooling and machining industry, including the industrial mold industry.

Since March 1979, the U.S. precision tooling and machining industry, including the industrial mold industry, has received almost $8 million to conduct preemployment institutional training programs. Under a current $1.5 million program, a 12-week instructional plan provides for the recruitment of economically disadvantaged persons in eight States. Instruction includes blueprint reading and interpretation, machine theory, tool selection, and materials-processing methods. The majority of the trainees are placed in on-the-job training slots as tool and diemakers, moldmakers, and machine tool operators.

- o Since 1979, the U.S. Small Business Administration (SBA) has approved loans to 293 companies in the special dies, tools, jigs, and fixtures industry, totaling $526 million.

Loans totaling a gross value of $526 million have been approved since 1979 under the various loan programs of the SBA. Industrial mold shipments accounted for about one-quarter of total shipments of the special dies, tools, jigs, and fixtures industry in 1981; on this basis, it is estimated that roughly 75 firms that make industrial molds may have received SBA loans.

- o The Canadian Government provides a wide range of programs, tax incentives, and services to promote the expansion of business in Canada.

There are a variety of programs available to Canadian firms to assist Canadian industries, although none of these programs were identified as providing benefits solely to the industrial mold industry. It is estimated that the value of such known assistance provided to the Canadian mold industry by the Canadian Government for all products manufactured by the industry amounted to $4.8 million over the past six years.

The Canadian manpower programs were the largest Canadian programs in terms of the value of benefits provided to the mold producers. During fiscal years 1979-82, the value of benefits provided to the Canadian mold industry by the Canadian Employment and Immigration Commission for apprenticeship and nonapprenticeship programs amounted to $1.1 million.

5. CONDITIONS OF COMPETITION

- o Canadian producers of industrial molds have a competitive advantage over domestic producers in the areas of labor and energy costs.

The most significant cost advantage enjoyed by Canadian manufacturers vis-a-vis U.S. producers is in wages, which typically account for 65-70 percent of total production costs. When a comparison is made in U.S. dollars, these wage rates in Canada for tool and die makers were 20.9 percent lower than those in the North Central States of the United States during 1983. Prices of natural gas and electricity in Canada during 1979-83 were significantly lower than those in the United States, although energy usage accounts for only a small portion of overall production costs.

- o The U.S. industry has a competitive advantage over Canadian producers in the cost of component parts, cost of capital, and the level of production technology.

Both U.S. and Canadian producers of industrial molds purchase most of their component parts from U.S. sources, but the Canadian producers pay higher prices because of import duties. The cost of short- and long-term capital was lower in the United States than in Canada during the study period. The short-term (prime) interest rate in the United States, was approximately 0.2 percentage points lower than the short-term interest rate in Canada, during the same period. Furthermore, long-term interest rates were an average of 1.1 percentage points lower in the United States than in Canada during 1979-83.

The industry also maintained an advantage in terms of production technology. The U.S. industrial mold producers maintained and operated a larger number of CAD/CAM programing systems than their Canadian counterparts.

- o <u>According to bid-request data reported by U.S. purchasers of industrial molds, awards were generally made to firms quoting the lowest price, but significant exceptions were also reported</u>.

Of the 104 reported awards, which involved competition between domestic and Canadian mold shops, 78 orders, totaling $8.5 million, were made to firms quoting the lowest price, and 26 orders, totaling $5.2 million, were made to firms not quoting the lowest price, but offering better quality or more timely delivery than competing suppliers. Of the 78 awards to firms quoting the lowest price, Canadian firms won 57, totaling $5.5 million, and undersold the lowest competing U.S. bids by a weighted-average margin of 11 percent, whereas U.S. firms won 21, totaling $3.0 million, and undersold the lowest competing Canadian bids by a weighted-average margin of 15 percent. Of the 26 awards to firms not quoting the lowest price, Canadian firms won 16, totaling $4.4 million, and U.S. firms won 10, totaling $0.8 million.

- o <u>U.S. purchasers consider an existing supplier relationship, availability of the product, and shorter delivery time as the most important reasons for buying from a U.S. source; for buying from Canada, shorter delivery time and supplier relationship were also considered important, but lower purchase prices was most often cited in responses to the Commission's survey</u>.

U.S. purchasers responding to the Commission's questionnaire ranked the reasons for buying molds from domestic sources and Canadian sources. They stated that an existing supplier relationship was the most important reason for buying from domestic sources. Availability of the product and a shorter delivery time than offered by foreign suppliers were the second and third most likely reasons, respectively, for buying from domestic sources. When procuring from Canadian sources, virtually all indicated that a lower purchase price than offered by U.S. suppliers was the most important reason, followed by shorter delivery time, and an existing supplier relationship.

- o <u>The U.S. dollar appreciated against the Canadian dollar in real terms by 12.7 percent from January-March 1977 to April-June 1981 before declining by 3.7 percent through October-December 1983</u>.

The quarterly real exchange rate between the Canadian and U.S. dollar increased by 8.5 percentage points between January-March 1977 through October-December 1983. Most of this appreciation occurred before 1979 and may have had some impact on U.S. imports of industrial molds from Canada since 1977.

- o <u>U.S. mold producers undertook measures to compete more effectively in U.S. and foreign markets</u>.

U.S. industrial mold producers usually responded to increased competition in their home market and in foreign markets by implementing cost-reduction efforts, maintaining or reducing prices, or cutting back production of industrial molds, upgrading plants and equipment, and improving mold quality.

DESCRIPTION AND USES

Industrial molds are basic tools used by more than 100,000 firms in the United States to mold industrial parts from such materials as plastics, nonferrous alloys, rubber, glass, and other materials. These molds range from simple, gravity-fed impressions that are cut in steel blocks to highly complex, multiple-cavity molds for pressure casting. Molds may also incorporate heating elements and adjustable features that permit changing the size and configuration of the mold. Molds are used in producing such important and diverse articles as interior and exterior plastic metal parts for motor vehicles; plastic and metal parts for electrical appliances and electronic products; plastic toys and containers; rubber shoes and tires; concrete blocks, pipes, and poles for street lighting; ceramic tiles and plumbing fixtures; glass bottles; and other parts for machinery and transportation equipment, e.g., wheels, pistons, cylinder blocks, base plates, and housings.

This study focuses primarily on the major types of industrial molds produced in the United States, including molds for plastics, especially the injection mold type; molds for die-casting metals, and molds for molding rubber products. Particular emphasis will be placed on molds for plastics, by far the major type of industrial mold produced in the United States and imported into the United States from Canada. 1/

The smallest steel industrial molds, costing as little as $3,500, are designed for small-volume use and include a single cavity. Examples of such molds include molds for forming plastic forks or scotch tape dispensers. The largest industrial molds, costing as much as $450,000, are designed for large-volume use, include multicavities, and weigh as much as 4 tons. Molds used for producing automatic transmission casings are included in this category. Industry sources indicate that more complex molds are now made to take advantage of new technology which permits better regulation of heat and pressure during the molding process. In addition, increased design capabilities are responsible for the manufacture of molds that produce more complex parts simultaneously.

Molds for Plastics

Molds for plastics include a variety of types including injection, compression, blow, reinforced, transfer, forming, plunger, and rotational types. Molds basically consist of two sections, usually made of metal, that are joined during the manufacturing process. The plastic is inserted into those sections in a molten form and, when set, is removed in a hardened form. The injection mold is the most common for plastics.

Figure 1 depicts a simple injection mold in the closed position after plastic has been injected into the mold. Identified in this figure are

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1/ U.S. imports of industrial molds and parts and molders' patterns for the manufacture of castings from Canada totaled $93.4 million in 1983, of which $68.7 million, or 74 percent, consisted of injection molds for rubber or plastics materials, excluding shoe machinery molds.

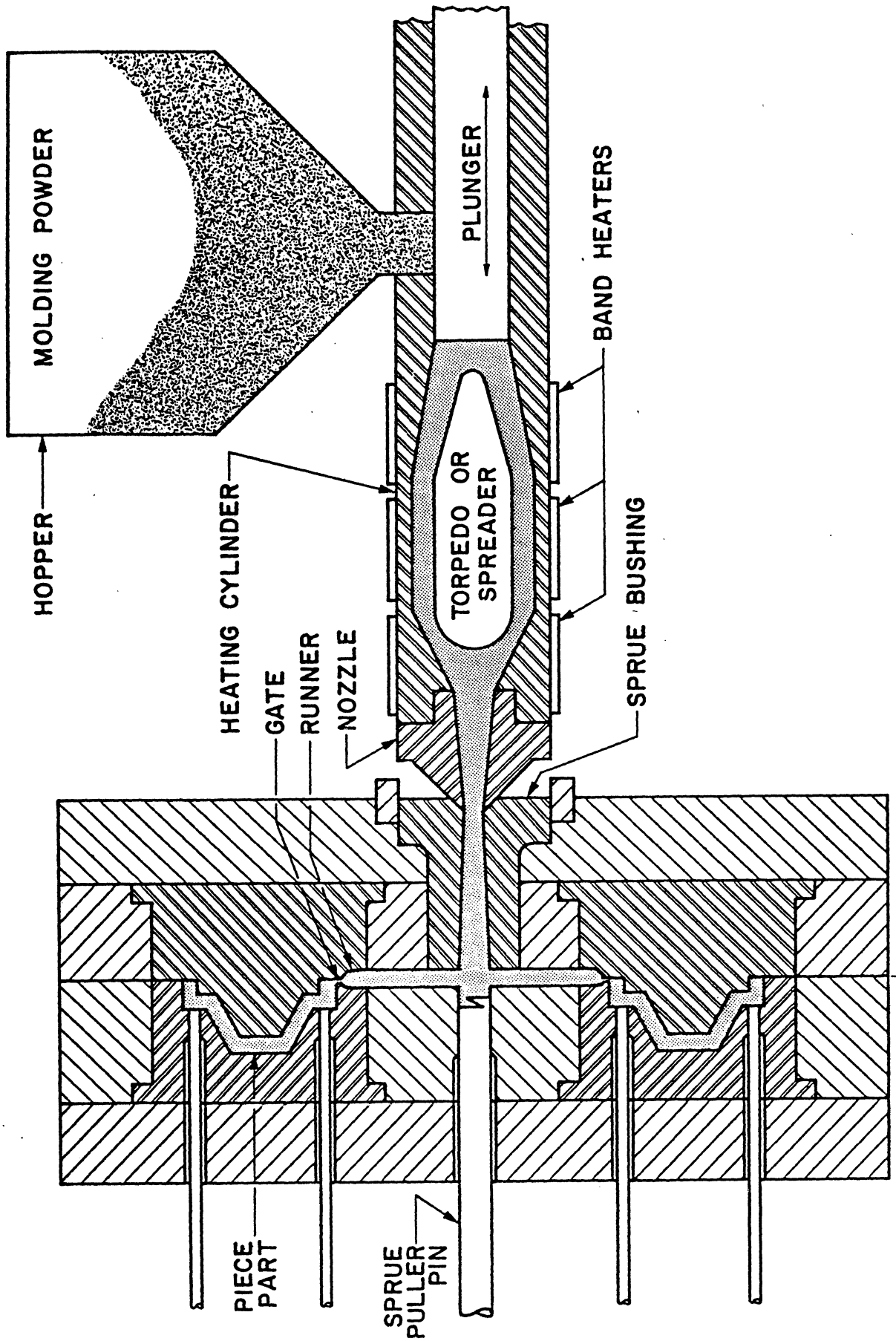


Figure 1.--Simple plastic injection mold, in the closed position.

Source: National Tooling & Machining Association, Moldmaking and Die Cast Dies for Metalworking Trainees, 1978.

certain parts or features that are common to molds in general. A runner is a groove or channel cut into either one or both halves of the mold which carries the molding material to the vicinity of the cavities. A cavity is the depression or female portion of the mold which gives the external shape to the part being produced. A gate is an opening at the end of the runner through which the material enters the cavity. A sprue puller is a pin, hole, or undercut located opposite the opening of an injection mold which is used to remove the hardened material when the mold is opened.

Molds for Metals

Molds for metal include mainly die-casting molds, two important classes being (1) molds for zinc die-casting and molds for aluminum die-casting, and (2) foundry molds. A mold for zinc die-casting consists of two sections, a stationary and a moveable portion. In figure 2, the two sections which meet at the parting line contain the hardened cavities and cores. The molten alloy enters the mold and is then deflected into the runners by the sprue spreader. The ejector portion also contains a housing which provides room for the ejector mechanism movement.

Molds for Rubber

Molds for rubber are used to make a multitude of parts and products, but the most important type is used to make motor-vehicle tires. Molds for mechanical rubber goods have two basic designs, transfer and compression (figs. 3 and 4). Transfer molds are designed with a transfer pot into which a crude-rubber compound is placed in sheet form. The plunger enters the pot, and by means of pressure from a hydraulic press, the compound is transferred into the cavities through openings. Compression molds usually need only two plates. With the plates apart, the compound is placed in the cavity and the two mold halves are put together and compressed in a hydraulic press.

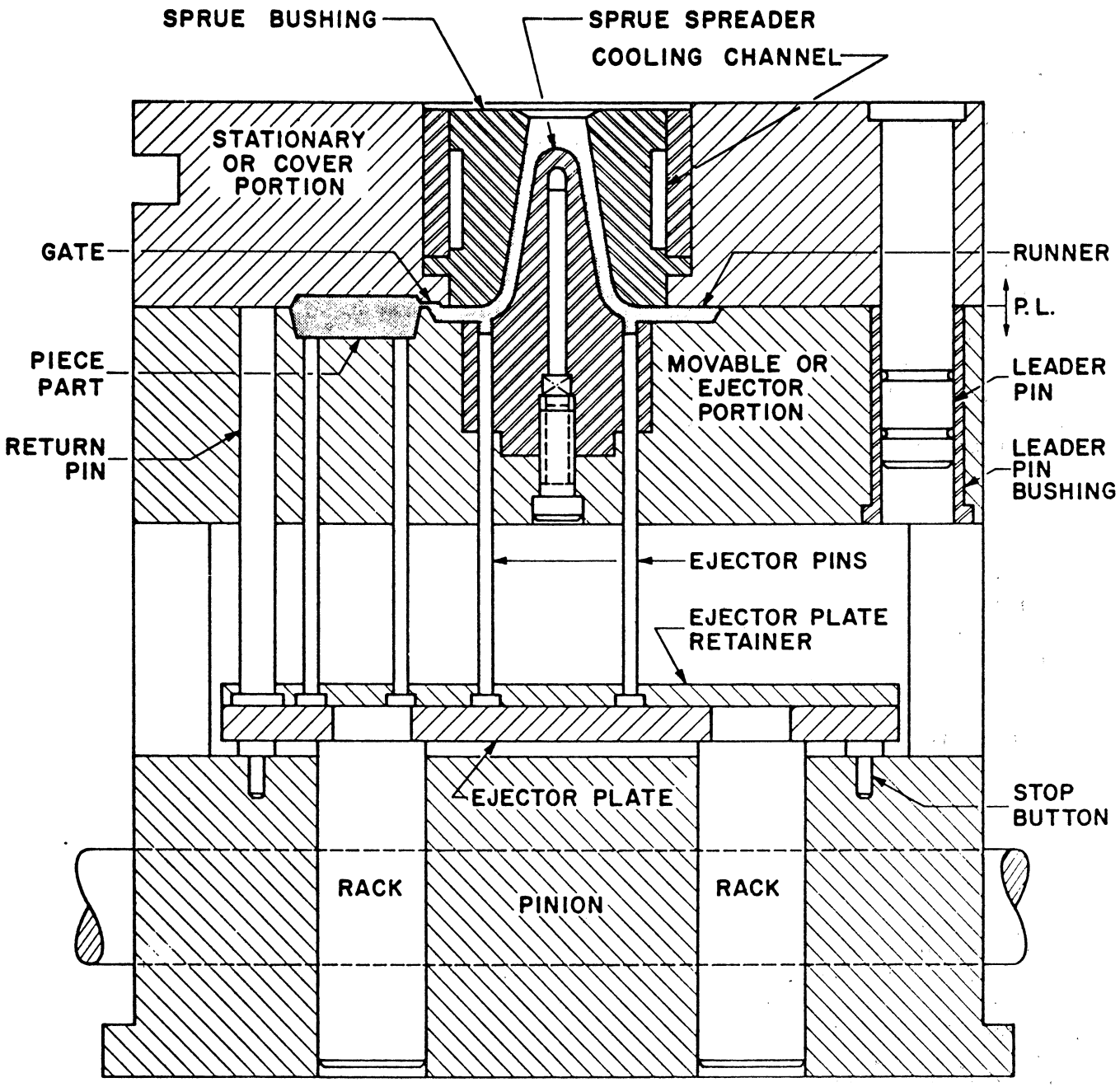
Other Molds, Parts, and Accessories

All other molds, including molds for glass and other materials and mold bases, account for roughly 10 percent of total industrial mold production. Industrial molds made of materials other than metal represent about 1 percent of industry output. Parts of molds were included in the statistics throughout this report, as indicated. Also included with foreign trade statistics are molders' patterns that are shaped to the same configuration as that of the desired part. These patterns are generally made from wood or some other easily worked material; where many castings of the same part will be produced, duplicate patterns are made from an original or master pattern.

The Sourcing and Manufacturing Process

A moldmaker typically will receive information from a potential customer, including drawings of a part to be made, the type of material to be used, the projected production rate of the part, and the machine that will produce the

Figure 2.--Mold for zinc die-casting.



Source: National Tooling & Machining Association, Moldmaking and Die Cast Dies for Metalworking Trainees, 1978.

Figure 3.--Transfer mold for rubber goods.

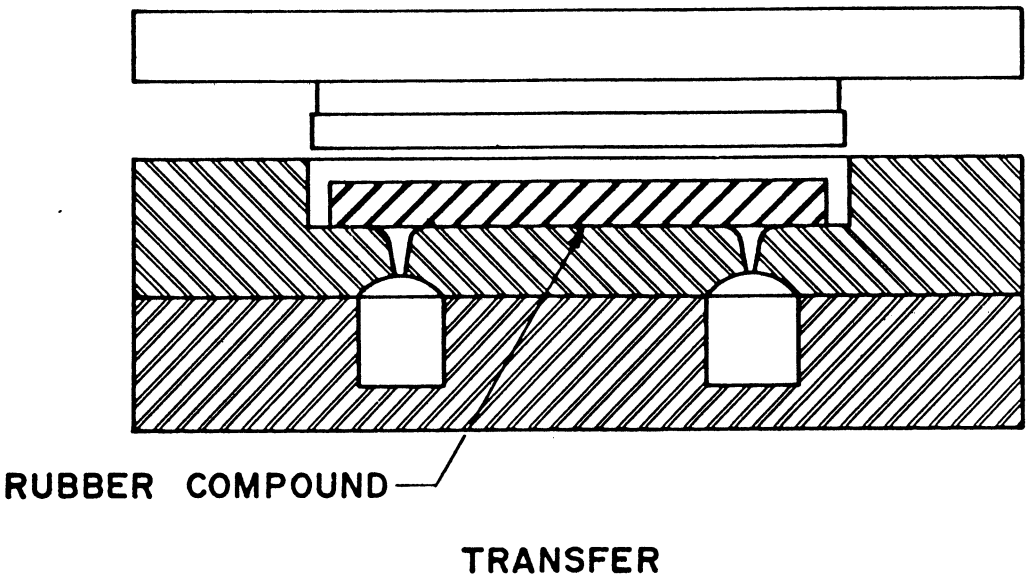
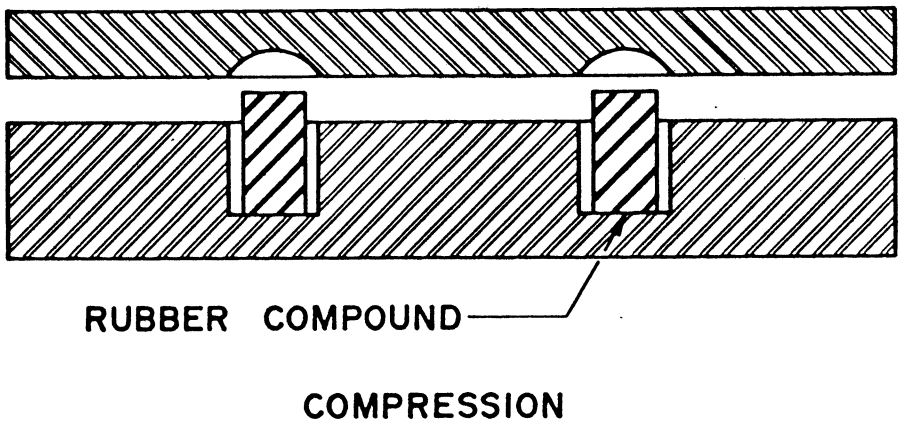


Figure 4.--Compression mold for rubber goods.



Source: National Tooling & Machining Association, Moldmaking and Die Cast Dies for Metalworking Trainees, 1978.

part. Next, the moldmaker estimates the total cost of the mold, including design, labor, materials, and profit. In addition, a delivery time must be specified. Finally, the bid is submitted.

Once a moldmaker wins a bid, the following processes usually take place: 1/ (1) The design is completed and submitted for customer approval; (2) additional engineering decisions are made; (3) necessary materials are purchased, including steel and the mold base (if not manufactured by the moldmaker); (4) the various machining operations on the steel block, including electric discharge machining (to create the mold cavity), various milling operations, grinding, jig boring, jig grinding, finishing (engraving or texturing), and polishing are performed; (5) fitting and assembly are completed; (6) the testing process, including running a sample shot of the part, to be sent to the customer for inspection is done; and (7) the mold is shipped to the customer.

Recent technological developments include new types of electrodes which burn the desired cavity into the mold metal and orbital grinders which replace some of the hand polishing requirements, a time-consuming and expensive part of the manufacturing process. There has been an evolution in this industry toward the increased use of numerically controlled (NC) and computer numerically controlled (CNC) machine tools. Most significant of all, especially for the future, has been the introduction of computed-aided-design and computer-aided-manufacture (CAD/CAM) programing systems in a few of the largest U.S. and Canadian moldmaking plants. 2/ Technological developments will be covered more fully in a later section of the report.

CUSTOMS TREATMENT

U.S. Tariff Treatment

Industrial molds and parts are classified under several items of the Tariff Schedules of the United States (TSUS). Molders' patterns which are within the scope of this investigation are classified under TSUS item 680.07. Molds used for rubber or plastics materials are classified under TSUS items 680.11 and 680.12. Molds used for metals (except ingot molds), for metallic carbides, glass, and mineral materials and other molds are classified under TSUS item 680.13. Parts of industrial molds are classified under the parts provisions of the various types of molding machines in which they will be used. Thus, parts of molds used in metallurgy and in foundry industries are

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1/ A major auto producer indicated that designing a mold is a share venture between itself and the selected moldmaker. The car producers' engineer sketches a mold, including any features that would affect price. Then the selected moldmaker does the final drawing and carries out the production. Approximately 20 percent of this design cost would be accrued by the auto producer.

2/ On Nov. 16, 1983, the Commission staff met with members of the Windsor Alliance of Moldmakers, which represents about 50 Canadian mold producers. A representative of one of Canada's largest moldmakers contends that the Canadian moldmaking industry is 2 years behind the U.S. moldmaking industry in adopting CAD/CAM.

classified under TSUS item 674.10 as parts of converters, ingot molds, and casting machines; parts of molds for rubber or plastics materials are classified under TSUS item 678.35, as parts of machines used for molding or otherwise forming rubber or plastic articles.

The column 1 rates of duty shown in appendix D for industrial molds and parts were reduced as a result of negotiations in the Tokyo round of the Multilateral Trade Negotiations (MTN). 1/ Table 1 provides the staged reductions in the rates of duty as a result of the MTN.

Canadian Tariff Treatment

Industrial molds are classified under item 42700-1 of Schedule A, Group 8, of the Tariff Schedules of Canada. Duty reductions for industrial molds and parts were established during the Tokyo round of the MTN. The rates of duty applicable to Canadian imports of industrial molds are shown in table 2.

Canada maintains a five-tiered tariff system. The lowest rates apply to imports from all Commonwealth countries under British preferential tariff treatment. Industrial molds imported from the United States are accorded MFN rates as shown in the following tabulation (in percent ad valorem):

Item No.	Description	Present 1/ rate of duty	Negotiated rate of duty
42700-1	Machines, n.o.p., and accessories attachments, control equipment, and tools for use therewith; parts of the foregoing-------	11.4%	8%

1/ Rate currently applicable to imports from the United States, effective Jan. 1, 1984.

The highest or general rates apply to imports from the few countries with which Canada has no trade agreements. General preferential rates apply to certain imports from developing countries. Special rates are accorded to

1/ See explanation in app. D.

Table 1.--Industrial molds and parts: U.S. rates of duty, by TSUS items

(Percent ad valorem)

TSUS item No. 1/	Description	Pre-MTN col. 1 rate of duty 2/	Staged col. 1 rate of duty effective with respect to articles entered on or after Jan. 1--								Col. 2 rate of duty
			1980	1981	1982	1983	1984	1985	1986	1987	
674.10A	Parts of converters, ingot molds, and casting machines, all of the foregoing of types used in metallurgy and in metal foundries.	4.5%	3.9%	3.4%	2.8%	2.3%	1.7%	1.1%	0.6%	Free	35%.
678.35A	Parts of machines used for molding or otherwise forming rubber or plastic articles.	5.5%	5.3%	5.1%	4.9%	4.7%	4.5%	4.3%	4.1%	3.9%	35%.
680.07A	Molders' patterns for the manufacture of castings.	6.0%	5.8%	5.6%	5.3%	5.1%	4.9%	4.7%	4.4%	4.2%	50%.
	Molds of types used for metal (except ingot molds), for metallic carbides, for glass, for mineral materials, or for rubber or plastic materials:										
	Molds used for rubber or plastic materials:										
680.11	Shoe machinery molds----------	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free.
680.12A	Other----------	5.5%	5.3%	5.1%	4.9%	4.7%	4.5%	4.3%	4.1%	3.9%	35%.
680.13A	Other----------	5.5%	5.3%	5.1%	4.9%	4.7%	4.5%	4.3%	4.1%	3.9%	35%.

1/ The designation "A" indicates that the item is currently designated as an eligible article for duty-free treatment under the U.S. Generalized System of Preferences (GSP) and that certain developing countries, specified in general headnote 3(c) of the Tariff Schedules of the United States Annotated, are not eligible for the GSP.

