

Plastics and Rubber Machinery

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Canada

1990-1991

PLASTICS AND RUBBER MACHINERYINDUSTRY, SCIENCE AND
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In a rapidly changing global trade environment, the international competitiveness of Canadian industry is the key to growth and prosperity. Promoting improved performance by