2/ Rate effective prior to Jan. 1, 1980.

imports from the United Kingdom and Ireland. The following tabulation lists the rates of duty for industrial molds under the various Canadian tariff treatments, effective January 1, 1984 (in percent ad valorem):

Tariff treatment	Rate of duty
British preferential	2.5%.
Most-favored-nation	11.4%.
General	35% ad.
General preferential	2.5%.
United Kingdom and Ireland	9.2%.

Canada's tariff rates on imported industrial molds are higher than U.S. tariff rates on these products. In 1984, Canadian rates on the majority of industrial molds were 11.4 percent ad valorem; those of the United States averaged 4.5 percent ad valorem. The disparity between tariff rates translates into a 6.9-percent cost advantage in trade of Canadian-produced industrial molds during 1984. Tariff rates in both the United States and Canada are computed in a similar manner. Both rates are applied against the customs value of imports, which does not include freight, insurance, and other charges incurred in transporting merchandise from the port of exportation to the port of importation.

Industrial molds imported into Canada are eligible for remission of customs duty and excise taxes under various Canadian orders. Under Customs Memorandum D7-3-1 (Inward Processing Remission Order), industrial molds are eligible for duty remissions if they are imported for further processing and are subsequently exported. Processing includes the repair, adjustment, assembly, modification, or alteration of any end products. This provision is similar to one available to U.S. imports under TSUS item 864.05, which provides for temporary duty-free entry of articles under bond for repair, alteration, or processing, when not entered for sale or for sale on approval.

Under Customs Memorandum D8-1-5 (Order on the Remission of Customs Duty and Excise Taxes on Goods Temporarily Imported into Canada), molds and dies qualify for partial remission of duties and excise taxes if imported temporarily into Canada and exported within 12 months. The portion of the customs duty and excise taxes that is remitted is an amount equal to the total customs duty and excise taxes payable on the goods, minus the greater of Can $25 or the amount of customs duty and excise taxes payable on 1/16 of the value of goods for each month or part of a month that the goods have remained in Canada. Under Customs and Excise Memorandum D8-2-1 (Canadian Goods Abroad Remission Order), remission of duty and taxes is granted to Canadian-manufactured goods (including industrial molds) where the goods were exported for the declared purposes of repairs and returned to Canada within 12 months from the day they were exported. Under these circumstances, duties and taxes are payable on the fair-market value of the repairs.

Nontariff Barriers

The Commission was unable to identify nontariff barriers in the United States or Canada that applied specifically to the industrial mold industry. However, both countries are known for a number of general nontariff barriers, not applying to any one industry, that, according to other countries, adversely affect trade.

For the United States, one such alleged nontariff barrier is the uncertainty of the classifications in the Tariff Schedules of the United States, its need for explanatory notes, and its nonconformity with the CCCN. Other alleged barriers include federal and state procurement procedures; enforcement of immigration laws affecting foreign businessmen traveling in the United States; customs and administrative entry procedures, such as complex invoice forms and marks of origin regulations affecting imported goods; and problems with escape clause actions and procedures under section 337 of the U.S. Tariff Act of 1930, the latter of which is considered by other countries to be discriminatory.

For Canada, a mentioned nontariff barrier concerns countervailing duty investigations in which there is no requirement to determine that a Canadian industry is injured. Other frequently cited alleged barriers involve government procurement; Customs valuation; Customs classification; and origin labeling requirements.

WORLD TRADE

During 1979-82, the major nations trading industrial molds experienced a decline in real terms of imports and exports, although making negligible gains in current dollars. 1/ This decline in trade coincided with a general downturn in the worldwide industrial cycle. Estimates of the dollar value of the worldwide trade in industrial molds vary. For 1980, the most recent year for which data are available, the United Nations estimated the value of imports, c.i.f., of the total world market economy at $1.04 billion, increasing from $963 million in 1979. 2/ United Nation's estimates of the world market economy exports, f.o.b., for 1980 were $1.25 billion, increasing from $1.05 billion in 1979. Another estimate for 1980 places the trade of 14 supplier nations to 102 country destinations at $1.12 billion in 1980, increasing from $950 million in 1979. 3/ Nonetheless, in real terms, it is clear that world imports and exports of industrial molds experienced a decline.

1/ Data from tables 2 and 3, when deflated by the U.S. Producer Price Index for industrial molds, show a decline in both imports and exports in real terms.

2/ 1980 Yearbook of International Trade Statistics, Volume II, Trade by Commodity, United Nations, 1982, p. 669. Data are for SITC item 749.91, foundry molds, and so forth, n.e.s.

3/ U.S. Department of Commerce, International Trade Administration, Market Share Reports, Commodity Series SITC No. 749.91, Foundry Molds, etc., n.e.s. 1979-80.

During 1979-82, the United States was the largest importer of industrial molds, followed by West Germany, and France, a distant third (table 2). 1/ During 1979-82, U.S. imports increased by 14 percent, from $133.8 million to $153.0 million. In contrast, imports by Canada, Hong Kong, and Japan each increased by well over 50 percent during the period and were valued at $29.4 million, $19.9 million, and $16.5 million, respectively, in 1982.

According to estimates by the United Nations, in 1980, the developed market economies accounted for approximately 71.6 percent of the value of industrial mold imports of the total market economy. The European Community accounted for an estimated 38.5 percent, and the United States accounted for 12.7 percent.

According to estimates by the United Nations, the developed market economies accounted for 97.3 percent of the value of world industrial mold exports and the European Community accounted for 55.6 percent. West Germany's exports in 1980 accounted for an estimated 17.8 percent of the value of world industrial mold exports, followed by those of the United States (13.5 percent) and Italy (12.5 percent). 2/

During 1979-82, West Germany was the leading source of exports of industrial molds, followed by the United States and Italy (which ranked second and third, respectively, in various years), and Japan, which ranked a close fourth (table 3).

During 1979-82, West Germany's and Italy's exports peaked in 1980, while those of the United States, France, and Canada peaked in 1981. Exports from such countries as Japan, Hong Kong, Australia, and Switzerland increased continuously, but at a slower rate than the other major producing countries, during 1979-82. The increase in exports varied considerably among countries during this period. The increase in exports of the major West European countries ranged from 5 to 13 percent during 1979-82, with the exception of the United Kingdom's exports which actually declined. In contrast, Japan's exports over the period increased by over 32 percent, and that of the United States increased by 64 percent; Canadian exports increased by approximately 21 percent.

1/ Tables 2 and 3 show the imports and exports of the leading exporting nations of industrial molds ranked according to 1982 data, the most recent year for which data are available. Included in the table are Hong Kong, Japan, and Australia, which in 1983 were major markets for U.S. industrial mold exports. However, data for Portugal, a major source of U.S. imports, are not readily available. In 1980, Brazil, Yugoslavia, and Saudi Arabia were among the world's top 10 importing nations.

2/ 1980 Yearbook of International Trade Statistics, Volume II, Trade by Commodity, United Nations, 1982, p. 669. Data are for SITC item 749.91, foundry molds, and so forth, n.e.s.

Table 2.--Industrial molds: 1/ Imports, by specified markets, 1979-82

(In millions of dollars)

Market	1979	1980	1981	1982
United States	133.8	138.8	145.4	153.0
West Germany	105.1	109.8	104.0	112.5
France	73.2	78.7	76.3	68.9
United Kingdom	68.0	72.9	57.7	60.9
Netherlands	36.3	34.7	31.3	32.7
Belgium/Luxembourg	36.2	39.1	19.0	32.5
Canada	19.3	22.2	28.8	29.4
Switzerland	21.8	30.2	24.5	22.6
Italy	18.4	16.7	16.2	20.5
Hong Kong	10.6	12.9	15.0	19.9
Japan	10.4	11.0	11.4	16.5
Australia 2/	12.3	11.5	7.1	7.2
Total	545.4	578.5	536.7	576.6

1/ Excludes patterns for industrial molds.

2/ Based on fiscal year July-June.

Source: Data compiled from trade publications of various foreign governments and the European Community.

Table 3.--Industrial molds: 1/ World exports, by specified sources, 1979-82

(In millions of dollars)

Source	1979	1980	1981	1982
West Germany	191.5	208.7	185.9	200.4
United States	103.0	140.0	172.7	168.7
Italy	132.7	146.2	143.8	139.9
Japan	98.6	103.9	123.0	130.3
France	97.1	91.0	100.4	101.9
Canada 2/	73.8	78.6	95.6	89.0
United Kingdom	68.0	79.1	63.6	59.2
Belgium/Luxembourg	55.3	58.5	44.4	45.6
Switzerland	36.9	40.3	40.8	41.9
Netherlands	30.9	43.8	31.3	32.6
Hong Kong	10.0	14.5	19.2	23.1
Australia 3/	3.5	4.5	6.0	12.5
Total	901.3	1,009.1	1,026.7	1,045.1

1/ Excludes patterns for industrial molds.

2/ Export data are for dies and molds for plastics machinery only and, therefore, understate total Canadian exports of industrial molds.

3/ Based on fiscal year July-June.

Source: Data compiled from trade publications of the various foreign governments and the European Community.

In 1982, Italy had the largest trade surplus in industrial molds, valued at $119.4 million, followed by Japan, with $113.8 million (table 4). West Germany's trade surplus was $87.9 million, and Canada's was valued at an estimated $59.6 million. The United States, in contrast, attained a trade surplus in industrial molds of only $15.7 million in 1982. In 1983, Canada's trade surplus was an estimated $78.4 million, compared with a trade deficit of $11.8 million for the United States. 1/

During 1979-82, significant annual trade surpluses were achieved by Italy, Japan, and Canada; West Germany, France, Switzerland, and Belgium/Luxembourg each exported much more than was imported. In contrast, the United States, and the United Kingdom each maintained relatively small annual trade surpluses, with the value of exports marginally, if at all, exceeding those of imports. It should be noted that the United States had a trade deficit of $30.8 million in industrial molds in 1979.

Table 4.--Industrial molds: 1/ Trade surpluses (or deficits), by specified countries, 1979-82

(In millions of dollars)

Country	1979	1980	1981	1982
Italy	114.3	129.5	127.6	119.4
Japan	88.2	92.9	111.6	113.8
West Germany	86.4	98.9	81.9	87.9
Canada 2/	54.5	56.4	66.8	59.6
France	23.9	12.3	24.1	33.0
Switzerland	15.1	10.1	16.3	19.3
United States	(30.8)	1.2	27.3	15.7
Belgium/Luxembourg	19.1	19.4	25.4	13.1
Australia 3/	(8.8)	(7.0)	(1.1)	5.3
Hong Kong	(.6)	1.6	4.2	3.2
Netherlands	(5.4)	9.1	-	(.1)
United Kingdom	-	6.2	5.9	(1.7)
Total	355.9	430.6	490.0	468.5

1/ Excludes patterns for industrial molds.
2/ Canadian export data are for dies and molds for plastics machinery only; therefore, such data understate Canadian exports of industrial molds. As a result, the trade surplus data are likewise understated.
3/ Based on fiscal years July-June.

Source: Compiled from data in tables 2 and 3.

1/ Statistics Canada and U.S. Department Commerce, Bureau of the Census.

THE U.S. AND CANADIAN INDUSTRIES

Industry Profiles

United States

There were 876 establishments identified as producing industrial molds as their primary product in 1977. In addition, there were numerous other firms that were not separately identified by the Bureau of the Census that produced molds as well as other firms that manufacture molds as secondary products and were classified by Census with other industries. One official of the National Tooling & Machining Association believes that there are currently about 4,000 establishments producing molds in the United States, slightly above the level of 1977. 1/ The majority of these firms are located in the East North Central States with Ohio, Michigan, and Illinois especially important, and in the Middle Atlantic States, including Pennsylvania, New Jersey, and New York. The need for a close relationship between producer and end user is a factor contributing to the geographic concentration of mold producers in the heavily industrialized areas of the United States. Data obtained indicate that there were five mergers, acquisitions, and purchases of assets in the industrial mold industry during 1979-82; these corporate changes showed no discernible trend throughout the period. 2/ Data only for companies with $1 million or more in sales are included; therefore, such information for many of the small companies that account for the majority of the industry and a significant share of the shipments of this industry was not reported.

The U.S. industry is made up mainly of small- to medium-sized firms whose annual sales average between $500,000 and $2.5 million. 3/ According to industry sources, the average U.S. industrial mold-producing establishment employed 32 persons in 1982, of which an average of 26 were production workers. This is a decrease from the number in 1977, when the average firm employed 38 persons, of which 32 were production workers. The majority of U.S. establishments employ fewer than 20 persons, and less than 1 percent of such firms employ 1,000 or more workers.

One of the U.S. firms responding to the Commission's questionnaire indicated that it is 25 percent or more beneficially owned by foreign entities, and one other U.S. producer has direct investments abroad in foreign

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1/ Entry into this industry is relatively easy once an individual acquires the necessary technical experience (usually after working for another company) and certain machinery and equipment, new or used. However, at the Commission's hearing, another official of the NTMA indicated that many small companies went out of business over the last several years and Association membership was down 10 to 15 percent (transcript of the hearing, p. 52, Feb. 2, 1984).

2/ Cambridge Corp. Yearbook on Corporate Mergers, Joint Ventures, and Corporate Policy, various editions.

3/ National Tooling & Machining Association, Industry Operating Costs and Executive Compensation Report, various reports, 1977-82.

affiliates or subsidiaries, or participated in joint ventures. 1/ Furthermore, one U.S. firm indicated that a foreign company had direct investment in its operations. 1/

U.S. capacity and capacity utilization.--Capacity utilization was at 80 percent in 1979 and then declined annually to a low of 66 percent in 1983, as indicated in table 5. Although shipments rose throughout this period, by 16 percent from 1979 to 1983, additions to capacity increased by 40 percent during the same period. 2/ Many of the firms that responded to the Commission's survey are large concerns that have added more automated machinery than others within the industry. It is probable that delivery of these machines after 1980 contributed to the lower capacity utilization ratios experienced by the industry during 1981-83, when demand rose only slightly.

Table 5.--Industrial molds: U.S. producers' shipments, capacity, and capacity utilization, 1979-83

Item	1979	1980	1981	1982	1983
Shipments----1,000 dollars--	163,799	181,827	183,654	187,202	189,753
Capacity----------do----	204,866	237,154	254,415	265,973	286,132
Capacity utilization percent--	80	77	72	70	66

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Production.--Production of molds rose in 1980 to 8,418 units and then declined annually to 7,279 units in 1983, or by 14 percent (table 6). During 1979-83, production of injection molds for plastics remained at about the same level, with a low of 4,993 units in 1980, and a high of 5,197 units in 1981. Production of molds for rubber declined throughout the period, from 2,376 units in 1979 to 1,536 units in 1983.

U.S. purchasers of industrial molds that responded to the Commission's survey reported that during 1979-83, the number of molds they produced varied irregularly; such production reached a low of 2,004 units in 1982 and a high of 2,625 units in 1983. In 1983, the number of purchaser-produced molds increased by 13 percent compared with that in 1979 (table 7).

1/ Information submitted in response to questionnaires of the U.S. International Trade Commission.

2/ Capacity utilization ratios were derived from questionnaire responses. Industrial mold producers reported their actual value of shipments and their potential value of shipments, assuming a realistic work pattern.

Table 6.--Industrial molds: U.S. producers' domestic production, by types, 1979-83

(In units)

Type	1979	1980	1981	1982	1983
Molds for plastics	4,992	4,993	5,197	5,172	5,111
Molds for metals	502	832	709	480	414
Molds for rubber	2,376	2,353	1,844	1,761	1,536
All other	205	240	253	298	218
Total	8,075	8,418	8,003	7,711	7,279

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 7.--Industrial molds: U.S. purchasers' production, by types, 1979-83

(In units)

Type	1979	1980	1981	1982	1983
Molds for plastics	844	717	884	526	724
Molds for metals	54	64	83	90	123
Molds for rubber	674	469	585	601	528
All other	746	970	866	787	1,250
Total	2,318	2,220	2,418	2,004	2,625

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

A study prepared by the University of Michigan indicated that in-house mold production is more expensive than the cost of having such production done by an independent mold shop. 1/ Mold purchasers will produce some of their own molds, at times, to fully utilize technical staff 2/ and to safeguard proprietary secrets concerning the design of new products. In some cases, large producers, such as those in the rubber tire industry, have established large, efficient moldmaking operations that do produce molds at a competitive cost; furthermore, these firms believe they have better control over quality and delivery.

Mold producers responding to the Commission's survey predicted an upturn in domestic production over the next 3 years. Such shipments are expected to total 8,841 units in 1984, 9,959 units in 1985, and 11,048 units in 1986, representing an increase of 25 percent during those years (table 8) and 52

1/ University of Michigan, The Tool and Die Industry, Problems and Prospects, 1975, p. 76.

2/ One large company reported that one of the reasons that it made the volume of molds it did was to comply with union obligations.

percent compared with the levels of 1983, the most recent year for which actual production data are available. All types of molds are expected to experience production gains during 1984-86.

Table 8.--Industrial molds: U.S. producers' estimated future production, by types, 1984-86

(In units)

Item	1984	1985	1986
Molds for plastics	6,182	6,915	7,685
Molds for metals	591	687	764
Molds for rubber	1,980	2,260	2,492
All other	88	97	107
Total	8,841	9,959	11,048

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Employment and hours worked.--Employment in the U.S. industrial mold industry fluctuates with the cyclical demand for its products. However, in a downturn, skilled workers tend to be released more slowly than the proportional drop in production because of the scarcity of such workers and, in an upturn, employment gains may be somewhat slower than the recovery, for the same reason. Industry representatives indicate that direct labor costs account for approximately 65 percent of the total cost of production.

During 1979-83, the average number of employees that worked on industrial molds declined irregularly, from 3,345 in 1979 to 3,245 in 1983, or by 3 percent (table 9). The average number of production workers dropped more sharply, from 2,979 in 1979 to 2,792 in 1983, or by 6 percent. During 1979-83, industrial mold production workers accounted for 86 percent of total production workers in these establishments.

Estimated employment in the U.S. industrial mold industry rose from 36,600 in 1979, to 37,800 in 1980, and then declined annually to 33,700 in 1983. This decline in total estimated employment of 8 percent during the period compares with a 3-percent decline reported in the Commission's survey. Many small firms entered and left the industry during 1979-83. According to certain industry and U.S. government sources, more firms entered the industry than left during this period.

Table 9.--Average number of employees in U.S. establishments producing industrial molds and all production and related workers directly engaged in the production of industrial molds, 1979-83

Item	1979	1980	1981	1982	1983
Average number of persons employed in reporting establishments producing industrial molds:					
All persons	4,521	4,581	4,465	4,230	4,127
Production and related workers	3,718	3,739	3,658	3,430	3,334
Average number of persons employed in the production of industrial molds:					
All persons	3,345	3,346	3,401	3,270	3,245
Production and related workers	2,979	2,980	3,005	2,874	2,792

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Respondents to the Commission's survey reported man-hours worked by all production and related workers in their establishments varied irregularly during 1979-83, but declined from 8.8 million man-hours in 1979 to 8.3 million man-hours in 1983, a decrease of 6 percent, as indicated in the following tabulation (in millions):

Year	Man-hours
1979	8.8
1980	9.0
1981	8.7
1982	8.2
1983	8.3

Man-hours worked by production workers on industrial molds in these establishments declined from 6.7 million in 1979 to 6.6 million in 1983, or by 1 percent. During this period, man-hours devoted to production of industrial molds accounted for 80 percent of total man-hours in these establishments.

Research and development expenditures.--Respondents to the Commission's questionnaires reported relatively low expenditures for research and development during 1979-83, as shown in the following tabulation:

Year	Value 1,000 dollars
1979	141
1980	495
1981	423
1982	1,034
1983	1,075

Such expenditures in 1983 occurred at a time when orders from certain of this industry's major markets, such as automotive, appliances, and electronics, had begun to increase, although such gains were not reflected in shipments to the largest market (automotive), according to data in the Commission's survey. Only 14 companies of the 82 producers responding to the Commission's questionnaire reported such research and development expenditures. The major type of expenditure was for experimental molds, followed by manufacturing methods, evaluation of computer numerically controlled equipment, and various other research projects involving plating, heat treating, new steel types, runner systems, molding machinery, and CAD/CAM feasibility.

Financial experience of U.S. producers.--Net sales rose slightly each year during 1979-83, but profits before income taxes and the ratio of net profit before income taxes to net sales declined during 1979-82, and rose only slightly in 1983 (table 10). The ratio of profits to sales dropped annually from 11.1 percent in 1979 to 3.7 percent in 1982, and then increased to 4.1 percent in 1983. During 1979-83, such profits declined, in part, because of price competition from imports and because of major expenditures by the industrial mold industry for capital equipment, including CAD/CAM systems and CNC machines tools.

Table 10.--Industrial molds: U.S. producers' net sales and net profit on sales of industrial molds, 1979-83

Item	1979	1980	1981	1982	1983
Net sales----1,000 dollars--	163,799	181,827	183,654	187,202	189,753
Net profit before income taxes--1,000 dollars--	18,219	16,180	13,901	6,889	7,711
Ratio of net profit before income taxes to net sales percent--	11.1	8.9	7.6	3.7	4.1

Source: Compiled from data submitted to response to questionnaires of the U.S. International Trade Commission.

Capital expenditures.--U.S. producers' capital expenditures for domestic facilities for production of industrial molds varied during 1979-83, reaching a low of $11.2 million in 1980 and a high of $15.5 million in 1981 (table 11).

Table 11.--Industrial molds: U.S. producers' capital expenditures for domestic facilities, 1979-83

Year	Land or land improvement	Building or leasehold improvement	Machinery, equipment, and fixtures	Total
1979	216	1,710	10,179	12,105
1980	94	977	10,100	11,171
1981	204	979	14,329	15,512
1982	904	1,829	11,022	13,755
1983	9	473	12,086	12,568

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Machinery and equipment accounted for the bulk of capital expenditures; these expenditures as a share of total capital expenditures ranged from a low of 80 percent in 1982 to a high of 96 percent in 1983. In 1982, these firms spent a larger share of their total capital expenditures on building or leasehold improvements (18 percent).

Advertising and other promotional expenditures.--U.S. producers' expenditures on advertising and other promotional expenditures are estimated in the following tabulation:

Year	Value 1/ (1,000 dollars)
1979	$5,125
1980	5,991
1981	6,180
1982	6,296
1983	6,388

1/ Estimated data were provided by the National Tooling & Machining Association, on the basis of the industries' experience of spending 0.4 percent of sales revenue for purposes of advertising and sales promotion. When such estimates are applied to the segment of the U.S. industrial mold industry responding to the Commission's survey, the following advertising and sales promotion expenses are estimated: 1979-$648,000; 1980-$717,000; 1981-$723,000; 1982-$734,000; and 1983-$742,000.

Canada

There are 196 firms in Canada regularly manufacturing industrial molds and approximately 50 additional firms occasionally producing industrial molds. 1/ Information currently available indicates that there have been no

1/ The number of firms are estimated from submission of the Society of the Plastics Industry of Canada, and the Canadian Trade Index 1982, Canadian Manufacturers Association.

departures, additions, or ownership changes during the period covered by this report. Industrial mold producers in Canada are highly concentrated within the Provinces of Ontario and Quebec. There are 170 mold producers located in Ontario and 21 mold shops in Quebec. The other provinces of Canada account for a very small number of mold shops, with British Columbia representing most of the remaining shops. Within the Province of Ontario, the cities of Windsor and Toronto 1/ have the largest concentration of establishments producing molds. 2/

Canadian mold shops tend to be privately held; two of the largest producers of molds maintain production facilities in the United States. According to industry sources, only one firm in Canada is now under the control of U.S. interests. Canadian producers manufacture a variety of molds, including injection molds, transfer molds, compression molds, and blow molds. Smaller mold shops in Canada specialize their production in only one or two types of molds. 3/

The 10 largest firms account for approximately 15 percent of total shipments of industrial molds. A further indication of the concentration within the industry is that approximately 65 percent of the mold shops in Canada employ 20 or fewer workers. The tenth largest mold shop employs 50 workers, and the largest mold shop employs approximately 200 workers.

Shipments.--Canadian demand for molds is dependent primarily upon the motor-vehicle and parts industry, the electronic components industry, and the household appliance industry. Industry sources indicate that the majority of Canadian-produced molds are directed toward the motor-vehicle and parts industry. Canadian mold shipments increased from an estimated $117.4 million in 1979 to $160.9 million in 1982 (table 12).

As shown in table 12, Canadian shipments of molds are made up predominantly of metal molds for plastics machinery. Molds for plastics machinery accounted for over 64 percent of total Canadian mold shipments in 1979. Such molds maintained a large share of total Canadian shipments in 1980 and 1981, accounting for more than 55 and 53 percent, respectively, of shipments during those years. During 1982, shipments of molds for plastics machinery increased to $89.5 million and accounted for almost 56 percent of total shipments. These molds are likely to account for an even larger share of Canadian shipments as the consumption of plastics in automobiles, household appliances, and electronic components increases.

1/ Industry sources indicate Toronto surpasses Windsor in the number of firms producing molds.

2/ As late as 1957 there were only 10 tooling shops capable of producing molds. Since 1957, more than 75 mold shops have been established in the Windsor area, serving primarily the U.S. and Canadian motor-vehicle and parts industry.

3/ "Riding High on Craftsmanship", Canadian Plastics, April 1982, p. 48.

Table 12.--Industrial molds: Canadian shipments, by types, 1979-82

(In thousands of U.S. dollars)

Type	1979	1980	1981	1982
Metal molds:				
For plastics machinery	75,154	67,578	68,246	89,501
For rubber machinery	6,335	6,040	4,975	4,790
Other	10,865	14,200	14,499	19,506
Plastic molds	892	6,291	8,972	1/ 11,116
Forming dies and molds	1/ 4,243	4,497	12,910	20,585
Dies and molds, not elsewhere classified	19,899	23,783	20,279	15,381
Total	117,388	122,389	129,881	160,879

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

Source: Statistics Canada, except as noted.

According to Statistics Canada, Ontario and Quebec together accounted for 91.5 percent of total Canadian metal mold production during 1979, as shown in the following tabulation:

Province	1979 (1,000 Canadian dollars)	Percent of total
Ontario	98,900	87.3
Quebec	4,700	4.2
Alberta	342	0.3
All other	9,247	8.2
Total	113,189	100.0

It is estimated by industry sources that these Provinces' share of production remained the same during 1980-83. The majority of production occurs in these Provinces because of their proximity to end users of molds.

Ontario and Quebec have easy access to the industrialized areas of southern Ontario and Quebec and the industrialized States in the Northeast and Midwest United States. Mold shops located in Windsor, Ontario, are close to the automotive market in the Detroit metropolitan area.

Producers of molds maintain a close relationship with end users not only during the initial design of a new mold, but also for servicing, repairing, and reconditioning of used molds. The need for a close relationship between producer and end user is a factor contributing to the geographic concentration of Canadian mold producers in the heavily industrialized areas of Canada and near the industrialized areas of the United States.

Capacity utilization.--According to estimates compiled from Statistics Canada and the Windsor Alliance of Moldmakers, capacity utilization rates decreased from an estimated 83.6 percent in 1979 to an estimated 62.7 percent in 1982, as shown in the following tabulation:

Item	1979	1980	1981	1982
Shipments--1,000 U.S. dollars--	117,388	122,389	129,881	160,879
Capacity----------do----	140,416	153,948	167,588	256,585
Capacity utilization--percent--	83.6	79.5	77.5	62.7

The decrease in capacity utilization rates was attributed to a rapid expansion in capacity which exceeded the increasing level of shipments during 1979-82. Canadian shipments of molds increased by 37 percent, whereas capacity increased by 82.7 percent during 1979-82.

Exports.--Canadian exports and reexports of dies and molds for plastics machinery increased from $77.6 million in 1979 to $126.1 million in 1983 (table 13). Data on other types of molds are not available. Dies and molds for plastics machinery accounted for the majority of Canadian exports of the products covered in this report.

Molds for metal, the next largest category of molds exported from Canada, are included under foundry equipment and parts, n.e.s. Canadian exports and reexports of these products, which include products other than molds, increased from $23.1 million in 1979 to $31.1 million in 1983 (molds for metals account for a small portion of these data), as shown in table 13.

Although the exact ratio of exports to production is not available, Canadian mold producers export the majority of their production. Some mold shops which manufacture blow molds export as much as 85 percent of their output. 1/ The United States represents the largest export market for all types of Canadian-produced molds, particularly molds for plastics machinery, according to data provided in Statistics Canada. The U.S. market represented 92.9 percent of total Canadian exports of dies and molds for plastics machinery in 1983. The U.S. automotive industry is the largest consumer of Canadian mold exports to the United States. Other smaller export markets for Canadian-produced industrial molds for plastics machinery in 1983

1/ "Riding High on Craftsmanship", Canadian Plastics, April 1982, p. 48.

Table 13.--Industrial molds: Canadian exports, by types, 1979-83

(In thousands of U.S. dollars)

Product	1979	1980	1981	1982	1983
Dies and molds for plastics machinery	73,800	78,619	95,629	88,986	116,141
Reexports	3,801	4,215	5,412	5,174	9,978
Total	77,601	82,834	101,041	94,160	126,119
Foundry equipment and parts, n.e.s 1/	20,780	23,795	24,196	27,904	28,909
Reexports	2,273	2,843	3,188	4,265	2,177
Total	23,053	26,638	27,384	32,169	31,086
Grand total	100,654	109,472	128,425	126,329	157,205

1/ In addition to industrial molds for metal, these export data include other foundry equipment and parts; therefore, such data overstate exports of industrial molds.

Source: Statistics Canada.

included the United Kingdom, West Germany, Japan, and Mexico, as shown in the following tabulation:

Market	Exports (1,000 U.S. dollars)		Percent of total	
	1982	1983	1982	1983
United States	80.3	107.9	90.2	92.9
United Kingdom	3.8	2.3	4.2	2.0
West Germany	1.2	2.0	1.3	1.7
Japan	.6	1.1	.7	.9
Mexico	1.1	.6	1.3	.5
All other	2.0	2.2	2.3	2.0
Total	89.0	116.1	100.0	100.0

The share of Canadian shipments represented by exports of dies and molds for plastics machinery increased from 66.1 percent in 1979 to 77.8 percent in 1981, and then decreased in 1982 to 58.5 percent, as shown in the following tabulation:

Year	Canadian shipments of industrial molds (1,000 U.S. dollars)	Canadian exports of dies and molds for plastics machinery (1,000 U.S. dollars)	Ratio of exports of dies and molds for plastics machinery to shipments of all industrial molds (percent)
1979	117,388	77,601	66.1
1980	122,389	82,834	67.7
1981	129,881	101,041	77.8
1982	160,879	94,160	58.5
1983	1/	126,119	1/

1/ Not available.

Imports.--Canadian imports of industrial molds increased from $24.4 million in 1979 to $33.5 million in 1983, or by 37.3 percent. Approximately 50.8 percent of Canadian imports were made up of dies and molds for plastics machinery. The second largest group of molds imported to Canada during 1983 were tire molds, accounting for 17.6 percent of Canadian imports of industrial molds. The third largest group of imports during 1983 were metal die-casting molds, representing 20 percent of Canadian imports of all molds, as shown in table 14.

Table 14.--Industrial molds: Canadian imports, by types, 1979-83

(In thousands of U.S. dollars)

Type	1979	1980	1981	1982	1983
Dies and molds for plastics machinery	10,243	11,668	12,707	15,328	17,109
Molds, metal die-casting type	3,190	3,704	7,551	5,206	3,450
Tire molds	2,753	2,810	3,640	4,047	5,908
Patterns, metal, for metal molding, foundry	4,064	1,473	2,905	1,812	1,616
Molds and dies, for metal casting, foundry, n.e.s.	2,095	2,570	2,404	1,812	1,133
Centrifugal, casting	96	165	760	1,245	166
Patterns, wooden, for metal molding, foundry	1,046	1,203	1,753	1,134	1,139
Die, metal die-casting type, foundry	404	675	1,063	1,130	2,158

Table 14.--Industrial molds: Canadian imports, by types, 1979-83--Continued

(In thousands of U.S. dollars)

Type	1979	1980	1981	1982	1983
Molds, buckle	375	479	423	383	604
Molds, button	173	174	234	179	228
Molds, sintering of metal powders, foundry	-	-	-	1/	-
Total	24,439	24,921	33,443	32,276	33,511

1/ Less than $500.

Source: Statistics Canada.

Canadian imports from the United States accounted for a large and increasing share of total Canadian imports of industrial molds. Imports of industrial molds from the United States as a share of total Canadian imports increased annually, from 75.6 percent in 1979 to 89.2 percent in 1983. Canadian imports of dies and molds for plastics machinery from the United States increased from 79.1 percent of total Canadian imports in 1979 to 88.2 percent of total imports in 1983, as shown in table 15.

Table 15.--Industrial molds: Canadian imports from the United States as a share of total Canadian imports, by types, 1979-83

(In percent)

Type	1979	1980	1981	1982	1983
Molds, metal die-casting type	20.1	79.1	74.4	90.2	92.9
Tire molds	100.0	92.1	81.2	88.7	96.2
Patterns, metal, for metal molding, foundry	96.9	98.8	98.3	96.5	100.0
Molds and dies, for metal casting, foundry, n.e.s.	69.2	86.8	84.2	78.1	93.0
Dies and molds for plastics machinery	79.1	82.4	89.9	86.7	88.2
Centrifugal, casting	100.0	74.1	95.0	96.1	100.0
Patterns, wooden, for metal molding, foundry	99.1	99.9	99.5	99.6	98.3
Die, metal die-casting type, foundry	96.4	66.8	84.0	97.9	86.8
Molds, buckle	13.4	7.3	20.7	10.4	-
Molds, button	14.8	17.2	56.8	30.3	41.6
Molds, sintering of metal powders, foundry	-	-	25.0	100.0	-
Total	75.6	82.9	85.1	87.6	89.2

Source: Compiled from Statistics Canada.

Employment.--Canadian industry sources have estimated the number of production workers now producing industrial molds to be between 4,500 and 5,500. Canadian industry sources have stated that employment increased during 1983, as the major consumers of molds have increased their purchases of molds. The average number of employees per plant is estimated by Canadian industry sources at 25. 1/

The average hourly wage rate in 1983 of employees in metal-fabricating industries was $8.67. 2/ Mold producers employ workers with higher skill levels than those in other metal-manufacturing industries. According to the Windsor Alliance of Moldmakers, 1983 wage rates for journeyman moldmakers were as high as $12.48 per hour. 3/ Wage rates in Windsor, Ontario, are slightly higher than those in Toronto, Ontario.

An Evaluation of the Factors of Production in the United States and Canada

The competition that exists in the U.S. marketplace between domestically produced molds and those produced in Canada is influenced by a variety of factors of production such as the cost of raw materials, component parts, energy, capital, labor, the quality of production technology, and the extent of government support. An evaluation of these factors indicates that the United States and Canada maintain similar strengths in the cost of the major raw materials (steel). The United States enjoys a comparative advantage in factors such as the cost of component parts, the cost of capital, and the level of production technology. Canada maintains a competitive advantage in the costs of energy and labor, and government support to the Canadian mold producers, as summarized in the following tabulation:

Economic factor	U.S. advantage	Canadian advantage
Raw materials:		
Steel	1/	1/
Component parts	X	
Energy costs		X
Capital	X	
Production technology	X	
Labor		X
Government assistance		X

1/ Competitive position the same.

1/ Data obtained from prehearing submission of the Society of the Plastics Industry of Canada.

2/ Statistics Canada.

3/ See section on an evaluation of factors of production for a comparison of wage rates of tool and die makers in the United States and Canada.

Raw materials

Steel is the principal raw material consumed in the manufacture of industrial molds. It is usually purchased in the form of molders' block and worked into specific mold shapes, depending on design specifications. The type of steel used depends on the type of product the mold will produce. Molds for metal require an alloy or high-carbon steel with a hardness and durability that withstand wide temperature ranges. During the molding process, the temperature of the molten material can reach up to 1,100 degrees centigrade. The most common grade of steel used in molds for metal is hot-work chromium-type H-13. According to industry sources, approximately 90 percent of all molds for metal are produced from this steel. The chromium content of this grade of steel provides it with a high resistance to heat, and the addition of tungsten and molybdenum provides strength to the steel under very high temperatures.

Grade H-13 steel is produced in both the United States and Canada. There are 11 firms in the United States now producing grade H-13 steel. All of these firms are located in Illinois, New York, and Pennsylvania. There are two known Canadian firms producing grade H-13 steel; these firms are located in Ontario and Quebec. 1/

With increased pressure from lower prices of imported steel, as well as lower prices among domestic suppliers, average selling prices of various specifications of U.S.-produced alloy tool steel did not increase significantly during 1980-82. The average selling price of U.S.-produced hot-work-grade H-13 steel increased from $3,154 per short ton in January-March 1980 to $3,408 per short ton during January-March 1982, decreased to $3,208 per short ton during April-June 1982, and then recovered somewhat during the succeeding quarters to $3,254 per short ton in October-December 1982, as shown in table 16.

Industry sources have maintained that Canadian prices of H-13 steel paralleled those of the U.S. firms producing grade H-13 steel. The price per short ton of grade H-13 steel was $4,000 in February 1984. 2/

The most common grade of steel used in molds for plastics, by far the largest class of industrial molds, is grade P-20. This grade of steel is a medium hardening steel, which can be readily machined into complex shapes. P-20 steel is almost always carburized and hardened after the mold has been machined--the steel is high in toughness, low in wear resistance, and moderate in hot hardness.

1/ Data furnished by the American Iron & Steel Institute.

2/ Information supplied by a Canadian mold producer official. This source indicated, however, that the price of H-13 steel varies, depending on the quantity of steel purchased.

Table 16.--Average selling prices of U.S.-produced and imported hot-work-grade H-13 1/ alloy tool steel to end users, by quarters, 1980-82

(Per short ton)

Period	U.S. produced	Imported
1980:		
January-March	$3,154	2/
April-June	3,189	2/
July-September	3,075	2/
October-December	3,122	$3,124
1981:		
January-March	3,335	3,242
April-June	3,329	3,137
July-September	3,305	3,419
October-December	3,229	3,345
1982:		
January-March	3,408	3,251
April-June	3,208	2,895
July-September	3,210	2,935
October-December	3,254	2,973

1/ Hot-rolled or forged, annealed, rough-turned, 3-1/3-inch to 5-1/16-inch round, random lengths.

2/ Not available.

Source: Stainless Steel and Alloy Tool Steel: Report to the President on Investigation No. TA-201-48, USITC Publication 1377, May 1983, p. A-132.

P-20 steel is produced both in the United States and Canada. There are two known firms producing P-20 steel in the United States and two in Canada. The U.S. firms are located in New York; the Canadian firms are located in Ontario and Quebec. 1/ P-20 steel is a lower grade steel than H-13, and prices reflect the lower quality of this type of steel. The average selling price per short ton of P-20 steel was approximately $2,200 in February 1984. There are no major price differences between U.S. and Canadian firms. 2/

A part of raw-material costs in the production of molds can be accounted for by component parts of molds such as sprues, bushings, ejector pins, leader pins, angle pins, ejector plates, runners, and so forth. These component parts account for approximately 3 percent of the total cost of a mold. 3/ Most Canadian mold builders purchase these component parts from U.S. sources. There are some Canadian firms manufacturing component parts for molds or die-casting dies; however, most of these parts are either imported by Canadian mold producers from the United States, or purchased from Canadian distributors.

1/ Data furnished by the American Iron & Steel Institute.

2/ One large U.S. mold producer stated during a telephone conversation that he paid $4,000 per short ton for H-13 steel and $2,200 per short ton for P-20 steel. The price of steel varies depending on the quantities purchased.

3/ Information supplied by a major U.S. mold producer.

The ratio of material costs to shipments in the U.S. industrial mold industry parallels that of the U.S. tool, die, jig, and fixture industry. This ratio remained stable during 1978-81, representing approximately 30 percent of the value for the industry in 1981, as shown in the following tabulation:

Year	Ratio of material costs to shipments value in the U.S. die, tool, jig, and fixture industry 1/ (percent)
1978	31.1
1979	30.1
1980	29.8
1981	30.1
1982	2/

1/ Data represent all firms classified in the "special die, tool, jig, and fixture" industry, Standard Industrial Classification No. 3544, which includes industrial molds.
2/ Not available.

Energy

The cost of energy is approximately 2 percent of the total cost of the production of molds, of which natural gas and electricity are the largest energy components. Natural gas is purchased by the mold producers to operate furnaces used in the heat treatment of molds. 1/ Electricity is used to operate the machine tools and other mold machinery and equipment used to machine the steel into the shape of a mold. The price of natural gas for industrial use in the United States increased from $1.78 per 1,000 cubic feet in January-March 1979 to $3.91 per 1,000 cubic feet in October-December 1982. The price of natural gas in Canada for industrial use increased from $1.55 in January-March 1979 to $2.98 in October-December 1982, as shown in table 17.

Following the same trend during 1979-82, electricity prices paid by industrial consumers in the United States increased from 2.8 cents per kilowatt hour in 1979 to 5.1 cents per kilowatt hour in October-December 1982. The overall increase in U.S. electricity prices during 1979-82 amounted to 82 percent. The price of electricity paid by the industrial sector in Canada increased from 1.7 cents per kilowatt hour in January-March 1979 to 2.4 cents in October-December 1982, or by 41 percent, as shown in table 18.

1/ Heat treatment of molds is usually conducted in-house by large mold producers. The smaller producers of molds contract out this function. Heat treatment is not required in producing molds for metals.

Table 17.--Natural gas: Prices to industrial users in the United States and Canada, by quarters, 1979-82

(Per 1,000 cubic feet)

Period	United States	Canada
1979:		
January-March	US$1.78	US$1.55
April-June	1.78	1.52
July-September	1.86	1.46
October-December	2.05	1.56
1980:		
January-March	2.37	1.62
April-June	2.44	1.61
July-September	2.61	1.65
October-December	2.64	1.88
1981:		
January-March	2.94	2.21
April-June	2.96	2.20
July-September	3.08	2.33
October-December	3.34	2.47
1982:		
January-March	3.59	2.44
April-June	3.61	2.72
July-September	3.71	2.59
October-December	3.91	2.98

Source: U.S. Department of Energy, Energy Information Administration, International Energy Prices, 1978-82, January 1984, pp. 7 and 10.

Table 18.--Electricity: Prices to industrial users in the United States and Canada, by quarters, 1979-82

(In U.S. cents per kilowatt hour)

Period	United States	Canada
1979:		
January-March	2.8	1.7
April-June	2.9	1.7
July-September	3.1	1.7
October-December	3.2	1.7
1980:		
January-March	3.3	1.9
April-June	3.5	2.0
July-September	3.9	2.0
October-December	3.8	1.9
1981:		
January-March	3.9	2.1
April-June	4.1	2.2
July-September	4.5	2.1
October-December	4.4	2.2
1982:		
January-March	4.7	2.3
April-June	4.8	2.4
July-September	5.1	2.4
October-December	5.1	2.4

Source: U.S. Department of Energy, Energy Information Administration, International Energy Prices, 1978-82, January 1984, pp. 7 and 10.

The lower costs of natural gas and electricity in Canada stem largely from measures the Canadian Government has taken in energy production. In the National Energy Program, announced on October 28, 1980, the Canadian Government provided a number of new or revised measures to develop new energy sources, conserve energy, and convert to nonoil energy. With an abundance of natural gas, the Canadian Government was concerned that gas markets may not grow as quickly as reserves of natural gas and established a natural gas bank that would purchase natural gas from Canadian producers who, despite successful exploration, face severe cash flow problems because of market inaccessability. As a part of the National Energy Program, the Canadian Government has encouraged the expansion of electrical and natural gas distribution systems, thus making it possible for businesses to convert from oil to gas or electricity. 1/ The deregulation of natural gas prices in the United States could possibly increase the availability of natural gas to U.S. mold builders, making them more competitive with their Canadian counterparts. The significant advantage for the Canadian mold industry in costs of energy is not a major competitive factor in the U.S. market, because the cost of energy accounts for a small portion of the overall cost of production.

1/ Ministry of State for Economic Development, Assistance to Business in Canada 1981-82, pp. 51 and 52.

Capital

The competitive advantage in the area of availability and cost of capital was reported by the Organization for Economic Cooperation and Development to be in favor of the U.S. industry during 1978-82. Capital availability is important to both domestic and Canadian producers in order for them to finance necessary changes and improvements such as opening new production facilities, acquiring new machinery, or expanding into new product lines or market segments. This is especially important to U.S. producers, whose operations are becoming more capital intensive in an effort to compete with imports. The long-term cost of capital during 1979-83 was 1.1 percentage points lower in the United States than in Canada, as shown in the following tabulation:

(In percent per annum)

Country	1979	1980	1981	1982	1983 1/
United States	9.64	11.89	12.88	10.33	10.75
Canada	11.32	12.67	15.27	11.69	11.67

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

The cost of capital increased annually in the United States during 1979-81. Data compiled by the Federal Reserve Board show that the average prime interest rate charged by banks in the United States increased by almost 50 percent during 1979-81, before declining annually in 1982 and 1983, as shown in the following tabulation (in percent):

Year	Prime interest rate in the United States
1979	12.67
1980	15.27
1981	18.87
1982	14.86
1983	10.79

Data compiled by the Bank of Canada show that the average prime interest rate charged by banks in Canada paralleled that in the United States, increasing annually during 1979-81 and declining annually during 1981-83, as shown in the following tabulation (in percent). The five-year average prime interest rate in the United States during 1979-83 was 0.2 percentage points lower than the five-year average in Canada during the same period.

Year	Prime interest rate in Canada
1979	12.90
1980	14.25
1981	19.29
1982	15.81
1983	11.16

Technology

A significant technological development, especially for the future, has been the introduction of computed-aided-design and computer-aided-manufacture programing systems in a few of the largest U.S. and Canadian moldmaking plants. 1/ A major auto producer recently met with certain U.S. and Canadian moldmakers to discuss the importance this company placed on the introduction of CAD/CAM. According to one firm attending the meeting, only 4 of the 80 companies present utilized CAD/CAM facilities in their plants. CAD/CAM provides the users with the advantages of eliminating certain manufacturing steps, saves time, is more accurate, and reduces the amount of polishing, thus reducing expenses of the user. However, a CAD/CAM system is initially expensive, costing as much as $1 million, and because it requires special training, firms often report that they lose money with this equipment during a break-in period that may last up to 1 year. One manufacturer believes that specialty houses that buy the CAD equipment and perform the design functions for more than one mold producer will become more prevalent.

A measure of the technological development within the industry is the extent to which producers have utilized CAD/CAM programing centers and the ages of the machines in use. The following table aggregates responses to the Commission's questionnaire concerning the number and age of CAD/CAM systems in use by U.S. producer respondents as of 1983.

Age	CAD/CAM programming systems
0 to 2 years	20
3 to 4 years	3
5 to 9 years	5
10 to 19 years	0
20 years and over	0

Another technological development includes the introduction of electric discharge machines (EDM). These machines contain electrodes which burn away parts of metal, thus forming the desired shape of the mold cavity. The workpiece is usually submerged in a tank of fluid, usually oil, that insulates it from the electrode. Once submerged, the electrode is positioned near the surface of the workpiece and a sudden burst of electric energy creates a spark in the electrode that travels through the fluid to remove a portion of the

1/ On Nov. 16, 1983, the Commission staff met with representatives of the Windsor Alliance of Moldmakers, representing about 50 Canadian mold producers. A representative of one of Canada's largest moldmakers contends that the Canadian moldmaking industry is 2 years behind the U.S. moldmaking industry in adopting CAD/CAM.

workpiece. Electric discharge machining matches or exceeds the productivity and accuracy of other metal-removing techniques. 1/

Rapid advances in EDM technology are moving the mold and die industry toward the point where molds cut by EDM will require little or no subsequent grinding work on the molds and dies after the work leaves the machines. 2/ Responses to the Commission's questionnaire revealed the number and age of EDM's in use by U.S. producer respondents as of 1983, as shown in the following tabulation (in units):

Age	Electric discharge machines
0 to 2 years	40
3 to 4 years	53
5 to 9 years	81
10 to 19 years	79
20 years and over	7

Other more sophisticated machines used by the industrial mold industry in increasing numbers are computer numerically controlled machine tools and numerically controlled machine tools. The NC machine tools are machining systems which include a programer, a machine control unit, and a machine tool. The programer and machine control unit are used to create and implement a program that is converted into machine motions by the machine tool. The NC machine tools and the CNC machine tools are more effective than manually controlled tools, because they eliminate the need for manual work and decrease waste by more accurately machining the raw material. Formerly, a large supply of nonskilled (low-cost) labor permitted a higher ratio of labor to capital, utilizing simpler machine tools. Moldmakers and other skilled workers were more involved in the design and the production of molds. Recently, with the decline in the large numbers of skilled laborers and the increasing cost of labor, mold producers have looked to computers and other NC equipment to increase their output per man-hour of operation. 3/

The number and age of NC machine tools and computer NC machine tools in use by U.S. producer respondents as of 1983 are shown in the following tabulation (in units):

1/ Modern Machine Shop, EDM: Close Control for a Close Shave, May, 1981, p. 80.

2/ American Metal Market, EDM Makers Work to Improve Surface Finish, Jan. 18, 1982, p. 18.

3/ Modern Machine Shop, NC/CAM Guidebook, p. 305.

Age	Numerically controlled machine tools	Computer numerically controlled machine tools
0 to 2 years	20	81
3 to 4 years	16	59
5 to 9 years	35	42
10 to 19 years	42	1
20 years and over	1	0

Other machines used by industrial mold producers include manually controlled machine tools and tracer-controlled mills (tracer-controlled mills are milling machines which machine a mold into a specific shape by tracing a model or prototype). The number and ages of these machines in use by U.S. producer questionnaire respondents as of 1983 are shown in the following tabulation (in units):

Age	Manually controlled machine tools	Tracer-controlled mills
0 to 2 years	188	7
3 to 4 years	311	16
5 to 9 years	611	47
10 to 19 years	884	59
20 years and over	526	10

The Canadian industry uses numerous CNC machine tools. 1/ However, some Canadian industry sources have indicated that they consider the technological level of the Canadian industry far behind that of the United States, especially with regard to CAD/CAM programing systems. Nonetheless, one Canadian producer manufacturing injection molding machines and molds considers itself as a leader in the production of molds. This producer has manufactured molds to very high tolerances, permitting the interchangeability of mold components, and uses the most updated equipment to manufacture these molds. Through its standardization program, this firm is manufacturing molds on an assembly line production basis rather than producing molds one at a time. 2/

Labor

According to data provided by the U.S. Department of Labor, Bureau of Labor Statistics, U.S. wages paid to tool and die makers and machine tool operators, two of the most common occupations found in industrial mold

1/ Hearing held before the U.S. International Trade Commission, Feb. 2, 1984.
2/ Ibid.

shops, 1/ increased by over 42 percent during 1978-82. Tool and die makers' hourly wage rates increased from $8.51 in 1978 to $12.07 in 1982. The average hourly wage rates of U.S. machine tool operators increased from $8.38 in 1978 to $11.95 in 1982, as shown in the following tabulation (per hour):

Occupation	1978	1979	1980	1981	1982
Tool and die makers	$8.51	$9.13	$10.35	$11.32	$12.07
Machine tool operators (toolroom)	8.38	9.48	10.23	11.33	11.95

No comparable data are available for fringe benefits applicable to these occupations. Hourly earnings of tool and die makers and machine tool operators in the North Central States were approximately 5 percent higher than hourly earnings in the rest of the United States. Hourly earnings of tool and die makers in the North Central States increased from $8.97 in 1978 to $12.73 in 1982, whereas hourly earnings of machine tool operators in those States increased from $8.88 in 1978 to $12.61 in 1982, according to BLS, as shown in the following tabulation (per hour): 2/

Occupation	1978	1979	1980	1981	1982
Tool and die makers	$8.97	$9.95	$11.00	$12.07	$12.73
Machine tool operators (toolroom)	8.88	9.74	10.91	12.08	12.61

Again, no comparable data are available on fringe benefits applicable to these occupations.

1/ The BLS does not collect data on moldmakers, specifically the most important occupation found in mold shops.

2/ These data are compiled by the Bureau of Labor Statistics from cross-industry surveys and represent all-industry average hourly earnings in the North Central States. During the Commission's hearing held on Feb. 2, 1984, U.S. and Canadian producers provided estimates on average wage rates and fringe benefits in the U.S. and Canadian mold industries. U.S. producers stated that average wage rates in the U.S. mold industry presently range from $12 to $15 per hour, with fringe benefits accounting for an additional $4 to $6 per hour. Canadian producers indicated that average wage rates range from $10 to $14 per hour, with an additional $3 to $4 per hour for fringe benefits.

According to data provided by Labor Canada, tool and die makers' hourly earnings in Canada increased from US$7.27 in 1978 to US$10.08 in 1982, as shown in the following tabulation:

Year	Canada
1978	U.S.$7.27
1979	7.64
1980	8.71
1981	9.56
1982	10.08

When the wage rates of Canada are expressed in U.S. dollars, Canadian wage rates were 15.8 percent lower than the hourly wages rates for U.S. tool and die makers in the United States and 20.9 percent lower than the hourly wage rates in the North Central States for the same period.

In the course of the investigation, various U.S. producers indicated that the present skill levels of their work forces are not sufficient to meet their needs. 1/ A trained labor force is required to operate new and more modern equipment. The industrial mold industry and its trade association conduct their own in-house training program. In some States such as Michigan, a small part of these training programs are funded by the State Governments (see section on U.S. Government involvement). U.S. producers indicated that such programs are needed because the educational system in the United States stresses nonvocational academic training. As a result, very few students pursue careers in the skilled trades such as moldmaking. The decreasing number of people entering the moldmaking trade is one of the most serious problems facing moldmakers. The Society of Plastics Industry of the United States estimates that in 5 years the industry will need 5,000 journeymen; at best, the industry can train 2,000. 2/ Canadian producers stated that their employees have a high level of training and technical expertise. This can be partly attributed to the Canadian immigration policies in the 1950's and 1960's, which attracted a large number of highly skilled employees from many European countries. 3/ In addition, present day Canadian Government policies provide for apprenticeship training for the skilled trades (see section on Canadian Government involvement). These programs are considered conduits through which Canadian employers are provided a steady stream of skilled workers.

1/ Hearing held before the U.S. International Trade Commission, Feb. 2, 1984.

2/ "Moldmakers' Success Keyed to Economic Factors, Adaptation of Technology, Processors' Requirements," Design and Processing Magazine, September, 1982.

3/ Obtained from prehearing submission of the Society of the Plastics Industry of Canada.

Government Policies Affecting Industry

United States

The principal assistance to the U.S. industrial mold industry from the Federal Government is provided by the U.S. Department of Labor, particularly under its program to fund preemployment training classes. The U.S. Small Business Administration offers loans and other services to all small businesses, including virtually all companies within the industrial mold industry; its loan programs have been used extensively by this industry. The industrial mold industry, like other U.S. industries, benefits indirectly through the nation's patent laws. The industry also receives tax incentives, including tax credits, tax reductions, and other tax benefits such as those found in the Economic Recovery Tax Act of 1981. State programs in Illinois, Michigan, and Ohio are also available.

U.S. Department of Labor.--The U.S. Department of Labor operates three programs that provide assistance to the U.S. industrial mold industry. Two of these programs, preemployment training classes, funded under the Job Training Partnership Act (JTPA) 1/ and the Trade Adjustment Assistance Program, 2/ provided for in the Trade Act of 1974 and in other laws, furnish direct funding to this industry, whereas the remaining program, the National Apprenticeship Program, consists of coalitions of management, labor, and government, in which the government's role is to provide services to these program sponsors. Of these program sponsors that are directly funded, preemployment training classes have been used more extensively by the industrial mold industry than has the Trade Adjustment Assistance Program. Since 1964, the Department of Labor (DOL) has had a contract with the National Tooling & Machining Association (NTMA) to provide funding for a multi-State, preemployment institutional training program in the contract precision tooling and machinery industry, including the industrial mold industry. 3/ A recent press release by the DOL indicated that it had committed $1.5 million to the NTMA to conduct preemployment training classes for over 900 jobless persons in a total of 8 States; such funds are for these NTMA activities covering the period January 1, 1984, to June 30, 1985. The 12-week instructional programs will recruit economically disadvantaged persons in Arizona, California, Florida, Illinois, Massachusetts, Missouri, New York, and Ohio. The majority of these trainees will be placed in on-the-job training slots as tool and diemakers, moldmakers, and machine tool operators. Instruction will include blueprint reading and interpretation, machine theory, tool selection, and materials processing.

1/ Public Law 97-300, Oct. 13, 1982.

2/ The authority for the Trade Adjustment Assistance Program for workers is provided for in the Trade Act of 1974, as amended by Title XXV Omnibus Budget Reconciliation Act of 1981, Public Law 97-35; the Miscellaneous Revenue Act of 1982, Public Law 97-362; the Amendment to the International Coffee Act of 1980, and Public Law 98-120 of 1983.

3/ Such training programs were authorized in earlier years under the Manpower Development Training Act and the Comprehensive Employment and Training Act.

According to the NTMA's work proposal for this current contract, unsubsidized job opportunities will be secured for all who sucessfully complete this 12 weeks of preemployment institutional training. These opportunities were to be developed predominately with, but not restricted to, NTMA member companies. According to this work proposal, program graduates generally start unsubsidized employment at approximately 50 percent of the prevailing journeyman's wage, which generally ranges between $10.00 to $13.00 per hour, with top-rated workers earning in excess of $21.00 per hour.

According to the NTMA, 16,000 persons have been provided with preemployment training since 1964. Seventy-nine percent of those trainees have successfully completed the preemployment or institutional training, and virtually all of the successful institutional graduates have been placed in career employment. Table 19 indicates the various contract periods for contracts between DOL and NTMA, the number of trainees enrolled, and the funds allocated.

An official of the NTMA could not provide data on the costs incurred by the industrial mold industry to implement this preemployment training program, although he estimated that it exceeded the funds provided by the DOL. 1/

The Trade Adjustment Assistance Program (TAA) 2/ assists workers in situations where increased imports of foreign made products have contributed importantly to their loss of a job. To assure that the benefits go to such workers, the law requires the DOL to determine whether imports contributed importantly to job reductions in a particular company or subdivision of a company. The Department of Labor makes this determination in response to petitions from workers who have been laid off or threatened with layoffs. If the DOL decides that imports were an important factor, it certifies the affected workers in that company (or subdivision thereof) as having group eligibility for adjustment assistance.

The TAA provides cash benefits called "trade readjustment allowances" (TRA), training, job search and relocation allowances, and other employability services. Workers eligible for TAA may receive the following benefits: (1) special help in finding a new job; (2) training in a new skill if suitable employment is not otherwise available (when the training facility is beyond normal commuting distance, transportation and subsistence expenses may be paid); (3) job search allowance to cover expenses for looking for work outside of commuting range (workers may be paid 90 percent of their necessary transportation and subsistence costs up to a maximum of $600); (4) relocation allowance to help workers move their families and household goods to their new area of employment, plus a lump-sum payment not to exceed $600 to help them get settled (workers may be paid 90 percent of their moving expenses); and (5) trade readjustment allowances, generally at the level of unemployment insurance (UI) benefits, that become payable when workers have exhausted their entitlement to UI, including extended benefits (EB). The combination of UI, EB, Federal Supplemental Compensation (FSC), and TRA cannot exceed 52 times the TRA weekly benefit amount, except that up to 26 additional weeks may be paid to workers in approved training.

1/ Information provided to the Commission's staff on Feb. 22, 1984, by an official of the NTMA.

2/ Information on the release of the funds was received by the Commission's staff on Feb. 20, 1984.

Table 19.--Trainees enrolled and funds allocated under contracts between the Department of Labor and NTMA, by specified contract periods, January 1964-December 1985

Contract period	Number of trainees enrolled	Funds allocated
		1,000 dollars
August 1964-November 1967	1,669	167
August 1966-December 1969	1,686	521
January 1964-March 1970	1,395	1,065
January 1969-November 1970	225	295
November 1969-September 1972	1,517	2,704
November 1971-May 1973	1,151	1,701
June 1973-September 1974	810	819
June 1974-August 1975	830	1,020
June 1975-August 1976	888	1,702
September 1976-November 1977	950	2,000
November 1977-February 1979	1,085	2,120
March 1979-February 1980	1,011	1,862
March 1980-November 1981	1,500	2,970
December 1981-February 1982	117	201
February 1982-November 1982	458	798
December 1982-September 1983	401	667
January 1984-December 1985 1/	620	1,000

1/ An additional $500,000 has been allocated by the U.S. Department of Labor to NTMA to train approximately 300 workers through June 1985, but no contract had been signed as of Feb. 22, 1984.

Source: U.S. Department of Labor and NTMA.

Since the inception of the TAA in April 1975, there have been only two affirmative action investigations by the U.S. Labor Department involving workers producing industrial molds; 12 other petitions, including 3 from firms producing tire molds, were denied. On January 11, 1980, the workers and former workers of Reed City and Die Corp., Reed City, Mich., filed a petition with the DOL, Office of Trade Adjustment Assistance, alleging that workers

producing plastic injection and compression molds were being injured by increased imports. The DOL initiated an investigation on January 22, 1980, and published an affirmative recommendation on April 4, 1980. Twenty-five workers were certified eligible to apply for worker adjustment assistance on April 8, 1980. The DOL paid for 570 weeks of compensation at a total cost of $51,999. None of these workers received retraining or job search benefits or relocation allowances.

On October 13, 1982, the United Electrical Radio Machine Workers of America, Local No. 623, filed a petition with the DOL, Office of Trade Adjustment Assistance, on behalf of workers at Conmold, Inc., Latrobe, Pa., alleging that workers producing casting molds and casting machinery were being injured by increased imports. The DOL initiated an investigation on October 18, 1982, and published an affirmative recommendation on April 28, 1983. One hundred workers were certified eligible to apply for worker adjustment assistance on April 28, 1983. Of these 100 workers, 55 applied for TRA but, instead, received benefits under other Federal and State programs. Three of these workers have applied for retraining benefits and were awaiting the release of funds. 1/ The average cost of such retraining in Pennsylvania currently ranges from $5,000 to $5,800 for each trainee.

The National Apprenticeship Program, administered by the Employment and Training Administration of the U.S. Department of Labor, does not allocate funding to moldmakers, die-casting and plastic molding (or to the other 75 apprenticeship occupations classified by this agency), for the purpose of a specific apprenticeship program. Instead, the National Apprenticeship Program consists of a coalition of management, labor, and Government that supports the apprenticeship program in the United States. Specifically, this Bureau provides technical assistance to industry in several areas, including analyses for training content and work process development, development of related technical instruction curriculum, forecasting apprenticeship needs, and registration of apprenticeship programs.

The bulk of the funds for an apprenticeship program within the industrial molds industry are provided by the NTMA and its member companies. Each of the 60 major cities in the United States where NTMA chapters are located has some form of apprenticeship program, although some programs are much more structured than others. According to an official of the NTMA, there are no reliable cost data for this program.

U.S. Small Business Administration.--The U.S. Small Business Administration (SBA) assists new or growing businesses with financial assistance; counsels small firms with problems; offers special assistance to minority, women-owned, and veteran-owned businesses; helps small businesses to secure Government contracts; and acts as a special advocate for small business with other Federal agencies, with States, and within the private sector. 2/ The SBA offers two basic types of business loans. First, loans are made by private lenders, usually banks, and guaranteed by SBA. These SBA "bank

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1/ Information provided by the Employment and Training Administration, U.S. Department of Labor.

2/ U.S. Small Business Administration, SBA Business Loans from the SBA, May 1983.

guaranteed loans" are tied to funds appropriated by Congress. The amount of loans which SBA can guarantee is much larger than funds appropriated for direct loans. Thus, the majority of SBA loans are guaranteed.

Secondly, the SBA makes loans directly. Funds for direct loans also come from funds appropriated specifically by Congress for this purpose. In general, direct SBA loans carry interest rates slightly lower than those in the private financial markets. Such loans are available only to applicants unable to secure private financing or SBA-guaranteed or participation loans.

Although the SBA has a limitation on the maximum size a firm must be in order to be eligible for SBA loans (either 250 or 500 employees, depending on the type of loan and time of application), virtually all firms classified within the Standard Industrial Classification (SIC) number 3544 (special dies, tools, jigs, and fixtures industry) qualify, according to the SBA. 1/

The SBA provided the Commission with a complete list of all of its loan approvals during January 1979-February 1984. This listing covered all of SIC 3544, of which industrial molds account for roughly 25 percent. 2/ The total number of loan approvals was 293, including a variety of types of loans under the various loan programs of the SBA. The total amount for such loans during the period was $52.6 million, of which the SBA-guaranteed amount was $44.8 million, or 85 percent. 3/

U.S. Department of Commerce.--In addition to its export promotion functions that offer services to all industries, including the industrial mold industry, the DOC offers two programs, one general and the other specific, that are benefiting the industrial mold industry. This general program, Trade Adjustment Assistance for Firms and Industries, was authorized by title II, chapter 3 of the Trade Act of 1974. The specific program, the Development of a National Quality Control Program, also authorized under the Trade Act of 1974, is jointly funded by the DOC and the NTMA. The program's sponsor for this specific program is the National Tooling & Machining Foundation (NTMF), the research and educational arm of the NTMA.

The Trade Adjustment Assistance Program authorizes financial assistance for certified firms in the form of direct and guaranteed loans to enable the firms to implement their adjustment proposals. 4/ In addition to the financial assistance, this program provides techincal assistance to firms, including (1) guidance in preparing certification petitions; (2) general diagnosis of a firm's problems and its opportunities for recovery; (3)

1/ Letter to the U.S. International Trade Commission from the SBA, dated Feb. 24, 1984. For firms with fewer than 250 employees, 98 percent qualified for SBA loans, and for firms with fewer than 500 employees, 99 percent qualified.

2/ This estimate of the size of the industrial mold segment of the special dies, tools, jigs, and fixtures industry was based on industry value of shipments for 1977.

3/ The SBA guarantees up to 90 percent of each loan, although in some cases, this percentage of guarantee is less.

4/ U.S. Department of Commerce, International Trade Administration, Report on Adjustment Assistance of Calendar Year 1982, Sept. 21, 1983.

assistance in preparing loan applications and adjustment proposals; (4) examination of specific problems recognized by a firm's management; and (5) in-depth assistance to firms in carrying out their adjustment proposals. 1/ In addition, this program provides technical assistance to a variety of trade-impacted industries to help them deal on an industrywide basis with problems and opportunities concerning marketing, management, export promotion, production operations, and technological innovations. The Development of a National Quality Control Program, referred to above, is an example of such assistance to a trade-impacted industry.

Since January 1979, the DOC has certified 9 firms to receive technical assistance under the trade adjustment program. 2/ The total cost to the U.S. Government was $88,171, whereas the firms provided $21,643. The types of assistance received included (1) assistance in development of a management information system; (2) a marketing diagnosis; (3) assistance with drafting an adjustment assistance proposal; (4) an engineering proposal; (5) assistance in improving costing standards; and (6) help in completing a request for certification under the adjustment assistance program.

The goal of the U.S. Department of Commerce's program, under the program entitled The Development of a National Quality Control Program, is to help the U.S. tooling and machining companies improve their quality control programs so that they are more competitive with imports. 3/ This program is jointly funded by the DOC ($218,350) and the NTMA ($136,669). The major elements of this program are (1) an analysis of the current state of quality control procedures utilized in the industry; (2) development of a system of standards for quality control programs in contract tooling and machining companies; (3) production of a guide for individual companies to use in initiating their own quality control systems; and (4) presenting a series of seminars in industrial centers around the country to inform company owners and chief executives on how to organize, manage, and apply the quality management techniques developed through this cooperative agreement. The DOC believes that the NTMA is the only organization with the combination of technical skills, industry contacts, and credibility necessary to undertake this program of assistance for the U.S. tooling and machining industry. 4/

1/ Ibid.

2/ No industrial mold firms received financial assistance, but one firm, after receiving technical assistance in the form of a diagnostic study, an adjustment proposal, marketing and engineering assistance, and costing standards assistance, was able to secure a $485,000 loan from the U.S. Small Business Administration, a private bank loan of $350,000, and a line of credit of $150,000.

3/ U.S. Department of Commerce, Project No. 99-26-07163-30, National Tooling and Machining Foundation, Development of National Quality Control Program, undated.

4/ Ibid.

Other Federal programs.--The Production Research Program of the National Science Foundation is currently sponsoring research on CAD/CAM applications in the area of injection molding. During fiscal years 1981-84, approximately $1 million in grants were awarded to projects at Cornell University and the University of Wisconsin.

The U.S. Department of Education funds a project to counteract the shortage of precision tool machinists in the United States; types of machinists included are toolmakers, diemakers, screw machine setup persons, machine tool builders/assemblers, precision sheetmetal fabricators, and moldmakers. This program, effective June 1, 1983, and lasting 15 months, will determine the core performance requirements for precision machinists; develop strategies for schools, business, and industry to use in portraying a more accurate image of the precision metalworking occupational area to students; and will disseminate the project results to educators, business and industry personnel, and other interested persons.

Through the Army, Navy, and Air Force, the U.S. Department of Defense maintains a Manufacturing Technology (MAN TECH) program to research and develop technology in critical defense-related areas. Another Department of Defense program, the Industrial Modernization Incentives Programs (IMIP), provides incentives to companies to produce quality weapons systems, equipment, and materials, while continually motivating the producer to modernize the production process. No specific projects have been initiated under the above-mentioned programs which would be of direct benefit to the U.S. industrial mold industry. However, the results of MAN TECH and IMIP generic research programs in such areas as CAD/CAM and the development of composite materials may indirectly filter down to the industry and be of some general benefit.

The Export-Import Bank (Eximbank) of the United States provides direct loans and loan guarantees to public or private foreign buyers to finance U.S. exports of heavy capital equipment and large-scale installations. During 1979-83, Eximbank provided loans and guarantees to a number of industries that purchase industrial molds, including automobile-manufacturing equipment; electronics equipment manufacturing; miscellaneous manufacturing equipment; plastics products manufacturing equipment; pharmaceutical and health aids manufacturing; rubber products manufacturing equipment; steel foundry and fabrication equipment; and tire and tube manufacturing and repair. Such loans and guarantees ranged from a low of $89.6 million in 1983 to $364.5 million in 1981 and averaged $165.9 million per year over the period.

Direct loans and financial guarantees are for projects financed for a term of more than 5 years. For medium-term (181 days to 5 years) assistance, Eximbank has several programs, which are (1) the Medium-Term Commercial Bank Guarantee Program; (2) the Small Business Credit Program; (3) the Medium-Term Credit Program; and (4) the Working Capital Guarantee Program. Through the Commercial Bank Guarantee Program, Eximbank offers guarantees on medium-term export loans extended by U.S. commercial banks against nonpayment by foreign purchasers. The Eximbank's Small Business Credit Program enables U.S. banks to offer medium-term, fixed rate export loans to finance sales by small U.S. companies at the lowest rates permitted under the export credit guidelines followed by all members of the Organization for Economic Cooperation and

Development. The Working Capital Guarantee Program guarantees loans that would not be made commercially without the guarantee; such loans would then be used by small or medium-sized businesses as working capital to finance export sales.

The Eximbank, through its agent, the Foreign Credit Insurance Association (FCIA), extends export credit insurance to provide protection against the risks that the foreign purchaser will not pay, thereby minimizing the commercial and political risks of loss. Policies are available which cover a single buyer for medium-term sales or multiple buyers covering numerous short-term transactions during a 12-month policy period. Under Eximbank's New-to-Export policy, greater coverage is offered to those companies that had export sales of less than $750,000 a year and that have not used Eximbank or FCIA programs.

Selected State programs.--At its hearing covering industrial molds on February 2, 1984, the Commission received submissions identifying State assistance programs to business from Illinois, Michigan, and Ohio. The following information was extracted from these submissions, although there is little information available concerning the extent to which the U.S. industrial mold industry has been able to avail itself of these programs. A number of programs offering financial assistance, tax incentives, and manpower training assistance exist in these three States, where the industrial mold industry is primarily located.

The State of Illinois provides financial assistance to businesses through a number of special programs as well as through tax incentives. For example, State-provided funds can be used for purchasing machinery and equipment, land and buildings, or for construction and renovation of facilities, training, and working capital and financing expenses. 1/ The benefits which flow to the borrowing company include low interest rates, low downpayments, long payback terms, and insurance guarantees on the sale of bonds. An investment tax credit of 0.5 percent is provided for investment in tangible assets used in manufacturing, mining, and retailing.

Illinois also assists businesses with their training needs. The Illinois Industrial Training Program pays directly to the firm a portion of the salaries of new workers during their training. Funding from this program can also be used to improve the skills of currently employed workers and to support on-the-job training programs. 2/

Michigan, like Illinois, provides a number of financial and tax incentives as well as assistance services and training assistance to firms currently in the State or planning to do business there. The Michigan Economic Development Authority provides loans through five separate loan funds: the Private Development Loan Fund, the Industrial Facility Conversion Loan Fund, the Public Development Loan Fund, the Loan Insurance Fund, and the Research Center Fund.

1/ These programs include the Community Development Assistance Program, the Illinois Small Business Fixed-Rate Financing Fund, insured Industrial Revenue Bonds, conventional Industrial Revenue Bonds, and the Illinois Development Finance Authority Direct Loan Fund.

2/ Other State training assistance programs include the High Impact Training Services and the Job Training Partnership Act.

Michigan also provides tax incentives for capital investment by businesses. The State's single business tax provides a 100-percent tax deduction for new expenditures on machinery and equipment, with a possible 10-year carry forward. The Michigan Office of Economic Development provides assistance to businesses in several areas, including site selection, technical information on business imports and markets, Government and community liaisons, information on Federal programs and securing Federal contracts, and financial management assistance such as packaging business plans in pursuing capital for business location or expansion.

The Michigan Business and Industrial Training Program custom designs and administers training programs for new or expanding businesses. The program includes referral and selection of workers, orientation to the prospective employer, preemployment skill training, and in-plant training.

Ohio also provides financial and tax incentives to businesses, as well as assistance for employee training. The Ohio Department of Development provides direct loan or loan guarantees to qualified firms for the financing of land and buildings or capital equipment. Interest rates on the loans can vary by as much as 1/3 below the prime lending rate offered by commercial banks. However, of the 24.9 million dollars' worth of State direct loans provided between October 1983 and mid-February 1984, none were made to firms in the industrial mold industry. 1/ Through Ohio's Industrial Training Program, businesses may be reimbursed on a hourly basis for the instructor's teaching time. The State also provides other training services, such as coordinating State educational and vocational programs with those of business.

In 1983, there were approximately 200 State and local economic development activities with high-technology development features. The U.S. Office of Technology Assessment identified 38 of these programs in 22 States as specifically targeting the creation, attraction, or retention of high-technology firms.

Canada 2/

The Government of Canada provides a wide range of programs, tax incentives, and services to promote the expansion of business in Canada. None of these programs have thus far been identified as providing benefits solely to the industrial mold industry--rather, they are available to most of Canada's industries.

Financial and management services.--The Federal Business Development Bank (FBDB) is a Crown Corporation that assists the creation and growth of business enterprises across Canada by providing financial and management services. It supplements services available from other Government programs and gives particular attention to the needs of smaller enterprises. The FBDB extends

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1/ State of Ohio, Department of Development, Feb. 17, 1984.

2/ Data on this section obtained from the Government of Canada, Ministry of State for Economic Development, Assistance to Business in Canada, 1981 and 1982.

financial assistance to almost every type of new or existing Canadian business that does not have other sources of financing available to it on reasonable terms and conditions. The Bank provides loans, loan guarantees, interim financing, equity financing, or any combination thereof. A business may be eligible for financing if the amount and character of the investment in the business insures a continuing commitment to the business, it has an excellent chance of success, and it does not have other sources of financing available under reasonable conditions. In fiscal year 1980, the latest year for which data are available, the FBDB approved 16,571 loans, totaling $741 million (U.S.). The amount approved for producers of industrial molds is not separately available. 1/

Small-business loans.--The Small Business Loans Administration (SBLA) of the Department of Industry, Trade, and Commerce, under the Small Business Loans Act, administers this program. Under this program, all chartered banks, Alberta Treasury branches, and other approved lenders, such as credit unions, are authorized to make loans to small-business enterprises for the purchase or modernization of equipment on premises and for the purchase of land. Loans can be used to finance up to 80 percent of the cost of fixed or moveable equipment, including installation, and 90 percent of the cost of construction of new premises, the purchase of land, or the renovation or improvement of existing premises. The rate of interest is set at 1 percent over the prime rate. In 1979 and 1980, the Canadian Government guaranteed more than $220 million (U.S.) in small-business loans. Small-business enterprises in manufacturing, wholesale or retail trade, service businesses, construction, transportation, and communications whose gross revenues do not exceed $1.5 million (Canadian) during the fiscal period in which the application is made are eligible for assistance. SBLA reported that no data are available on the assistance it has provided to the Canadian mold industry. Data is available on an aggregated basis in broad manufacturing industries. 2/ Approximately 10 percent of SBLA loans are provided to manufacturing firms.

Export financing.--The Export Development Corporation (EDC) makes loans and loan guarantees to foreign borrowers to finance and expand Canadian exports. The EDC provides long-term loans to foreign borrowers, either by individual loan agreements or by confirmed lines of credit. The EDC also guarantees loans made to foreign borrowers to finance the purchase of Canadian exports of capital equipment and services. As of December 31, 1979, the total amount of agreements signed since the inception of the program in 1961 was more than $7.9 billion (U.S.). Canadian exporters may submit applications on behalf of foreign borrowers, or foreign borrowers may apply directly. The Commission's staff requested data on the assistance EDC provided the Canadian mold industry, but none were received.

1/ The FBDB advised the Commission staff that data on the Bank's support to Canadian industries are considered confidential. FBDB stated that it had seven accounts, nearly all of which were loans rather than equity participation of the seven mold producers; five are located in Ontario, one in Quebec, and one in British Columbia.

2/ SBLA stated that assistance to mold producers would be rare because of program criteria for eligibility. The applicants firm's sales cannot exceed $1.5 million and the aggregate loans outstanding to a firm cannot exceed $100,000.

Export insurance and guarantees.--The Export Development Corp. (EDC) assists in expanding Canada's export trade by insuring export transactions against various political and commercial risks of loss (excluding risks normally covered by commercial insurers) and by providing guarantees and other credit facilities. Generally, the losses insured against include such features as nonpayment arising from insolvency of the buyer, currency transfer, conversion restrictions, war, and other similar situations. The EDC generally assumes 90 percent of the risk, and the policy holder, 10 percent. The total declared value of exports for which EDC issued insurance and related guarantees in fiscal year 1979 (the latest year for which data are available) was $1.4 billion (U.S.). Specific data on assistance to industrial mold producers were requested, but none were received.

Performance-related insurance and guarantees.--The EDC provides a comprehensive program of performance-related insurance and guarantees to make Canadian exporters more competitive in bidding for contracts abroad. Performance-related insurance and guarantees are provided to cover advance payments, progress payments, and performance and completion provisions in commercial contracts to complement EDC's existing financing, insurance, and guarantee facilities. Data on assistance to industrial mold producers were requested, but none were received.

Defense Industry Productivity Program.--This program provides assistance to Canadian firms on selected projects involving the production of defense products. Contributions may be provided toward the cost of applied research and development and market feasibility studies of defense and defense-related products. In addition, assistance is provided to share acceptable costs of establishing a Canadian company as a qualified supplier of defense-related products. Contributions are provided to acquire advanced production equipment needed to upgrade manufacturing capability for defense-related products. All contributions are repayable with the exception of those given for capital assistance. Contributions for capital projects are repayable only if the company receives a contribution amounting to more than 50 percent of eligible costs. Three Canadian producers of industrial molds participated in the program during fiscal years 1979-82. None of these producers received contributions for the production of molds; the support was for products other than molds. The assistance provided to non-mold-related activities of the Canadian mold industry amounted to $1.7 million (U.S.) during this period. 1/ During fiscal year 1980, contributions of $49.5 million (U.S.) and loans of $11.6 million (U.S.) were made to all Canadian industries. 2/

Enterprise Development Program.--The Enterprise Development Program (EDP) provides various forms of assistance to small- and/or medium-sized manufacturing firms prepared to undertake high-risk projects that promise high rates of return. The objective of the program is to improve these firms' viability and international competitiveness. The two activities supported by this program are the design or development of new or improved products and manufacturing processes and the assistance to firms in adjusting to a changing

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1/ Data provided by the Department of Industry, Trade, and Commerce of the Government of Canada.

2/ Assistance to Business in Canada, 1981-82, Ministry of State for Economic Development, p. 109.

competitive environment. Assistance can be provided to businesses by providing insurance of up to 90 percent in support of term loans made by private lenders to manufacturers to restructure operations or supplement working capital when normal financing is not available at reasonable terms. In addition to insurance, this program provides contributions of up to 75 percent of costs for research and development and design projects if such projects represent a significant burden on the company's resources. The program also provides contributions of up to 75 percent of the cost of conducting market research studies, productivity enhancement studies, and design projects. Grants or loans in this program are limited to a maximum of $200,000 (Canadian) and are available to any firm with annual sales of not more than $5 million. Over the past six years, grants provided to the Canadian mold producers under this program amounted to $635,000 (U.S.). 1/

Program for Export Market Development.--The Program for Export Market Development encourages Canadian suppliers of goods and services to enter new export markets or undertake additional export development activities by sharing the costs incurred. The program organizes its activities to exploit export opportunities by encouraging Canadian suppliers to bid on specific projects in foreign countries, identifies new export markets for Canadian goods, encourages participation in international trade fairs, encourages Canadian firms to invite prospective buyers to Canada, encourages the formation and use of export consortia to improve Canadian export performance, encourages sustained export market development, and provides financial contributions to share the risk of exporting.

To be eligible for PEMD assistance, the applicant organization must be established and operating in Canada, have experience or potential for competitive performance in foreign markets in the products concerned, and have sound managerial and financial capability with positive net worth and working capital. The following tabulation provides data on PEMD assistance provided to Canadian producers of industrial molds.

Fiscal year 1/	Number of repayable contributions provided to Canadian producers	Value of benefits
1979----------	-	-
1980----------	1	U.S.$650
1981----------	-	-
1982----------	1	6,844
1983----------	1	3,433

1/ Canadian fiscal year runs from Apr. 1 through Mar. 31.

1/ Estimated from data provided in prehearing submission of the Society of the Plastics Industry of Canada.

Regional Development Incentives Program.--Direct grants, loan guarantees, and repayable incentives are provided by the Canadian Government for the establishment, modernization, or expansion of manufacturing and other activities which increase or maintain employment in designated regions of Canada. This assistance is provided to designated regions with slow rates of growth and high levels of unemployment. Most manufacturers may qualify for grants and loan guarantees, but certain industries qualify for loan guarantees only. The ceiling on incentives for plant modernization or volume expansion is 20 percent of capital costs. The ceiling for new plants or expansions is 25 percent of capital costs plus $5,000 per direct job created. During the past six years, grants provided to the Canadian mold industry under this program amounted to $635,565(U.S.). 1/

Manpower programs.--The Canada Employment and Immigration Commission operates a number of training programs to assist employers and employees in industries requiring such assistance. The Canada Manpower Industrial Training Program offers assistance to help employees initiate training or expand their training capability. The objectives of this program are to hire and train new workers and upgrade the existing workforce or retrain employees who have been affected by technological or economic dislocation. Training conducted under this program may be given on the job, in a classroom or other special training area, or a combination thereof. Provincial training officials provide an advisory function to the curriculum and methodology for the training program. Expenditures reimbursed are direct training costs (50 to 100 percent) and trainee wages (40 to 85 percent). During fiscal year 1979, the latest period for which data are available, total contributions under this program totaled $88.2 million (U.S.).

The Canada Manpower Training Program provides adults with the skills required for employees to increase their earning potential; the program includes provisions for skill courses and basic training for skill development to help individuals raise their education. The training is purchased by Canada's Employment and Immigration Commission from the Provinces and delivered through its training institutions and private trade schools. Living allowances, unemployment insurance benefits, and other assistance are available to full-time trainees. Expenditures during fiscal year 1979 were $295.3 million (U.S.) for training purchases, $71.9 million for allowances, and $120.1 million for unemployment insurance benefits.

The Canada Manpower Mobility Program enables workers whose skills are not needed in their home area to seek employment elsewhere. The types of assistance available include exploratory allowances for travel costs, relocation allowances, and temporary employment allowances for travel and living costs. The budget for this program during fiscal year 1979 was $8.5 million (U.S.).

Critical trade skills training initiatives are available to overcome certain chronic manpower shortages, particularly in manufacturing industries. Subsidies are available to employers for training workers in occupations that are in short supply. 2/ Training and technical support are provided by

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1/ Ibid.

2/ Discussions with Canadian mold producers indicate a shortage of skilled moldmakers and other mold-making occupations.

employers and/or employer associations to employee-trainees. Producers of industrial molds are eligible for financial assistance for the training of workers in molding, coremaking, and metal casting. This occupation is one of 33 general occupational groupings designated as a high-skill occupation in which national or regional shortages of workers are serious enough to warrant special action. The criteria for designating target occupations are general in nature and are not aimed at a particular segment of the Canadian industry. Producers of industrial molds are eligible to be considered for a contract with the Canada Employment and Immigration Commission to provide training for a specified number of workers. Committees were established, and a governing body was selected to administer the training of the programs. In Ontario, this governing body is the Ministry of Colleges and Universities, Apprenticeship Branch. Moldmakers are bound by contract to serve 8,000 hours in shop training and are required to attend classes for 720 hours in courses such as shop theory, related mathematics, and drafting. Under the apprenticeship contract, employers are requested to pay the apprentice a percentage of the journeyman's rates. For the first 1,000 hours, he receives 50 percent of the journeyman's rate and receives 5-percent wage increments for every 1,000 subsequent hours until completion of the 8,000 hours of training. At this point, the moldmaker receives 85 percent of a journeyman's wage rate. The Employment and Immigration Commission will pay for the major portion of the training and administrative costs and at least one-half of the trainees' wages during the first and second year of high-skill training. The following tabulation lists the number of participating mold producers, the number of employees, and the total value of benefits in terms of contract costs provided by the Employment and Immigration Commission for the apprenticeship programs during 1979-82.

Fiscal year 1/	Number of producers	Number of trainees	Benefits
1979----------	4	7	U.S. $12,000
1980----------	4	7	14,744
1981----------	1	1	1,601
1982----------	4	8	21,321
Total----------	2/	2/	49,666

1/ Canadian fiscal year runs from Apr. 1 through Mar. 31.
2/ Not meaningful because of double counting.

The following tabulation lists the number of the participating mold producers, the number of mold employees, and the total value of benefits in terms of contract costs provided by the Employment and Immigration Commission for nonapprenticeship programs for fiscal years 1979-82:

Fiscal year 1/	Number of producers	Number of trainees	Benefits
1979	51	142	U.S. $233,114
1980	53	235	353,666
1981	50	184	274,698
1982	20	89	212,681
Total	2/	2/	1,074,159

1/ Canadian fiscal year runs from Apr. 1 through Mar. 31.
2/ Not meaningful because of double counting.

Department of Regional and Economic Expansion (DREE). 1/--DREE provides incentives to manufacturing or processing operations in designated slow-growth areas of Canada. Contributions are primarily nonrepayable. For the establishment of new facilities, 25 percent of eligible capital costs and 15 percent of average salaries in the second and third years for newly created jobs are paid, up to a maximum of $5 million, or $30,000 per job. Eligible costs include buildings and equipment but do not include land or off-site equipment and vehicles. For expansion and modernization, 20 percent of eligible capital costs are paid, up to a maximum of $5 million. During the past six years, grants provided to the Canadian mold producers under this program totaled $90,255 (U.S.).

Industrial Labour Assistance Program (ILAP).--The program is designed to alleviate the relative distress caused in designated communities by permanent large-scale industry dislocation in a given sector when such dislocation results in large layoffs which have a high impact on total community employment. Assistance is available to manufacturing and processing firms undertaking projects to establish, expand, or restructure operations in designated communities. Nonrepayable contributions of up to 75 percent are available for consulting costs associated with the establishment, expansion, or restructuring of operations (including mergers and acquisitions). Repayable, interest-free contributions are available in sufficient amounts for the project to be undertaken, but the amount may not exceed 50 percent of eligible capital costs plus an amount not to exceed 50 percent of preproduction expenses. To be eligible, aggregrate capital and preproduction costs must be $100,000 or greater. During the past six years, grants to the Canadian mold producers under this program totaled $215,773 (U.S.). 2/

Industrial Energy Research and Development (IERD) Program.--The IERD program encourages research and development of new and improved processes and equipment that will reduce energy consumption in industry and insure the widest possible uses of the latest technology. Contributions of up to 50 percent of the total estimated cost of approved projects are made. Contributions provided to all industries eligible for assistance during fiscal year 1981 under this program were $1.26 million (U.S.). During the past six years, grants provided to the Canadian industrial mold industry totaled $373,615 (U.S.).

1/ Data obtained from prehearing submission of the Society for the Plastics Industry of Canada.
2/ Estimated from data obtained from prehearing submission of the Society of the Plastics Industry of Canada.

THE U.S. MARKET

Domestic Market Profile

Although virtually all industries buy at least some industrial molds, there is considerable concentration of purchases in the following major industries: automotive, appliances, electronics, pharmaceuticals, toys, furniture, and other rubber products, including tires. Among the over 100,000 U.S. purchasers of industrial molds, these industries were reported in the Commission's questionnaire to account for the following shares of total consumption in 1983: automotive, 32 percent; electronics, 16 percent; appliances, 15 percent; pharmaceuticals, 7 percent; and other rubber products, including tires, 4 percent. Table 20 and figure 5 show shipments by U.S. industrial mold producers during 1979-83.

During 1979-83, U.S. producers' domestic shipments to the automotive industry as a share of their total sales to all industries declined irregularly, from 40 percent in 1979 to 32 percent in 1983. Sales to other industries accounted for the increases in sales during this period.

These industries buy a variety of types of molds, but in 1977, molds for plastics accounted for about 60 percent of total molds consumption, compared with 20 percent for molds for metal and 10 percent for molds for rubber products, including tires. Interviews with producers and purchasers indicate that since 1977, molds for plastics have accounted for a larger share of total mold purchases in these markets, as plastic parts have replaced many types of metal parts, both die-cast and stamped, for automotive use and in other markets. 1/

Table 20.--Industrial molds: Distribution of U.S. producers' domestic shipments, by industry markets, 1979-83

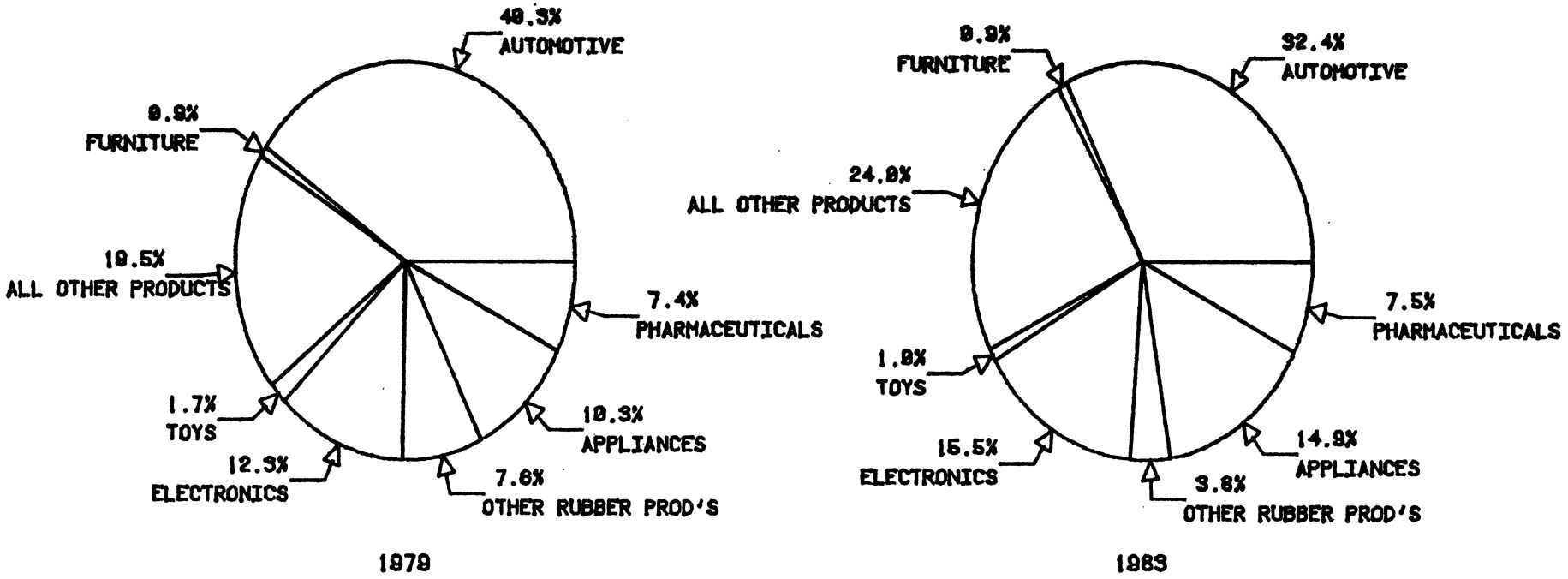
(In thousands of dollars)

Major markets	1979	1980	1981	1982	1983
Automotive	61,998	60,821	64,144	66,815	60,519
Appliances	15,841	21,669	24,014	24,271	27,796
Electronics	18,949	22,228	25,637	28,198	29,001
Pharmaceuticals	11,378	13,709	14,538	15,394	13,955
Toys	2,665	2,119	1,631	2,020	1,808
Furniture	1,351	1,892	1,344	1,479	1,614
Other rubber products	11,694	11,577	9,137	8,065	7,154
All other	29,780	41,596	41,472	37,032	44,938
Total	153,656	175,611	181,917	183,274	186,785

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

1/ "Polyester Resin Seen as Challenge to Metal in Some Applications," American Metal Market, March 5, 1984, p. 10.

Figure 5.--Major U.S. markets for U.S.-produced industrial molds, 1979 and 1983.



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. Consumption

During 1979-83, apparent U.S. consumption of industrial molds rose annually, from $1.31 billion in 1979 to $1.52 billion in 1981, then increased slightly to an estimated $1.61 billion in 1983 (table 21).

Demand for industrial molds held up throughout the period, despite a downturn in production by the automotive industry, the mold industry's major customer. Increased tooling requirements by the automotive industry to accomplish a major introduction of new models, including extensive downsizing, explains this sustained demand for molds by the automotive industry.

The ratio of imports to consumption during 1979-83 increased irregularly, from 10.2 percent in 1979 to an estimated 10.8 percent in 1983. The ratio of Canadian imports to U.S. consumption during this period varied from a low of 4.7 percent in 1980 to a high of 5.8 percent in 1983.

Table 21.--Industrial molds and parts thereof: U.S. producers' shipments, exports of domestic merchandise, imports for consumption, and apparent consumption, 1979-83

Period	Producers' shipments 1/	Exports	Imports	Apparent consumption 1/	Ratio of imports to consumption 2/
	1,000 dollars				Percent
1979	1,281,200	102,975	133,761	1,311,986	10.2
1980	1,497,800	139,951	138,775	1,496,624	9.3
1981	1,545,100	172,738	145,432	1,517,794	9.6
1982	3/ 1,574,000	168,672	153,020	1,558,348	9.8
1983	3/ 1,597,000	162,654	174,432	1,608,778	10.8

1/ These data are understated, for the following reason. In addition to the industrial mold shipments reported above, the Department of Commerce included other shipments of industrial molds in a "basket" statistical category. Roughly estimating industrial mold shipments from such data would indicate the following additional industrial molds shipments, by year: 1979--$230 million; 1980--$305 million; 1981--$320 million. No basis for estimating additional shipments in 1982 and 1983 is available.

2/ These data are overstated for the reason referred to in footnote 1.

3/ These data are estimated by the U.S. International Trade Commission based on industry responses to the Commission's questionnaire survey. Preliminary 1982 Census data from the U.S. Department of Commerce is expected to be made publically available in the near future. Due to differences in sample coverage of the Commission's questionnaire and the Census survey, the preliminary Census data may differ from Commission's estimates.

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

U.S. Shipments

Shipments by U.S. producers of industrial molds generally followed the trend in apparent U.S. consumption; such shipments increased annually, from $1.28 billion in 1979 to $1.55 billion in 1981, and then rose slightly to an estimated $1.57 billion in 1982 and an estimated $1.60 billion in 1983.

Respondents to the Commission's survey reported that the quantity of industrial mold shipments to the U.S. market rose in 1980 to 8,549 units and declined annually thereafter, reaching 7,188 units in 1983, down 16 percent from the 1980 level (table 22). This downturn was largely attributable to the decline in molds for rubber; shipments of such molds dropped from 2,351 units in 1979 to 1,507 units in 1983, down 36 percent. By value, shipments of all industrial molds rose annually throughout the period, increasing from $163.8 million in 1979 to $189.8 million in 1983, or by 15.9 percent.

Table 22.--Industrial molds: U.S. producers' domestic shipments, by types, as reported in the Commission's survey, 1979-83

Types	1979	1980	1981	1982	1983
	Quantity (units)				
Molds for plastics	4,898	5,067	5,206	5,158	5,028
Molds for metals	547	835	709	496	442
Molds for rubber	2,351	2,407	1,810	1,728	1,507
All other	199	240	251	293	211
Total	7,995	8,549	7,976	7,675	7,188
	Value (1,000 dollars)				
Molds for plastics	124,207	138,152	152,817	157,021	161,371
Molds for metals	22,112	26,315	16,463	16,082	16,233
Molds for rubber	15,161	15,094	11,535	11,188	9,308
All other	2,319	2,266	2,839	2,911	2,841
Total	163,799	181,827	183,654	187,202	189,753

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

According to data reported in the Commission's survey, molds for plastics accounted for 70 percent, by quantity, and 85 percent, by value, of total shipments of molds by domestic producers to the U.S. market in 1983. In 1979, such molds accounted for a smaller share of the market--61 percent, by quantity, and 76 percent, by value. Shipments of molds for plastics, by quantity, rose from 4,898 units in 1979 to 5,206 units in 1981, and then declined to 5,208 units in 1983, or by 3 percent. By value, such shipments rose annually during 1979-83, increasing from $124.2 million in 1979 to $161.4 million in 1983, or by 30 percent.

U.S. Exports

Total U.S. exports of industrial molds, parts, and supplies increased from $103 million in 1979 to $172.7 million in 1981, and then decreased annually to $163 million in 1983 (table 23). The major markets for U.S.-produced industrial molds, parts, and supplies were Canada, Mexico, the United Kingdom, and West Germany, which together accounted for 68.6 percent of the total value of exports in 1983. According to official data, Canada is the largest market for U.S-produced industrial molds, parts, and supplies. 1/

Tables E-1 through E-6, covering U.S. exports of industrial molds and parts, and molders' patterns for the manufacture of castings, by types, by major markets, for 1979-83, appear in appendix E.

During 1979-83, slightly over one-half of U.S. exports of the products covered by this investigation were accounted for by molds used for rubber or plastic materials, including shoe machinery molds (table 23); about one-third were molds (including die-cast dies) used for metal (except ingot molds), metallic carbides, glass, and mineral materials; and about a sixth were mold supplies and parts.

The increase in total U.S. exports during 1979-81 is attributed primarily to increased manufacturing activity in all U.S. export markets. In Canada and Mexico, U.S. corporations maintain subsidiary operations and exported domestically produced molds to those facilities. Canada and Mexico together accounted for the largest increase in U.S. exports during 1979-81.

The decline in total U.S. exports during 1982 and 1983, from their peak in 1981, occurred despite increases in U.S. exports to Mexico, the United Kingdom, and Australia. This decline is attributable principally to decreased manufacturing activity in a large number of smaller export markets, including Venezuela and France.

1/ During the hearing held at the U.S. International Trade Commission, U.S. industrial mold producers indicated that they exported very few molds to Canada; they could not substantiate the large volume of exports to Canada reported in official statistics of the U.S. Department of Commerce. Subsequently, a member of the Windsor Alliance of Moldmakers identified 11 Canadian firms that imported molds from the United States. No value or time period was provided.

Table 23.--Industrial molds, parts, and supplies: U.S. exports, by types, 1979-83

(In thousands of dollars)

Type	1979	1980	1981	1982	1983
Molds used for rubber or plastic materials:					
Injection	34,800	49,374	54,827	56,024	58,683
All other	27,230	30,775	34,148	30,724	28,487
Total	62,030	80,149	88,975	86,748	87,170
Molds (including die-cast dies used for metals (except ingot molds), for metallic carbides, glass, and mineral materials:					
Injection	3,500	4,297	11,627	9,713	8,602
All other	21,214	34,072	48,217	48,042	45,899
Total	24,714	38,369	59,844	57,755	54,501
Mold supplies and parts	16,231	21,433	23,919	24,169	20,983
Grand total	102,975	139,951	172,738	168,672	162,654

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

According to official statistics of the U.S. Department of Commerce, the largest share of U.S. industrial mold exports exit through Detroit, Mich. During 1982, exports through Detroit accounted for 21.4 percent of total U.S. exports. The following tabulation shows the principal customs districts for total industrial mold exports in 1982:

Customs district	U.S. exports (1,000 dollars)	Percent of total
Detroit, Mich	36,176	21.4
Laredo, Tex	25,258	14.9
New York, N.Y	22,771	13.5
Los Angeles, Calif	16,170	9.6
Buffalo, N.Y	15,820	9.4
Baltimore, Md	10,392	6.2
Miami, Fla	5,822	3.5
San Francisco, Calif	4,772	2.8
Ogdensburg, N.Y	4,043	2.4
Portland, Maine	3,624	2.1
All other	23,973	14.2
Total	168,821	100.0

During 1983, U.S. exports to Canada amounted to $66.4 million, or almost 41 percent of the total value of U.S. exports of industrial molds, parts, and supplies (table 24). Injection molds for rubber or plastic materials were the largest type of mold exported to Canada, representing almost 65 percent of the value of U.S. exports of industrial molds, parts, and supplies to Canada during 1983. The second largest type of industrial molds exported to Canada was molds (including die-cast dies) used for metal (except ingot molds), metallic carbides, glass, and mineral materials other than injection. U.S. exports of these molds amounted to $11.4 million, or 17 percent of the value of U.S. exports of those products to Canada. U.S. exports of mold supplies and parts to Canada increased from $4.7 million in 1979 to $9.7 million in 1983. During 1983, U.S. exports of injection molds used for metal, metallic carbides, glass, and mineral materials amounted to $2.3 million, or 3.5 percent of the value of U.S. exports of industrial molds, parts, and supplies.

Table 24.--Industrial molds, parts, and supplies: U.S. exports to Canada, by types, 1979-83

(In thousands of dollars)

Type	1979	1980	1981	1982	1983
Molds used for rubber or plastic materials:					
Injection	15,967	20,942	29,660	25,395	29,772
All other	10,557	12,718	12,981	10,482	13,225
Total	26,524	33,660	42,641	35,877	42,997
Molds (including die-cast dies used for metals (except ingot molds), for metallic carbides glass, and mineral materials:					
Injection	1,617	1,603	5,965	5,230	2,332
All other	6,173	10,867	11,592	10,552	11,352
Total	7,790	12,470	17,557	15,782	13,684
Mold supplies and parts	4,740	4,799	7,092	9,462	9,676
Grand total	39,054	50,929	67,290	61,121	66,357

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

The value of exports to Canada of individual product categories generally increased during the period, ranging from 25.3 percent to 104.1 percent. Other than mold supplies and parts, such exports remained stable or decreased, comparing those in 1981 with those in 1983. Data compiled from official statistics of the U.S. Department of Commerce are shown in the following tabulation:

Item	Overall increase in the value of U.S. exports of industrial molds to Canada, 1983 over 1979 (percent)	Overall change in the value of U.S. exports of industrial molds to Canada, 1983 over 1981 (percent)
Molds used for rubber or plastics materials:		
Injection	86.5	0.4
Other	25.3	1.9
Molds (including die-cast dies) used for metals (except ingot molds), for metallic carbides, glass, and mineral materials:		
Injection	44.2	-60.9
Other	83.9	-2.1
Mold supplies and parts	104.1	36.4

During 1982, more than 50 percent of total industrial molds exported from the United States destined for Canada exited through Detroit, Mich. Official data of the U.S. Department of Commerce presented in the following tabulation shows the 10 customs districts for all industrial mold exports destined for Canada in 1982:

Customs district	U.S. exports to Canada (1,000 dollars)	Percent of total
Detroit, Mich	34,577	56.0
Buffalo, N.Y	15,820	25.7
Ogdensburg, N.Y	4,036	6.5
Portland, Maine	3,624	5.9
Seattle, Wash	1,152	1.9
St. Albans, Vt	678	1.1
Pembina, N. Dak	542	.9
Los Angeles, Calif	495	.8
Chicago, Ill	418	.7
New York, N.Y	287	.5
Total	61,629	100.0

U.S. Imports

Official statistics show that total U.S. imports of industrial molds, parts and supplies increased 30.4 percent by value, during 1979-83, and peaked at $174.4 million in 1983 (table 25). The largest source of imports during 1979-83 was Canada, followed by Portugal, Japan, and Italy. During 1983, U.S. imports from Canada accounted for 53.5 percent of U.S. imports from all sources. 1/

During 1979-83, almost 83 percent of U.S. imports of the products covered in this report were accounted for by molds used for rubber or plastics materials (including shoe machinery molds). U.S. imports of these molds increased annually, from $103.5 million in 1979 to $144.6 million in 1983 (table 25). The majority of imported molds used for plastics or rubber materials are classified as injection molds. Recent imports of these molds increased significantly from $83.5 million in 1979 to $110.6 million in 1983.

The next largest types of imported molds were molds used for metals, metallic carbides, glass, and mineral materials. U.S. imports of these products increased irregularly from $23.8 million in 1979 to $24.2 million in 1983. These molds accounted for approximately 17 percent of the total value of U.S. mold imports during 1979-83. U.S. imports of mold supplies and parts (including molders' patterns for the manufacture of castings) decreased irregularly from an estimated $6.5 million in 1979 to an estimated $5.6 million in 1983. Shoe machinery molds, which account for a smaller portion of total imports of molds, increased from $2.1 million in 1979 to $4.9 million in 1981, and then declined to $4.5 million in 1982, before increasing again to $6.2 million in 1983. Mold supplies and parts accounted for approximately 4.2 percent of the total value of U.S. imports of these products during 1979-83.

1/ Tables F-1 through F-13, covering U.S. imports of industrial molds and parts, and molders' patterns for the manufacture of castings, appears in app. F.

Table 25.--Industrial molds, parts, and supplies: U.S. imports, by types, 1979-83

(In thousands of dollars)

Type	1979	1980	1981	1982	1983
Molds used for--					
Rubber or plastics materials:					
Shoe machinery molds	2,073	3,715	4,930	4,543	6,167
Other	101,416	105,550	110,874	112,118	138,432
Subtotal	103,489	109,265	115,804	116,661	144,599
Metals (except ingot molds), metallic carbides, glass, and mineral materials	23,811	21,538	22,715	31,804	24,215
Mold supplies and parts 1/	6,461	7,971	6,912	4,553	5,618
Total	133,761	138,774	145,431	153,018	174,432

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.

U.S. imports of industrial molds entered primarily through the customs district of Detroit, Mich. The following tabulation shows the top 10 Customs districts through which total U.S. imports of industrial molds entered during 1982:

U.S. customs district	U.S. imports (1,000 dollars)	Percent of total
Detroit, Mich	49,334	33
Buffalo, N.Y	18,914	13
New York, N.Y	18,512	12
Los Angeles, Calif	10,290	7
Boston, Mass	9,439	6
Chicago, Ill	7,440	5
New Orleans, La	3,765	3
Providence, R.I	3,705	2
Cleveland, Ohio	2,999	2
Savannah, Ga	2,435	2
All other	22,382	15
Total	149,215	100

Historically, Canada has supplied most of the U.S. imports of these products. During 1983, U.S. imports from Canada amounted to $93.4 million, or over 53.5 percent of the total value of U.S. imports. Molds for rubber and plastics materials accounted for the largest type of imports from Canada, representing 88 percent of the value of U.S. imports from that country. U.S. imports of molds for rubber and plastics materials (other than shoe machinery molds) increased from $58.5 million in 1979 to $82.6 million in 1983, or by 41.3 percent. Although shoe machinery molds account for a small portion of total U.S. imports from Canada, imports of these products increased from $182,000 in 1979 to $475,000 in 1983, or by 161 percent. U.S. imports of molds used for metal (except ingot molds), metallic carbides, glass, and mineral materials increased irregularly from $7.7 million in 1979 to $7.9 million in 1983. U.S. imports of supplies and parts increased irregularly from an estimated $2.0 million in 1979 to an estimated $2.4 million in 1983, as shown in table 26.

Table 26.--Industrial molds, parts, and supplies: U.S. imports from Canada, by types, 1979-83

(In thousands of dollars)

Type	1979	1980	1981	1982	1983
Molds used for--					
Rubber or plastics materials:					
Shoe machinery molds	182	362	577	360	475
Other	58,467	61,970	66,156	61,584	82,616
Subtotal	58,649	62,332	66,733	61,944	83,092
Metals (except ingot molds), metallic carbides, glass, and mineral materials	7,682	6,315	6,219	7,805	7,911
Mold supplies and parts 1/	2,029	2,382	1,888	1,630	2,382
Total	68,360	71,029	74,840	71,379	93,386

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.

The average value of U.S. imports of industrial molds from Canada, as reported by the U.S. Department of Commerce, generally increased during 1979-83, ranging from 3 to 161 percent. With the exception of that for shoe machinery molds, the value of imports of the other categories of industrial molds followed a similar pattern during 1981-83, ranging from 24.9 to 27.2 percent, as shown in the following tabulation (in percent):

Item	Overall increase in the value of U.S. imports of industrial molds from Canada, 1983 over 1979 (percent)	Overall change in the value of U.S. imports of industrial molds from Canada, 1983 over 1981 (percent)
Molds used for rubber or plastics materials:		
Shoe machinery molds	161.0	-17.7
Other	41.3	24.9
Molds (including die-cast dies) used for metal (except ingot molds), metallic carbides, glass, and mineral materials	3.0	27.2
Mold supplies and parts	17.4	26.1
Total	36.6	24.8

The majority of U.S. imports of industrial molds from Canada entered the United States through the Detroit customs district, which in 1982 accounted for 67 percent of total U.S. imports from Canada. The following tabulation compiled from official data of the U.S. Department of Commerce, shows the top five customs districts for industrial mold imports from Canada:

U.S. customs district	U.S. imports from Canada (1,000 dollars)	Percent of total
Detroit, Mich	47,081	67
Buffalo, N.Y	17,387	25
Ogdensburg, N.Y	2,542	4
St. Albans, Vt	1,488	2
Seattle, Wash	635	1
All other	698	1
Total	69,831	100

The dominance of imports from Canada over other foreign suppliers can be attributed to several factors including, but not limited to, a close relationship between the Canadian moldmakers and the automobile producers; the close proximity of the Canadian mold industry to the North Central States of the United States, enabling easier travel and communications between moldmakers and purchasers; the quality and price of Canadian molds; and the high skill levels of Canadian moldmakers. Several of these factors are covered in detail in other sections of the report.

Portugal was the second largest source of industrial molds and parts during 1979-83 and accounted for approximately 9.8 percent of the total value of U.S. imports. U.S. imports from Portugal increased from $12.5 million in 1979 to $19.2 million in 1983, or by 53.6 percent. In 1983, injection molds

used for rubber or plastics materials accounted for almost 75 percent of the value of U.S. imports of molds from Portugal. A major market for Portuguese molds in the United States is the U.S. toy industry; other major purchasers include appliance, housewares, and automobile manufacturers. 1/ The greatest incentive for purchasing molds from Portugal is price. With low labor costs Portuguese moldmakers can price their molds at least 30 percent lower than those for comparable molds in the United States. 2/ In addition, U.S. imports of these products from Portugal are eligible for GSP duty-free treatment.

The third largest source of imports of these products during 1979-83 was Japan, which accounted for 8.8 percent of the total value of U.S. imports. U.S. imports from Japan increased from $10.4 million in 1979 to $14.6 million in 1983. A major market for Japanese molds in the United States is the electronics industry; the molds are used to produce television and electronics cabinetry. 3/ Japan was the third largest source of injection molds for rubber or plastics materials, increasing its share of U.S. imports from $4.1 million in 1979 to $7.0 million in 1983. In 1983, Japan was also a large source, ranking second to Canada, of imports of blow molds for rubber or plastics materials, which totaled $277,000 in 1983. Imported Japanese molds usually require a large amount of hand finishing and polishing. Since this part of the production of a mold is the most labor intensive, lower wage rates in Japan have translated into lower mold prices in the U.S. market. 4/

Italy is the fourth largest source of U.S. imports of industrial molds, accounting for approximately 4.9 percent of the total value of imports during 1979-83. U.S. imports from Italy increased from $7.3 million in 1979 to $9.5 million in 1983. In 1983, injection molds for rubber or plastics materials accounted for approximately 44 percent of the total value of U.S. imports from Italy. Italy is the largest supplier of shoe machinery molds, accounting for 44 percent of the value of U.S. imports of shoe machinery molds in 1983. Italy is also a source for compression molds for rubber or plastics materials; imports of these products from Italy rose from $72,000 in 1979 to $104,000 in 1983. Moldmakers in Italy serve the large Italian automotive market; thus, they have the capacity to produce molds weighing up to 30,000 pounds. 5/

U.S. Trade Balance

The United States maintained a trade deficit in industrial molds, parts, and supplies during 1983, amounting to approximately $11.8 million. The deficit can be attributed to a large negative balance in trade of molds for rubber or plastics materials. In 1983, the negative trade balance in this category amounted to $57.5 million. The United States maintained a trade surplus in two other categories, molds for metal and mold supplies and parts.

1/ "Importing and Exporting Injection Molds: Americans in a World Market," Plastics Machinery and Equipment, September 1983, p. 31.
2/ Ibid., p. 32.
3/ Ibid., p. 32.
4/ Ibid.
5/ Ibid., p. 31.

The trade surplus in molds for metal amounted to $30.3 million, and that for mold supplies and parts amounted to an estimated $15.4 million, as shown in the following tabulation (in thousands of dollars):

Product	U.S. exports	U.S. imports	U.S. trade surplus or (deficit)
Molds used for:			
Rubber or plastic materials	87,170	144,599	(57,429)
Metal (except ingot molds), metallic carbides, glass, and mineral materials	54,501	24,215	30,286
Mold supplies and parts 1/	20,983	5,618	15,365
Total	162,654	174,432	(11,778)

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

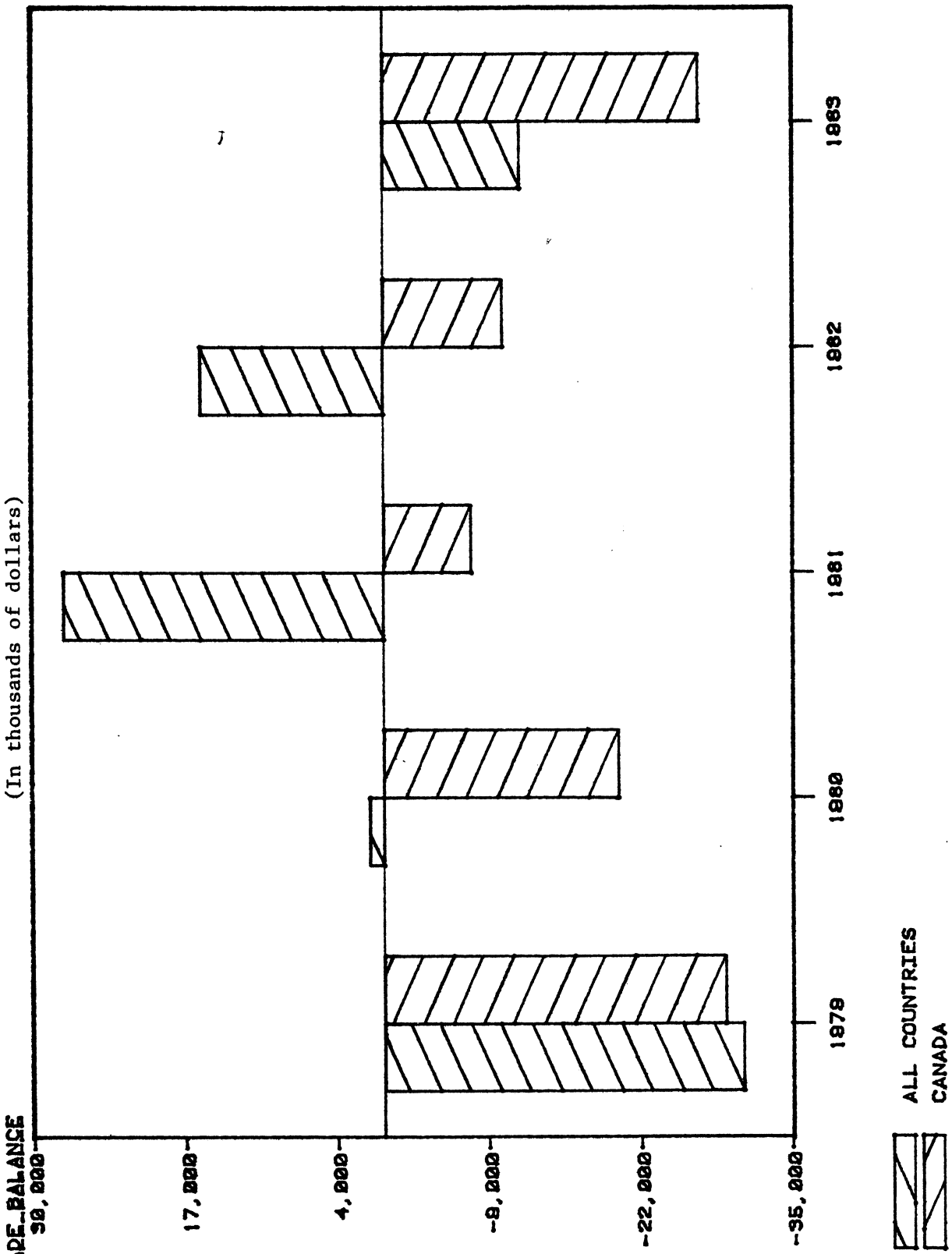
Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

The United States maintained a trade deficit with Canada in industrial molds, parts and supplies during 1983, amounting to approximately $27 million (figure 6). The deficit can be attributed to a large negative balance in trade of molds for rubber and plastics materials which amounted to $40 million in 1983. That same year, the United States maintained a trade surplus with Canada in molds for metal that amounted to $5.8 million as well as a trade surplus for mold supplies and parts totaling $7.3 million, as shown in the following tabulation (in thousands of dollars):

Product	U.S. exports to Canada	U.S. imports from Canada	U.S. trade surplus (or deficit) with Canada
Molds used for:			
Rubber or plastic materials	42,997	83,092	(40,095)
Metal (except ingot molds), metalic carbides, glass, and mineral materials	13,684	7,911	5,773
Mold suppliers and parts	9,676	2,382	7,294
Total	66,357	93,385	(27,028)

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

Figure 6.--U.S. balance of trade of industrial molds, 1979-83.



Source: Compiled from trade publications of various foreign governments and the European Community.

CONDITIONS OF COMPETITION IN THE U.S. MARKET BETWEEN U.S. AND CANADIAN PRODUCTS

Prices

Prices of industrial molds depend on several factors, including the complexity and size of the part to be produced in the mold, the number of cavities in the mold, and the smoothness of the finish of the cavity surface. Small molds, like those for producing plastic utensils, may cost from $8,000 to $20,000 each and require from 8 to 10 weeks to produce. Large molds, like those for producing transmission casings, may cost from $200,000 to $450,000 each and require from 20 to 30 weeks to produce.

Purchasers consider several factors when obtaining their industrial molds, including price, quality, and timely delivery. 1/ U.S. producers generally quote their selling prices f.o.b. factory, whereas Canadian producers generally quote their selling prices either f.o.b. factory or c.i.f., duty-paid port-of-entry. U.S. inland delivery costs, which are paid by the purchaser, are estimated at approximately 1 percent of the f.o.b. price. These delivery costs are not a significant factor in the purchaser's sourcing decisions. Both domestic and Canadian producers offer similar payment terms, either net 30-45 days or according to staged payment schedules. 2/ Quality factors include adherence to specifications and a highly polished cavity surface. Quality of the U.S. and Canadian molds is generally comparable. Additional information on product quality and delivery time as well as other competitive factors such as marketing techniques and sales service appear in subsequent sections of this report.

Industrial molds entail significantly different specifications and features from order to order and are generally sold through a competitive bid process. In the auto sector, purchasers use bid lists and generally request four to six bids per order. 3/ Invited mold shops usually receive only one opportunity to quote a price and generally do not find out their competitors' identities until the bid has been awarded. In rare instances, a purchaser may convene a meeting of the selected bidders to explain a request for an unusual mold. Generally, only in these latter instances are the competing firms aware

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1/ Proximity to the mold shop may also be an important consideration for some purchasers. The purchaser and mold shop may have to consult frequently during the production period, especially when the mold is complex or the purchaser requires the mold builder to perform extensive design work.

2/ On the net 30 to 45 day terms, mold suppliers may offer up to a 2-percent discount on payments made by the first 10 to 15 days. Staged payment schedules vary, with a typical example as follows: 30 percent payment upon receipt of the purchase order, 30 percent payment when the job is 50 percent completed, 30 percent payment upon delivery of the mold, and 10 percent payment upon approval of the samples.

3/ Bid lists contain the names of approved suppliers, which purchasers in the auto sector typically use in soliciting requests for bids.

of firms against which they are quoting before the bidding process begins. U.S. and Canadian mold shops expect to win from 5 to 20 percent of their bids. 1/

Price trends

The Bureau of Labor Statistics reports indexes of domestic producers' selling prices of industrial molds. These data are useful for analyzing price trends; indexes of domestic producers' selling prices for industrial molds, manufacturing equipment, and all commodities are presented in table 27, by quarters, from July 1981 through September 1983. 2/ U.S. producers' prices of all industrial molds increased by approximately 4 percent from July-September 1981 to July-September 1983, and prices of injection molds for plastics products and prices of manufacturing equipment each rose by approximately 5 percent. Producers' prices of all commodities rose at a slower rate, by approximately 2 percent, during the same period. Much of the increase in prices of these four product categories occurred in 1982, with generally slight increases in 1983, except for prices of all commodities, which softened in 1983.

Price level comparisons

Because of the uniqueness of each mold, price levels of domestic and Canadian molds sold in the U.S. market are compared on the basis of individual bids. The Commission requested purchasers to furnish data on competing price quotes, involving competition between domestic and Canadian molds, for their three largest orders of injection molds for plastic products and their two largest orders of die-casting molds for metal products, by years, 1981-83. 3/

1/ If a purchaser requires more than one mold in a project, it may split the order among several mold builders to assure that the delivery date will be met. When a purchaser requires multiple molds on a less-rigid delivery schedule, however, he may award a multiple-mold order to a single shop to get the lower price benefits from production economies.

2/ The Bureau of Labor Statistics began collecting prices of industrial molds in June 1981.

3/ Injection molds for plastic products and die-casting molds for metal products represent the two largest categories of domestically produced industrial molds. According to Department of Commerce figures for domestic producers' U.S. mold shipments in 1977, injection molds for plastic products accounted for approximately 44 percent ($442.2 million), and die-casting molds for metal products accounted for approximately 14 percent ($139.1 million).

Table 27.--U.S. Producer Price Indexes for selected commodity categories, by quarters, July 1981-September 1983

(July-September 1981=100)

Period	All industrial molds 1/	Injection molds for plastics	Manufacturing equipment	All commodities
1981:				
July-September	100.0	100.0	100.0	100.0
October-December	100.0	100.0	100.9	101.0
1982:				
January-March	100.3	100.4	101.7	101.3
April-June	102.2	103.1	102.2	101.6
July-September	103.1	104.0	102.9	102.0
October-December	103.4	104.0	103.1	102.1
1983				
January-March	103.4	104.0	103.4	101.9
April-June	103.8	104.7	104.7	102.0
July-September	103.9	104.6	104.9	101.8

1/ Includes injection and compression molds for metal, plastic, and rubber products.

Source: Compiled from official statistics of the U. S. Department of Labor, Bureau of Labor Statistics.

Twenty-five purchasers reported competing domestic and Canadian price quotes for 98 orders of injection molds for plastic products from 1981 through 1983 and for six orders of die-casting molds for metal products from 1981 through 1982. 1/ The 25 responding firms represented several sectors, including autos, pharmaceuticals, toys, appliances, and computers. The 98 orders together involved 152 molds, valued at approximately $12.74 million and the six orders together involved eight molds, valued at approximately $0.98 million. 2/ Of the 98 reported orders for injection molds, Canadian firms were awarded 71, amounting to 107 molds, valued at approximately $9.20 million; U.S. firms won the other 27 orders, amounting to 45 molds valued at approximately $3.54 million. Of the six reported orders for die-casting molds, Canadian firms were awarded two orders, amounting to three molds, valued at approximately $0.70 million; U.S. firms were awarded the other four orders, amounting to five molds, valued at approximately $0.28 million.

1/ Twenty-three firms responding to the purchasers' questionnaire provided usable bid-price data for the 98 orders of the injection molds, and three firms provided usable data for the six orders of the die-casting molds.

2/ Values of mold orders cited in this section of the report are based on the awarded values, which were quoted f.o.b. factory for domestic molds and c.i.f., duty-paid port of entry for the Canadian molds.

The 71 orders for injection molds for plastic products awarded to Canadian mold shops were based on price and nonprice factors. In 56 of these orders, amounting to 69 molds, valued at approximately $4.82 million, the awarded Canadian bids were the lowest quoted prices and undersold the lowest U.S. bids by a weighted-average margin of approximately 12 percent. In the 15 other orders, amounting to 38 molds, valued at approximately $4.38 million, the awarded Canadian bids were not the lowest quoted prices and averaged (weighted) approximately 16 percent above the lowest U.S. bids for 14 orders but 19 percent below the lowest U.S. bid in the remaining order. 1/ Nonprice factors of quality and delivery were cited as the major reasons for awarding these 15 orders to Canadian firms with higher prices.

The 27 orders for injection molds for plastic products awarded to U.S. mold shops were based on price and nonprice factors. In 17 of these orders, amounting to 30 molds, valued at approximately $2.76 million, the awarded U.S. bids were the lowest quoted prices, underselling the lowest Canadian bids by a weighted-average margin of approximately 13 percent. In the other 10 orders, amounting to 15 molds, valued at approximately $0.79 million, the awarded U.S. bids were not the lowest quoted prices and ranged from a weighted-average margin of approximately 5 percent above to 14 percent below 2/ the lowest Canadian bids. Nonprice factors of quality and delivery were cited as the major reasons for awarding these 10 orders to U.S. firms charging higher prices.

The six orders for die-casting molds for metal products were generally based on price; however, in the two orders awarded to Canadian firms, the winning price quotes were approximately 22 percent above and 2 percent below the respective lowest U.S. price quotes. Quality was cited as the major reason for awarding the former order to Canadian firm charging higher prices. In the four orders awarded to U.S. firms, the winning price bids were the lowest quoted prices, underselling the lowest Canadian bids by a weighted-average margin of 30 percent.

Exchange-rate changes

One of the factors considered in examining the competitive position of U.S. and Canadian mold producers is the change in the U.S./Canadian dollar exchange rate and the effect of any such change on the cost of inputs in the production of industrial molds. From 1979 to 1983, the latest period for which data are available, the value of industrial molds and parts imported from Canada increased from $68.4 million to $93.4 million, or by approximately 37 percent. 3/ The increase in imports from Canada does not appear to have

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1/ In this latter order, valued at approximately $155,650, the awarded Canadian bid was above some other Canadian bids.

2/ Of these 10 awards to U.S. firms, 4 winning bids, totaling approximately $320,490, were below the respective Canadian bids but above some other domestic bids.

3/ According to Department of Commerce data, imports of industrial molds and parts from Canada accounted for approximately 51 percent of all such imports during 1983. Imports from the next three largest suppliers of industrial molds and parts--Portugal, Japan, and Italy--together increased by approximately 43 percent from 1979 to 1983. The four countries together accounted for over 78 percent of U.S. imports of industrial molds and parts, during 1983.

been significantly affected by changes in the Canadian/U.S. dollar exchange rate between 1979 and 1983. As shown in table E-1, appendix E, the quarterly real exchange rate between the Canadian and U.S. dollar remained relatively stable, fluctuating within approximately 4 percentage points throughout the 20-quarter period covered by this report (January-March 1979-October-December 1983). However, if the periods under investigation are expanded to include the eight previous quarters, the real exchange rate between the Canadian and U.S. dollar fluctuated by over 12 percentage points throughout the 28-quarter period. Changes in the real exchange rates for the U.S dollar against the Canadian dollar and against the currencies of three other major supplier countries of industrial molds and parts are discussed in detail in appendix E.

Competitive effects of any exchange rate changes between the Canadian and U.S. dollar are limited to the extent that Canadian mold producers use inputs that are priced in Canadian dollars. Although 60 to 75 percent of the cost of the mold may be accounted for by labor costs, some of the remaining costs consist of parts and materials that are generally imported from U.S. suppliers. 1/ Wages are denominated in Canadian dollars, whereas prices of parts and supplies purchased from U.S. suppliers are denominated in U.S. dollars.

Quality

Because molds are often the only tool used in making specific products, quality of the mold is often a major factor affecting purchasing decisions. Virtually all of the U.S. purchasers that responded to the Commission's survey indicated that quality was a significant factor in their firm's decision to purchase industrial molds. The quality of molds are determined primarily by a number of factors, including moldmaking-skills to construct molds in conformance to an engineer's design; careful attention to detail and finish; engineering expertise to design molds appropriate for their end use; 2/ and quality of raw materials selected. Molds for metal require a durable construction to withstand the temperature ranges required to construct die-cast metal parts.

The majority of U.S. purchasers responding to the Commission's survey reported that the quality of U.S.- and Canadian-made molds are generally comparable. Most purchasers indicated that there apppears to be the same variation in product quality within each country. One major U.S. purchaser indicated that the quality requirement dictates which shops a mold is bought from, not which country the mold is bought from. Other U.S. purchasers indicated, however, that the quality of the workmanship in Canada is better than that in the United States and that the operational lifespan of Canadian-

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1/ Based on Commission staff conversations with Canadian mold builders, November 1983.

2/ Based on responses to the Commission's survey, U.S. purchasers of domestically produced molds ranked superior design of the domestically produced molds as the eighth most important reason for buying from a domestic source. U.S. purchasers of Canadian-produced molds, on the other hand, indicated that superior design was the fourth most important reason for buying from a Canadian source.

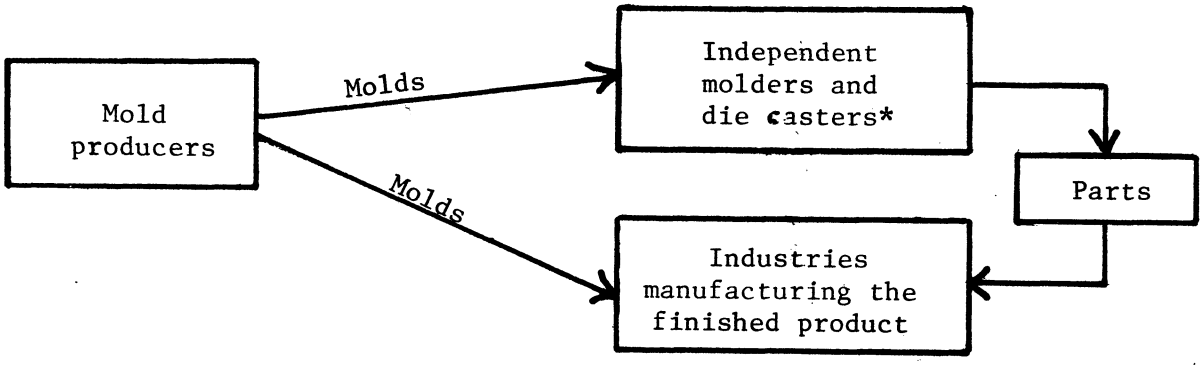
produced molds is twice as long as U.S. made molds. Some U.S. purchasers indicated that they have experienced problems with the ejector mechanisms in Canadian-made molds.

There is market pressure that raises the quality standards in the United States and Canada. Large purchasers of molds survey mold producers by visiting their plants to determine whether they have the capability to be on their bid list. This puts pressure on mold shops to produce high-quality molds; without such standards, mold shops lose the opportunity to place bids on important contracts. Certain shops in the United States and Canada have established a reputation for quality products, either across the board or in a particular product or market.

Marketing Techniques

Industrial molds are generally distributed to two major types of customers. Molds are sold either to firms that use molds and molded parts for their own use or to those firms (vendors) that use molds to manufacture molded parts for another firm, as shown in figure 7.

Figure 7.--Marketing distribution



* These firms receive a portion of the molds produced and use them to make parts, but the firms within the industries manufacturing the finished product normally take ownership title to the molds.

Source: Compiled from data provided by U.S. mold producers.

Vendors generally do not own the mold; rather, they purchase it on behalf of the end user (their client) and return it to their client when the project is completed. Vendors are providing a service to end users by using their client's mold to manufacture a specific volume of molded parts. Some end users make extensive use of vendors; others prefer in-house production of parts.

U.S. and Canadian mold producers use similar strategies in marketing their molds. Sales are made by word of mouth, developing a good reputation, initiating direct sales calls, advertising in trade journals, disseminating sales brochures, participating in trade shows 1/ (so that the company can demonstrate its engineering and equipment capabilities), and establishing a good supplier relationship. The larger mold shops maintain a sales force, initiating direct sales calls on prospective customers. Smaller shops are generally contacted directly by mold purchasers. 2/

Moldmakers tend to specialize in sales to one or a few industries, to regional markets, and to production of certain types or sizes of molds. When business turns down in certain markets, firms make a greater effort to find additional business in unaccustomed markets. From the purchaser standpoint, it may be desirable to have the moldmaker nearby, although it is not usually necessary, particularly if a mold repair shop is close by. Other customers have indicated that they do not consider proximity important and would give this factor consideration only if all other factors were equal. One mold producer indicated that if a firm is far from its customer, a lower price must be offered. This firm believes that the chances for success are greater nearby and that such markets are where a mold producer should direct its principal efforts.

Most of the Canadian marketing effort is directed toward the Midwest and the Northeast U.S. regions. Sales normally are made by company salesmen, perhaps doubling as engineers or company executives, and sales representatives. The closeness of the Detroit automotive market to the Windsor, Ontario, moldmakers assists their marketing and after-sales followups and service effort and allows the Canadian producers to provide additional assistance, on occasion, with Customs' paperwork. Conversely, because the Canadian mold market is relatively small and well served, it is difficult for U.S. moldmakers to justify the cost of mounting a significant marketing effort in Canada.

Pre-and After-Sales Service

U.S. purchasers of industrial molds consider services offered by industrial mold producers before and after sales as important factors affecting their purchasing decision. Presales service includes design consultation and initial testing of molds. After-sales service involves repairs, redesign, and replacement of molds or parts thereof. Design consultation is provided to purchasers by mold builders prior to building a mold. Involving the participation of the purchaser in the design of a mold helps to achieve a mold design with both the greatest mold life and the lowest cost and maintenance. Presale testing of the finished product before delivery enhances acceptance by the customer. Large mold-making shops maintain injection molding machines and die-cast machines that are used to test the finished product. In some

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1/ Trade shows are usually sponsored by U.S. and Canadian trade associations.

2/ One automotive vendor states on the questionnaire response that marketing molds is not like marketing household consumer goods. He stated, "In this business, we must have an order from an automobile company before we can purchase a mold."

instances the mold producer is required to produce production quantities of the molded parts as part of the agreement of a mold sale. Following test results, debugging, and grooming, dimensional corrections are performed on the mold to further enhance the accuracy of the mold.

After-sales service involves the redesign, repair, and replacement of molds or parts thereof. It is not uncommon for a mold purchaser to return the mold to the producer for redesign or repair following its introduction into the production process. Under some circumstances, after-sales servicing can be performed without removing the mold from the plant. 1/ The repair of used molds is a significant part of a typical moldmaker's business. One firm indicated that, during 1982, approximately 40 percent of its sales was accounted for by repair work on used molds. For the industry as a whole, it is estimated that the repair of used molds is less than 10 percent. Service and rebuilding of used molds is a large part of the business of firms manufacturing molds for metal or die-casting dies. These molds are heat treated to withstand temperatures of up to 1200 degrees F. A die-casting die can produce 50,000-100,000 units of a given product, whereas a plastics injection mold can produce up to 1 million units before it requires an overhaul. Service warranties are offered by most mold shops in the U.S. and Canada. Standard warranty terms are 1 year on materials and workmanship.

Data from U.S. purchasers' questionnaire responses indicate that there are no major differences in warranties or services offered by U.S. and Canadian moldmakers before or after sales. Some U.S. purchasers of Canadian molds have indicated that they service their Canadian produced molds locally in an effort to reduce shipment time, transportation, and customs costs, and for thisreason consider this factor as an advantage to the U.S. industry. Others have indicated that they prefer to have their molds serviced by the original Canadian producer. 2/ Although services offered by moldmakers before and after sales are important factors in a firm's decision to purchase industrial molds, services offered by U.S. and Canadian mold industries are comparable, with neither enjoying a competitive advantage. However, because of the additional costs that a U.S. purchaser must bear to have his mold serviced in Canada, the U.S. industry enjoys a competitive advantage with respect to services offered in the U.S. market.

Analysis of Overall Interaction Between U.S. and Canadian Products in the U.S. Market

When U.S. producers and purchasers were surveyed on the overall conditions of competition in the U.S. market, they indicated that Canadian-produced molds maintained an overall competitive advantage in almost all product categories except molds for rubber.

1/ Some U.S. purchasers indicated that it is difficult to get U.S. mold shops to do in-plant servicing when needed.

2/ Some U.S. purchasers indicated that they cannot service their molds as easily in Canada as in the United States because of geographic distances and increased costs.

U.S. producers' competitive assessment

When U.S. producers examined specific product-related attributes, they indicated that U.S. producers have the competitive advantage in shorter delivery times, providing servicing/training, providing favorable warranties, maintaining supplier relationships, producing a product compatible with existing systems, and producing a product with excellent performance features (table 28). U.S. producers indicated that Canada maintains an overall advantage in the U.S. market with competitive strengths in price, changes in exchange rates, shorter delivery times, favorable product financing, and an ability to add to or upgrade production capability. U.S. producers reported that U.S.- and Canadian-produced molds have the same competitive position in factors such as availability, changeover time, and productivity (output per man-hour), as shown in the following table:

Table 28.--Industrial molds: U.S. producers' competitive assessment of product-related factors of competition for the U.S.- and Canadian-produced industrial molds in the U.S. market, 1979-83

Item	U.S. advantage	Canadian advantage
Overall competitive advantage		X
Lower purchase price (delivered)		X
Changes in exchange rates		X
Shorter delivery time	X	
Availability	1/	1/
Servicing/training	X	
Favorable product financing terms	X	
Favorable warranties	X	
Supplier relationship	X	
Ability to add to or upgrade production capability		X
Compatibility with existing systems	X	
Changeover time	1/	1/
Installation costs		X
Performance features:		
Superior design	X	
Higher productivity (man-hour output ratio)	1/	1/
More durable	X	
Less maintenance	X	
Energy efficiency	X	

1/ Same competitive advantage.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. purchasers' competitive assessment

When U.S. purchasers made a competitive assessment of product-related factors of competition pertinent to the selection of U.S.- and Canadian-produced industrial molds in the U.S. market, they generally indicated an advantage for Canadian-produced mold producers in price, delivery, performance features, favorable financing and warranties, and other advantages as indicated in table 29. They indicated that U.S.-produced molds had an advantage in availability, servicing/training, supplier relationship, and ability to add to or upgrade production capability, among other advantages.

Table 29.--Industrial molds: U.S. purchasers' competitive assessment of product-related factors of competition for the U.S.- and Canadian-produced industrial molds in the U.S. market, 1979-83

Reason for purchase	Competitive advantage		Ranking of reasons for purchase 1/	
	U.S.-made	Canadian-made	U.S.-made	Canadian-made
Lower purchase price (delivered)		X	4	1
Shorter delivery time		X	3	2
Availability	X		2	5
Servicing/training	X		6	9
Favorable financing		X	13	11
Favorable warranties		X	11	10
Supplier relationship	X		1	3
Ability to add to or upgrade production capability	X		9	13
Compatibility with existing systems	X		5	6
Changeover time	X		10	16
Lower installation costs		X	16	15
Performance features:				
Superior design		X	8	4
Higher productivity (man-hour output ratio)		X	15	8
More durable		X	12	7
Less maintenance		X	14	12
Energy efficiency	2/	2/	17	17

1/ One means most often cited; 17 means least often cited.
2/ Same competitive advantage.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. producers' responses to import competition

U.S. producers of industrial molds reported that the most frequent steps taken to respond to import competition in the U.S. market included implementing cost reduction efforts, maintaining or reducing prices, cutting back on production, and reducing or dropping plans to expand capacity; the ranking of responses is shown in table 30.

Table 30.--Industrial molds: U.S. producers' responses to import competition in the U.S. market, 1979-83 1/

Nature of response	Ranking of responses
Took no or few actions because your firm--	
Had already shifted production to other lines of industrial molds	6
Lacked capital funds to counter Canadian competition	8
Other	10
Your firm took the following actions:	
Maintained or reduced prices	2
Reduced or dropped plans to expand capacity	4
Cut back production of industrial molds	3
Reduced or closed plant operations for industrial molds	7
Shifted to other types of industrial molds	9
Implemented cost reduction efforts	1
Improved quality of the product	5
Imported industrial molds	2/
Opened a plant to manufacture industrial molds abroad	2/

1/ Data supplied by 81 firms which together account for 13.5 percent of the value of U.S. producers' shipments in 1983.
2/ No responses.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The increasing number of CAD/CAM programing systems and other advanced machinery and equipment mentioned previously suggests that the industry is attempting to improve its competitive position by becoming more cost efficient in the long run by immediately installing expensive modern machinery to compete with Canadian and other foreign imports. No firms responded to import competition by importing industrial molds or by opening a plant to manufacture industrial molds abroad. Two mold producers stated that they are aware of firms considering the establishment of manufacturing facilities in Canada. None have done so at this time. 1/

1/ Official transcript of the hearing held before the U.S. International Trade Commission, February 2, 1984, pp. 47-50.

APPENDIX A

LETTER TO THE COMMISSION FROM THE SUBCOMMITTEE ON TRADE, COMMITTEE ON WAYS AND MEANS, U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON WAYS AND MEANS

U.S. HOUSE OF REPRESENTATIVES

WASHINGTON, D.C. 20515

SUBCOMMITTEE ON TRADE

August 19, 1983

The Honorable Alfred E. Eckes
Chairman
U.S. International Trade Commission
701 E Street, N.W.
Washington, D.C. 20436

Dear Mr. Chairman:

The Subcommittee on Trade of the Committee on Ways and Means requests that the U.S. International Trade Commission conduct an investigation under section 332 of the Tariff Act of 1930 on the conditions of competition in the U.S. market between domestically-produced industrial molds and imports of these products from Canada.

In particular, we are interested in obtaining information on the relative prices, quality, and marketing techniques for the domestic and Canadian products and any other factors which influence competitive strength in the U.S. market. A further area of interest is the nature and level of government involvement with the respective industries.

Each of the following should be specifically addressed in the study:

(1) A profile of the U.S. and Canadian industries including both a descriptive view of the industry and an analysis of the various strengths and weaknesses of each industry in terms of such factors as raw material, capital, labor availability and cost, and technology level.

(2) An analysis of the key economic factors in the U.S. market including U.S. consumption, production, trade, and other relevant factors.

(3) A discussion of U.S. and Canadian government policies and regulations and their influence on the industrial mold industry.

(4) An analysis of the conditions of competition in the U.S. market between domestic and Canadian products including factors such as price, quality, marketing techniques, and after sales service.

It would be appreciated if the final report were transmitted to the Subcommittee on Trade not later than eight months after receipt of this request.

Sincerely,

Sam M. Gibbons
Chairman

SMG/RYc

APPENDIX B

NOTICE OF INSTITUTION OF INVESTIGATION NO. 332-169, NOTICE OF HEARING LOCATION, AND NOTICE OF CHANGE OF HEARING LOCATION

[332-169]

Competitive Conditions Relating to the Importation of Industrial Molds Into the United States From Canada

AGENCY: International Trade Commission.

ACTION: Following receipt on August 23, 1983, of a request from the Chairman of the Subcommittee on Trade of the Committee on Ways and Means of the U.S. House of Representatives, the Commission, on its own motion, instituted investigation No. 332-169

[1] Pending admission to the bar.

under section 332(b) of the Tariff Act of 1930 (19 U.S.C. 1332(b)), for the purpose of gathering and presentation information on competitive conditions relating to the importation of industrial molds into the United States from Canada.

EFFECTIVE DATE: September 9, 1983.

FOR FURTHER INFORMATION CONTACT: Mr. David Slingerland or Mr. Ronald DeMarines, Machinery and Equipment Division, U.S. International Trade Commission, Washington, D.C. 20436, telephone 202–523–0263 or 202–523–0259, respectively.

Background

As requested by the Subcommittee on Trade, the study will present (1) a profile of the U.S. and Canadian industries, including both a descriptive view of the industry and an analysis of the various strengths and weaknesses of each industry in terms of such factors as raw material, capital, labor availability and cost, and technology level, (2) an analysis of the key economic factors in the U.S. market including U.S. consumption, production, trade, and other relevant factors, (3) a discussion of U.S. and Canadian Government policies and regulations and their influence on the industrial mold industry, and (4) and analysis of the conditions of competition in the U.S. market between domestic and Canadian products including factors such as price, quality, marketing techniques, and after sales service

Public Hearing

A public hearing in connection with the investigation will be held in Detroit, Mich., beginning at 10:00 a.m., e.s.t., on February 2, 1984, to be continued on February 3, 1984, if required. At least 60 days prior to the hearing, a Federal Register notice will be posted giving the exact location in Detroit, Mich. All persons shall have the right to appear by counsel or in person, to present information, and to be heard. Requests to appear at the public hearing should be filed with the Secretary, United States International Trade Commission, 701 E Street NW., Washington, D.C. 20436, not later than noon, January 25, 1984.

Written Submissions

In lieu of or in addition to [illegible] at the public hearing, interested persons are invited to submit written statements concerning the investigation. Commercial or financial information which a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of section 201.6 of the Commission's *Rules of Practice and Procedure* (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by interested persons. To be ensured of consideration by the Commission, written statements should be submitted at the earliest practicable date, but no later than January 27, 1984. All submissions should be addressed to the Secretary at the Commission's office in Washington, D.C.

Issued: September 12, 1983.

By order of the Commission.

Kenneth R. Mason,

Secretary.

[FR Doc. 83-25753 Filed 9-20-83; 8:45 am]

BILLING CODE 7020-02-M

ACTION: This notice announces a change in hearing location in connection with the Commission's investigation on the competitive conditions relating to the importation of industrial molds into the United States from Canada.

EFFECTIVE DATE: December 8, 1983.

SUPPLEMENTARY INFORMATION: Notice is hereby given that the location of the public hearing in connection with the investigation has been changed from Detroit, Michigan to Washington, D.C. The public hearing will be held in the Commission Hearing Room, 701 E Street N.W., Washington, D.C. 20436, beginning at 10:00 a.m. on February 2, 1984, to be continued on February 3, 1984, if required. Notice of the institution of the investigation was published in the **Federal Register** of September 21, 1983 (48 FR 43109), and notice of the public hearing location in Detroit, Michigan was published in the **Federal Register** of October 26, 1983 (48 FR 44559).

FOR FURTHER INFORMATION CONTACT: David Slingerland (202–523–0263), Office of Industries, Machinery and Equipment Division, U.S. International Trade Commission, Washington, D.C. 20436.

Issued: December 9, 1983.

By order of the Commission.

Kenneth R. Mason,

Secretary.

[FR Doc. 83-33231 Filed 12-13-83; 8:45]

BILLING CODE 7020-02-M

[332-169]

Competitive Conditions Relating To Importation of Industrial Molds Into the United States From Canada; Change in Hearing Location

AGENCY: International Trade Commission.

[332-169]

Import Investigations; Competitive Conditions Relating to the Importation of Industrial Molds Into the United States From Canada

AGENCY: United States International Trade Commission.

ACTION: This notice announces the hearing location in connection with the Commission's investigation on the competitive conditions relating to the importation of industrial molds into the United States from Canada.

EFFECTIVE DATE: October 21, 1983.

SUPPLEMENTARY INFORMATION: Notice is hereby given that the public hearing in connection with the investigation will be held beginning at 10 a.m. on February 2, 1984, to be continued on February 3, 1984, if required, in the Westin Hotel, Marquette Room, Renaissance Center, Detroit, Michigan. Notice of the institution of the investigation was published in the Federal Register of September 21, 1983 (48 FR 43109).

FOR FURTHER INFORMATION CONTACT: David Slingerland (202-523-0263), Office of Industries, Machinery and Equipment Division, U.S. International Trade Commission, Washington, D.C. 20436.

By order of the Commission.

Issued: October 21, 1983.

Kenneth R. Mason,

Secretary.

[FR Doc. 83-29741 Filed 10-25-83 8:45 am]

BILLING CODE 7020-02-M

APPENDIX C

CALENDAR OF PUBLIC HEARING

CALENDAR OF PUBLIC HEARING

Those listed below appeared as witnesses at the United States International Trade Commission's hearing:

Subject : Competitive Conditions Relating to the Importation of Industrial Molds into the United States from Canada

Inv. No. : 332-169

Date and time: February 2, 1984 - 10:00 a.m.

Sessions were held in the Hearing Room of the United States International Trade Commission, 701 E Street, N.W., in Washington:

Domestic:

Webster, Chamberlain & Bean--Counsel
Washington, D.C.
on behalf of

The U.S. Moldbuilding Industry and The National Tooling & Machining Association

William Nachtrab, Vice President and General Manager, Modern Tools Division, Libby-Owens-Ford

Robert Haas, Jr., President, Delaware Machining and Tool Co., Inc.

F. William Werth, President, Reed City Tool & Die

Bruce N. Hahn, Manager, Government Affairs, National Tooling & Machining Association

C. Michael Deese--OF COUNSEL

Importers:

The Windsor Alliance of Mold Makers, Inc.

Edward Regan, President

Joseph Ouelette, Past President

Barnes, Richardson & Colburn--Counsel
Washington, D.C.
on behalf of

Husky Injection Molding Systems, Ltd., Bolton, Ontario

Trevor Johnson, Vice President, Marketing

Ron Burnside, Manager, Sales Promotion Corporation

David O. Elliott)
Matthew T. McGrath)--OF COUNSEL

Barnes, Richardson & Colburn--Counsel
Washington, D.C.
on behalf of

International Tools, Ltd., Windsor, Ontario

Nicholas Lewchuk, Special Projects Manager

David O. Elliott)
Matthew T. McGrath)--OF COUNSEL

APPENDIX D

PORTIONS OF THE TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1984) RELATING TO U.S. IMPORT CLASSIFICATIONS OF INDUSTRIAL MOLDS AND PARTS

Explanation of the rates of duty applicable to industrial molds and parts

The rates of duty in column 1 are most-favored-nation (MFN) rates, and are applicable to imported products from all countries except those Communist countries and areas enumerated in general headnote 3(f) of the TSUSA. 1/ However, such rates do not apply to products of developing countries which are granted preferential tariff treatment under the Generalized System of Preferences (GSP) or under the "LDDC" column.

The rates of duty in the "LDDC" column are preferential rates (reflecting the full U.S. MTN concession rate for a particular item without staging of duty reductions) and are applicable to products of the least developed developing countries designated in general headnote 3(d) of the TSUSA which are not granted duty-free treatment under the GSP. If no rate of duty is provided in the "LDDC" column for a particular item, the column 1 rate applies.

The rates of duty in column 2 apply to imported products from those Communist countries and areas enumerated in general headnote 3(f) of the TSUSA.

The GSP is a program of nonreciprocal tariff preferences granted by the United States to developing countries to aid their economic development by encouraging greater diversification and expansion of their production and exports. The GSP, implemented by Executive Order No. 11888, of November 24, 1975, applies to merchandise imported on or after January 1, 1976, and is scheduled to remain in effect until January 4, 1985. It provides for duty-free treatment of eligible articles imported directly from designated beneficiary developing countries. Eligible articles are identified in the column marked "GSP" with an "A" or "A*." The designation "A" means that all beneficiary developing countries are eligible for the GSP, and "A*" indicates that certain developing countries, specified in general headnote 3(c) of the TSUSA, are not eligible.

1/ The only Communist countries currently eligible for MFN treatment are the People's Republic of China, Hungary, Romania, and Yugoslavia.

GSP	Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
A	674.10		Converters, ingot molds, and casting machines, all the foregoing of types used in metallurgy and in metal foundries, and parts thereof	.....	1.7% ad val.	Free	35% ad val.
			Casting machines:				
		10	Die-casting machines	No.			
		15	Other	No.			
		40	Other	X			
A	674.20		Metal rolling mills and parts thereof	.....	5.9% ad val.	4.9% ad val.	30% ad val.
		05	Rolling mills	No.			
			Parts thereof:				
			Rolls:				
		10	Not over 5,000 lbs	No.			
			Over 5,000 lbs. but not over 15,000 lbs.:				
		15	Cast	No.			
		20	Other	No.			
		25	Over 15,000 lbs	Lb.			
		30	Other	X			
			Machine tools:				
			Metal-working machine tools:				
A	674.30		Machine tools for cutting or hobbing gears	.....	7.4% ad val.	5.8% ad val.	40% ad val.
		15	Used or rebuilt	No.			
			Other:				
		25	Gear hobbers	No.			
		35	Gear shapers	No.			
		45	Other	No.			
A	674.32		Boring, drilling, and milling machines, including vertical turret lathes	.....	4.9% ad val.	4.2% ad val.	30% ad val.
			Machining centers:				
			Without indexing turret or automatic head-changing capability:				
			Vertical-spindle machines with a Y-axis travel of:				
		04	Not over 26 inches (660 mm)	No.			
		06	Over 26 inches (660 mm)	No.			
		09	Other	No.			
		11	Other	No.			
		12	Single-station machines and multistation transfer machines	No.			
		13	Way-type machines	No.			
			Combination boring, drilling, and milling machines:				
		15	Used or rebuilt	No.			
			Other:				
			With numerical controls or facings for numerical controls:				
			Horizontal spindle:				
		17	Table type, excluding planer type	No.			
		18	Other	No.			
		19	Other	No.			
			Other:				
		22	Horizontal spindle	No.			
		23	Other	No.			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
A*	678.50 (con.)		Machines not specially provided for, and parts thereof (con.):				
			Combination machines containing tape players (con.):				
			Phonograph-tape player combinations and radio-phonograph-tape player combinations:				
			Radio-phonograph-tape player combinations:				
		65	Cartridge type	No.			
		66	Other	No.			
		67	Other	No.			
		72	Combinations incorporating a Citizens Band (CB) transceiver	No.			
		75	Other	X			
			Other:				
			Industrial robots and parts thereof:				
		86	Robots	No.			
		87	Parts	X			
		95	Other	X			
	678.51	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	X	Free		
			Subpart J. - Parts of Machines				
			Subpart J statistical headnote: 1. For the purposes of statistical reporting of ball bearings provided for under item 680.37, a radial bearing is one primarily designed to support its load perpendicular to the shaft axis.				
A	680.05	00	Molding boxes for metal foundry	No.	7.1% ad val.	5.7% ad val.	45% ad val.
A	680.07	00	Molders' patterns for the manufacture of castings	No.	4.9% ad val.	4.2% ad val.	50% ad val.
			Molds of types used for metal (except ingot molds), for metallic carbides, for glass, for mineral materials, or for rubber or plastics materials:				
			Molds used for rubber or plastics materials:				
	680.11	00	Shoe machinery molds	No.	Free		Free
A	680.12		Other		4.5% ad val.	3.9% ad val.	35% ad val.
		10	Injection	No.			
		15	Compression	No.			
		20	Blow	No.			
		25	Bladder operated (tire)	No.			
		30	Other	No.			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
			Molds of types used for metal (except ingot molds), for metallic carbides, for glass, for mineral materials, or for rubber or plastics materials (con.):				
A	680.13		Other	.....	4.5% ad val.	3.9% ad val.	35% ad val.
		05	Injection, including die cast dies	No.			
		10	Compression (compaction)	No.			
		15	Blow	No.			
		20	Gravity pour (permanent)	No.			
		25	Other	No.			
			Taps, cocks, valves, and similar devices, however operated, used to control the flow of liquids, gases, or solids, all the foregoing and parts thereof:				
			Hand-operated and check, and parts thereof:				
A	680.14		Of copper	.....	7% ad val.	5.6% ad val.	47% ad val.
		10	Under 125 pounds working pressure	Lb.			
			125 pounds working pressure and over:				
		20	Check	Lb.			
		30	Gate	Lb.			
		40	Globe	Lb.			
		50	Plug	Lb.			
		60	Ball	Lb.			
		70	Butterfly	Lb.			
		80	Other	Lb.			
	680.16	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	Lb.....	Free		
A	680.17		Of iron or steel	.....	9.5% ad val.	8% ad val.	45% ad val.
			Of iron or steel containing over 2.5 percent carbon by weight:				
		05	Check	Lb.			
		10	Gate	Lb.			
		15	Globe	Lb.			
		18	Plug	Lb.			
		25	Ball	Lb.			
		30	Butterfly	Lb.			
		35	Other	Lb.			
			Other:				
		42	Check	Lb.			
		45	Gate	Lb.			
		50	Globe	Lb.			
		55	Plug	Lb.			
		60	Ball	Lb.			
		65	Butterfly	Lb.			
		68	Other	Lb.			
	680.18	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	Lb.....	Free		
A	680.19	00	Other	Lb.....	6.9% ad val.	4.4% ad val.	45% ad val.
	680.24	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	Lb.....	Free		

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

SCHEDULE 8. - SPECIAL CLASSIFICATION PROVISIONS
Part 1. - Articles Exported and Returned

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty	
				1	2
		Articles returned to the United States after having been exported, etc. (con.):			
806.30	00 1/	Any article of metal (except precious metal) manufactured in the United States or subjected to a process of manufacture in the United States, if exported for further processing, and if the exported article as processed outside the United States, or the article which results from the processing outside the United States, is returned to the United States for further processing.....	1/ 2/	A duty upon the value of such processing outside the United States (see headnote 2 of this subpart)	A duty upon the value of such processing outside the United States (see headnote 2 of this subpart)
807.00	00 1/	Articles assembled abroad in whole or in part of fabricated components, the product of the United States, which (a) were exported in condition ready for assembly without further fabrication, (b) have not lost their physical identity in such articles by change in form, shape, or otherwise, and (c) have not been advanced in value or improved in condition abroad except by being assembled and except by operations incidental to the assembly process such as cleaning, lubricating, and painting.....	1/ 2/	A duty upon the full value of the imported article, less the cost or value of such products of the United States (see headnote 3 of this subpart)	A duty upon the full value of the imported article, less the cost or value of such products of the United States (see headnote 3 of this subpart)

1/ See subpart B statistical headnote 1.
2/ See subpart B statistical headnote 2.

APPENDIX E

U.S. EXPORTS OF INDUSTRIAL MOLDS AND PARTS, AND MOLDERS' PATTERNS FOR THE MANUFACTURE OF CASTINGS, 1979-83

Table E-1.--Industrial molds and parts, and molders' patterns for the manufacture of castings: U.S. exports of domestic merchandise, by principal markets, 1979-83

(In thousands of dollars)

Market	1979	1980	1981	1982	1983
Canada	39,054	50,929	67,290	61,121	66,357
Mexico	13,626	17,866	29,811	31,822	35,196
U King	5,702	12,148	4,728	4,619	5,956
Fr Germ	4,964	4,980	5,960	4,879	4,149
Hg Kong	1,976	2,357	3,507	5,401	3,856
Colomb	578	1,248	1,204	2,639	3,668
Venez	4,308	4,808	6,039	5,920	2,925
Austral	2,004	1,965	2,319	2,720	2,788
Kor Rep	86	607	1,644	2,353	2,300
France	1,319	2,916	5,824	3,857	2,282
All other	29,357	40,127	44,413	43,339	33,177
Total	102,975	139,951	172,738	168,672	162,654

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

Table E-2.--Injection molds used for rubber or plastics materials: U.S. exports of domestic merchandise, by principal markets, 1979-83

(In thousands of dollars)

Market	1979	1980	1981	1982	1983
Canada	15,967	20,942	29,660	25,395	29,772
Mexico	5,468	6,978	7,914	12,006	13,822
Fr Germ	2,236	2,500	2,921	3,285	2,638
Hg Kong	1,050	954	1,959	2,392	1,717
U King	2,002	8,574	1,277	1,425	1,478
China t	262	322	857	879	1,187
Belgium	951	822	1,089	447	1,020
Venez	448	536	479	607	932
France	547	960	2,121	1,050	876
Japan	1,203	765	841	270	568
All other	4,666	6,020	5,710	8,268	4,675
Total	34,800	49,374	54,827	56,024	58,683

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

Table E-3.--Other molds used for rubber or plastics materials: U.S. exports of domestic merchandise, by principal markets, 1979-83

(In thousands of dollars)

Market	1979	1980	1981	1982	1983
Canada	10,557	12,718	12,981	10,482	13,225
Mexico	4,688	4,121	5,469	5,729	4,605
U King	1,784	1,129	1,160	778	1,417
Venez	1,537	1,505	2,690	2,667	928
Ireland	164	197	664	1,650	842
Hg Kong	291	428	635	1,520	627
Singapr	73	133	232	136	555
Austral	253	491	308	525	545
Colomb	265	66	389	466	522
Japan	438	320	411	476	481
All other	7,180	9,668	9,210	6,293	4,740
Total	27,230	30,775	34,148	30,724	28,487

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

Table E-4.--Injection molds (including die cast dies) used for metal (except ingot molds), for metal carbides, for glass, and for mineral materials: U.S. exports of domestic merchandise, by principal markets, 1979-83

(In thousands of dollars)

Market	1979	1980	1981	1982	1983
Mexico	786	696	3,286	2,190	3,500
Canada	1,617	1,603	5,965	5,230	2,332
Spain	-	43	-	25	591
Austria	4	2	-	-	349
U King	279	458	277	75	305
France	35	1	262	5	276
China t	1	18	12	14	195
Kor Rep	2	52	128	4	155
Singapr	56	72	204	-	150
Japan	41	57	49	54	137
All other	679	1,294	1,445	2,116	612
Total	3,500	4,297	11,627	9,713	8,602

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

Table E-5.--Other molds used for metal (except ingot molds), for metallic carbides, for glass, and for mineral materials: U.S. exports of domestic merchandise, by principal markets, 1979-83

(In thousands of dollars)

Market	1979	1980	1981	1982	1983
Mexico	1,732	3,699	10,303	9,428	11,373
Canada	6,173	10,867	11,592	10,552	11,352
Colomb	91	54	302	968	2,553
India	1,473	1,230	1,894	3,739	1,790
U King	975	1,089	940	1,543	1,646
Austral	617	1,079	1,410	1,353	1,469
Kor Rep	75	466	572	1,048	1,330
S Arab	185	2,516	7,302	3,478	1,182
Brazil	2,075	2,108	3,611	2,937	1,056
Fr Germ	193	821	638	502	938
All other	7,624	10,144	9,651	12,493	11,208
Total	21,214	34,072	48,217	48,042	45,899

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

Table E-6.--Mold bases and parts, and molders' patterns for the manufacture of castings: U.S. exports of domestic merchandise, by principal markets, 1979-83

(In thousands of dollars)

Market	1979	1980	1981	1982	1983
Canada	4,740	4,799	7,092	9,462	9,676
Mexico	952	2,373	2,838	2,470	1,897
U King	661	898	1,074	798	1,109
Hg Kong	590	711	750	788	869
Kor Rep	9	67	834	1,135	787
Rep Saf	33	151	27	136	477
Switzld	118	73	45	197	458
China M	-	-	-	3	434
Fr Germ	1,629	571	685	391	431
Venez	708	1,130	1,683	963	428
All other	6,791	10,660	8,892	7,826	4,418
Total	16,231	21,434	23,919	24,169	20,983

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

APPENDIX F

U.S. IMPORTS OF INDUSTRIAL MOLDS AND PARTS, AND MOLDERS' PATTERNS FOR THE MANUFACTURE OF CASTINGS, 1979-83

Table F-1.—Industrial molds and parts, and molders' patterns for the manufacture of castings: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	68,360	71,029	74,840	71,379	93,386
Portugl	12,505	13,237	11,844	16,642	19,184
Japan	10,427	12,904	14,698	12,860	14,638
Italy	7,322	6,306	6,316	7,203	9,508
Fr Germ	9,961	10,597	9,296	9,405	7,348
Austral	2,695	2,661	3,005	4,991	4,469
U King	3,222	3,349	3,456	4,803	4,309
France	5,433	4,849	5,344	6,135	4,241
Switzld	3,685	1,851	3,997	4,303	3,125
Hg Kong	2,229	2,332	2,706	3,390	2,845
All other	7,921	9,659	9,930	11,907	11,380
Total	133,760	138,775	145,432	153,017	174,432

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

Table F-2.—Shoe machinery molds: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Italy	660	1,292	1,366	1,754	2,708
Spain	453	455	839	939	913
Fr Germ	305	986	1,044	433	792
U King	348	231	297	533	484
Canada	182	362	577	360	475
China t	20	144	284	297	424
Japan	-	-	-	-	213
France	35	197	388	185	106
Kor Rep	8	-	-	2	29
Mexico	54	47	105	10	11
All other	7	2	31	30	14
Total	2,073	3,715	4,930	4,543	6,167

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

Table F-3.--Injection molds used for rubber or plastics materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	51,828	53,319	55,182	51,811	68,653
Portugl	8,748	9,684	8,312	11,595	14,320
Japan	4,135	4,063	8,836	5,555	7,044
Italy	3,628	2,765	2,490	3,300	4,160
Austral	2,478	2,234	2,914	4,928	3,795
Hg Kong	1,764	1,791	2,055	2,637	2,311
Switzld	2,396	640	3,031	3,435	2,112
U King	1,050	1,318	1,050	1,806	1,694
Fr Germ	2,575	2,458	1,522	1,721	1,644
China t	261	574	596	894	1,259
All other	4,595	5,316	4,778	4,574	3,572
Total	83,457	84,162	90,767	92,254	110,564

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

Table F-4.--Compression molds used for rubber or plastics materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	1,872	1,405	3,034	2,328	3,126
U King	7	10	72	29	185
Italy	72	104	56	28	104
Austria	6	-	-	-	92
Kor Rep	1/	-	33	38	65
China t	3	-	42	1	45
Denmark	1/	-	-	-	43
Portugl	25	44	65	12	29
France	20	4	5	-	25
Austral	-	29	-	-	13
All other	96	309	47	178	31
Total	2,102	1,905	3,353	2,613	3,759

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

Table F-5.--Blow molds used for rubber or plastics materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	1,186	3,387	3,877	3,738	5,758
Japan	324	129	139	118	277
Portugl	-	-	-	15	150
Fr Germ	60	50	8	14	126
Switzld	10	14	8	59	98
Mexico	-	-	-	-	25
Austral	-	-	1/	-	17
Austria	-	-	-	-	13
Italy	-	18	124	-	10
France	-	36	6	2	9
All other	83	47	33	53	11
Total	1,663	3,681	4,197	4,000	6,492

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

Table F-6.--Bladder operated (tire) molds used for rubber or plastics materials: U. S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	1,055	1,126	1,045	746	1,811
Belgium	319	15	62	152	661
Japan	-	1	6	6	260
Denmark	-	46	-	76	62
Austral	1	7	-	-	1
U King	70	38	10	53	-
Italy	25	-	55	37	-
Mexico	-	-	-	3	-
Nethlds	-	-	-	2	-
Fr Germ	23	-	19	2	-
All other	12	59	39	2	-
Total	1,506	1,292	1,235	1,079	2,795

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

Table F-7.--Other molds used for rubber or plastics materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Japan	2,148	4,987	1,926	2,179	4,266
Canada	2,526	2,733	3,018	2,961	3,268
Portugl	1,631	1,185	1,260	1,856	2,057
Italy	1,492	1,001	1,283	820	948
Fr Germ	811	851	757	700	831
Austral	-	117	1	24	584
France	2,459	1,313	1,124	614	494
Mexico	274	199	323	296	406
China t	120	267	140	190	375
Kor Rep	3	-	14	40	308
All other	1,223	1,857	1,476	2,491	1,286
Total	12,688	14,510	11,322	12,173	14,822

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

Table F-8.--Injection molds (including die cast dies) used for metal (except ingot molds), for metal carbides, for glass, and for mineral materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	2,321	2,272	2,696	4,880	3,948
Portugl	1,048	1,459	1,421	1,882	1,670
Japan	980	1,910	1,554	2,660	1,149
U King	223	220	337	704	505
France	57	197	566	702	274
Hg Kong	32	230	135	530	250
Fr Germ	473	478	532	476	243
Italy	262	217	249	342	212
Israel	24	109	6	2	181
Austria	47	24	32	18	103
All other	1,242	833	1,064	1,751	466
Total	6,709	7,949	8,591	13,948	9,000

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

Table F-9.--Compression (compaction) molds used for metal (except ingot molds), for metallic carbides, for glass, and for mineral materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	1,446	283	186	146	460
Fr Germ	205	80	157	86	241
U King	73	9	6	121	168
France	-	-	1	970	53
Portugl	124	11	41	-	49
Italy	13	79	179	156	19
Switzld	-	-	-	-	10
Mexico	2	-	-	-	9
Japan	1	7	98	92	6
Nethlds	-	-	-	22	2
All other	198	225	259	506	-
Total	2,062	693	928	2,099	1,017

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

Table F-10.--Blow molds used for metal (except ingot molds), for metallic carbides, for glass, and for mineral materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Japan	7	57	221	431	178
Fr Germ	30	76	70	515	115
Canada	362	12	58	203	85
France	79	-	61	533	53
Italy	26	-	-	28	23
Belgium	29	-	-	-	6
U King	47	1/	-	1	1/
Switzld	13	-	-	14	-
Spain	-	-	1	-	-
Dom Rep	-	19	-	-	-
All other	18	2	-	-	-
Total	610	166	411	1,725	460

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

Table F-11.--Gravity pour (permanent) molds used for metal (except ingot molds), for metallic carbides, for glass, and for mineral materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
France	26	255	127	14	955
Canada	154	294	301	476	451
Fr Germ	301	217	83	105	138
Japan	7	10	99	63	121
Portugl	-	70	31	97	99
China t	217	4	-	18	31
U King	-	13	19	3	23
Ireland	30	-	7	-	9
Nethlds	-	-	-	52	8
India	-	-	-	-	7
All other	540	121	76	51	17
Total	1,276	983	743	879	1,859

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

Table F-12.--Other molds used for metal (except ingot molds), for metallic carbides, for glass, and for mineral materials: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	3,399	3,454	2,978	2,100	2,967
Fr Germ	3,506	3,222	3,479	3,859	1,967
France	246	490	922	1,954	1,550
Italy	967	666	344	605	1,184
Portugl	918	779	687	1,171	799
Japan	2,583	1,343	1,552	1,491	790
U King	628	460	630	810	620
Spain	48	27	1	177	554
Mexico	5	51	33	11	426
Switzld	46	34	19	142	190
All other	809	1,221	1,399	834	832
Total	13,154	11,747	12,041	13,154	11,879

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

Table F-13.--Mold parts and molders' patterns for the manufacture of castings: U.S. imports for consumption, by principal sources, 1979-83

(In thousands of dollars)

Source	1979	1980	1981	1982	1983
Canada	2,029	2,383	1,887	1,629	2,382
Fr Germ	1,621	2,145	1,603	1,335	1,251
Switzld	320	750	560	74	469
U King	415	316	275	254	328
Japan	231	273	260	266	326
France	1,243	1,435	1,651	364	194
Italy	173	119	165	109	140
Austria	147	101	35	90	116
Belgium	31	189	81	41	104
Sweden	80	62	127	75	83
All other	171	199	269	315	225
Total	6,461	7,972	6,912	4,553	5,618

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

APPENDIX G

A DISCUSSION OF EXCHANGE-RATE CHANGES AMONG SELECTED U.S. TRADING PARTNERS

Unless offset by other factors, including differences in relative inflation rates, changes in the value of the U.S. dollar vis-a-vis that of a foreign currency can alter the competitiveness of imports in the United States. For example, a strong dollar and a relatively high rate of U.S. inflation can cause the dollar to increase in value, increasing the competitiveness of imports in the United States.

To determine if changes in exchange-rates could have been affected by changes in inflation rates, real exchange rate indexes are often used. These indexes deflate changes in nominal exchange rates by changes in relative price levels. They show the change in competitiveness between the products of two countries since a base period. 1/ Real exchange rates for the U.S. dollar are determined by the following formula: 2/

$$\text{Real exchange-rate index} = \frac{\text{nominal exchange-rate index X U.S. Producer Price Index}}{\text{foreign price index}}$$

If the real exchange-rate index equals 100, the real value of the U.S. dollar has not changed since a base year. If the real exchange-rate index is greater than 100, the dollar has increased in value compared with that in a base year, and U.S. products in general have become less competitive with foreign products. The index would be greater than 100 if either the U.S. price level has risen relative to the foreign price level with no change in nominal exchange rates or the value of the dollar has risen in foreign exchange markets with no offsetting movement in relative price levels. If the real exchange-rate index is less than 100, the dollar has decreased in value compared with that in the base year, and U.S. products in general have become more competitive with foreign products.

Table G-1 presents quarterly indexes of producer prices in the United States and Canada and quarterly indexes of the nominal and real exchange rates between Canadian and U.S. dollars, from January-March 1977 (the base period) through October-December 1983. As shown in table G-1, in real terms the Canadian/U.S dollar exchange rate increased to its peak in the second quarter of 1981 and then declined thereafter; it fluctuated approximately 13 percentage points of the base period value throughout the 28-quarter period. Although by the end of the period the U.S. dollar appreciated in nominal terms by approximately 20 percent against the Canadian dollar, Canada's rapid rate of inflation (approximately 78 percent) during this period resulted in the U.S. dollar increasing in real terms against the Canadian dollar by approximately 8 percent.

For the United States and the top four countries supplying industrial molds and parts to the U.S. market, the following tabulation shows indexes of producer prices in 1983 and indexes of the nominal and real exchange rates in

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1/ The price advantage from exchange-rate changes that foreign producers enjoy in the United States applies only to those imported products that use inputs that are priced in foreign currency. If the foreign producers pay U.S. dollars for all of their inputs, they gain no competitive advantage vis-a-vis that of U.S producers, from currency fluctuations. The price of some inputs must be denominated in the foreign currency for the foreign producer to gain some competitive advantage.

2/ The index of real exchange rates is based on nominal exchange rates expressed in units of foreign currency per U.S. dollar.

Table G-1.--Indexes of producer prices in the United States and Canada and indexes of the nominal and real exchange rates between the U.S. dollar and the Canadian dollar, by quarters, January-March 1977 - October-December 1983

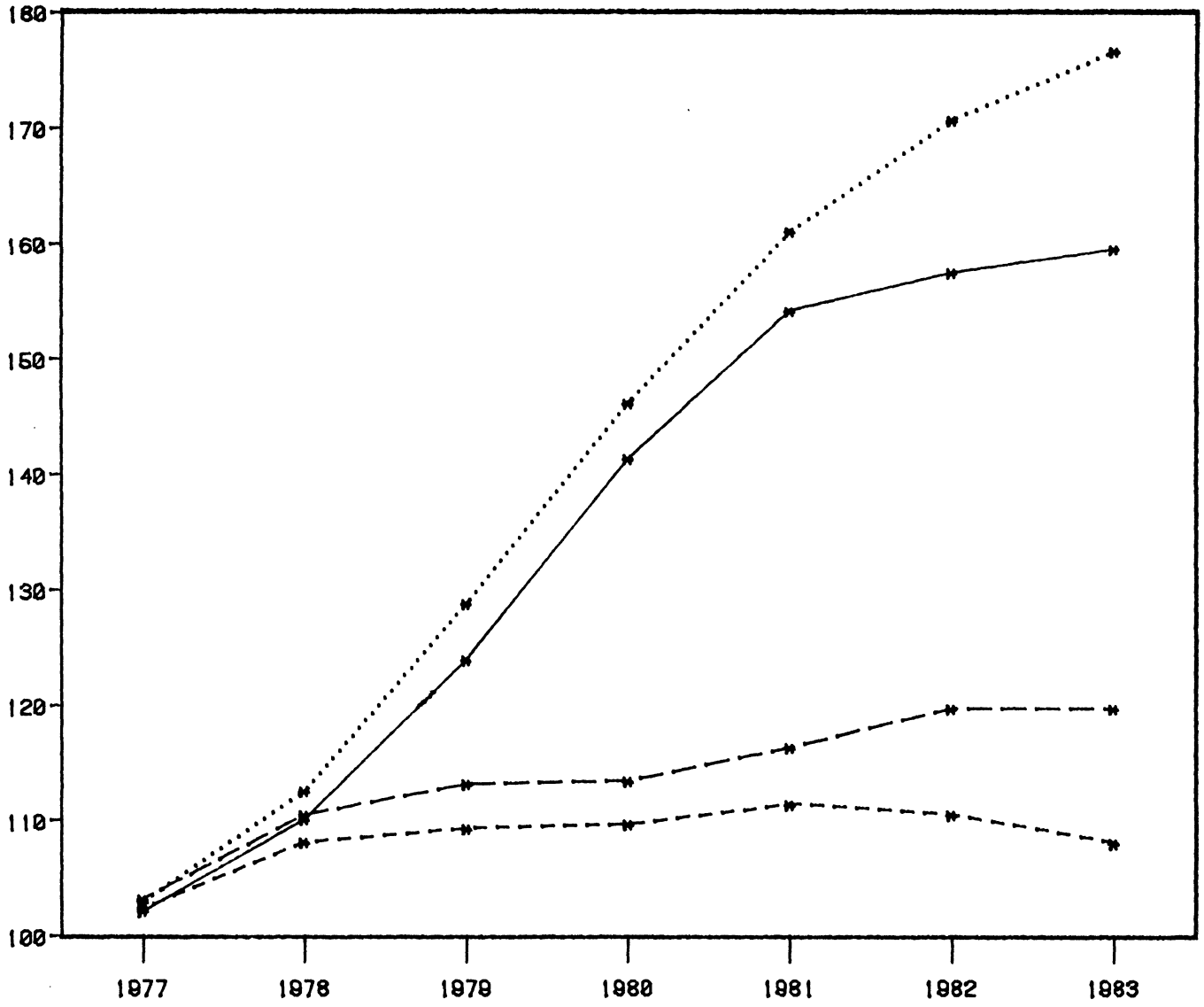
(January-March 1977=100)

Period	United States producer price index	Canadian producer price index	Nominal exchange rate index 1/	Real exchange rate index 1/
1977:				
January-March	100.0	100.0	100.0	100.0
April-June	102.5	102.6	102.2	102.1
July-September	102.6	104.1	103.9	102.4
October-December	103.9	105.5	107.0	105.4
1978:				
January-March	106.3	108.2	107.5	105.6
April-June	109.5	111.3	109.4	107.6
July-September	111.2	113.5	111.0	108.8
October-December	113.7	117.4	114.4	110.8
1979:				
January-March	117.9	123.0	115.2	110.4
April-June	122.0	126.8	112.4	108.1
July-September	125.9	130.5	113.2	109.2
October-December	130.3	135.3	114.0	109.8
1980:				
January-March	136.3	141.8	113.0	108.6
April-June	139.1	143.4	113.6	110.2
July-September	143.6	147.5	112.5	109.5
October-December	146.7	152.3	114.9	110.7
1981:				
January-March	150.9	156.3	115.9	111.9
April-June	154.6	159.7	116.4	112.7
July-September	155.8	163.2	117.6	112.3
October-December	155.7	165.3	115.7	109.0
1982:				
January-March	157.0	167.6	117.4	110.0
April-June	157.2	170.8	120.8	111.2
July-September	158.0	172.1	121.3	111.4
October-December	158.1	172.6	119.6	109.6
1983:				
January-March	158.3	173.9	119.2	108.5
April-June	158.8	176.5	119.5	107.5
July-September	160.4	178.0	119.7	107.9
October-December	161.1	178.5	120.2	108.5

1/ Based on nominal exchange rates expressed in units of Canadian dollars per U.S. dollar.

Source: International Monetary Fund, International Financial Statistics, December 1983.

Figure G-1.--Indexes of producers' prices in the United States and Canada and indexes of the nominal 1/ and real exchange rates between the U.S. dollar and the Canadian dollar, 1977-83 (1977=100)



1/ Nominal exchange rates expressed in Canadian dollars per U.S. dollar

Source: International Monetary Fund, International Financial Statistics, March 1984.

1983 between the U.S. dollar and the currencies of these four countries, 1977=100. The indexes were calculated from data reported by the International Monetary Fund, International Financial Statistics, March 1984. Unless otherwise noted, the 1983 figures in the tabulation are an annual average of 1983, generally the latest period for which data were available.

Country	Producer price index	Nominal exchange rate index 1/	Real exchange rate index 1/
United States	156.2	-	-
Canada	171.3	115.9	105.7
Japan	124.3	88.5	111.2
Italy	2/ 216.2	172.1	124.3
Portugal	3/ 313.8	289.4	156.2

1/ Based on nominal exchange rates expressed in units of foreign currency per U.S. dollar.

2/ Based on the index of producer prices for the first three quarters of 1983.

3/ Based on the index of consumer prices for the first three quarters of 1983 (the Producer Price Index for Portugal was not available for recent periods).

As shown by the real exchange-rate indexes for 1983, the U.S. dollar appreciated against the currencies of three of the four countries since 1977. The unweighted-average real exchange-rate index for the U.S. dollar against the foreign currencies of all four countries is 120. The U.S. dollar appreciated sharply against the Portuguese escudo since 1977, by approximately 56 percent. On the other hand, the U.S. dollar appreciated slightly against the Canadian dollar since 1977, by approximately 6 percent. 1/

1/ A recent study of the U.S. International Trade Commission found that although changes in exchange rates influence trade, other factors, including competitors' prices, product demand, and manufacturing costs, are often equally important. The Effect of Changes in the Value of the U.S. Dollar on Trade in Selected Commodities; Report on Investigation No. 332-150 . . ., USITC Publication 1423, August 1983.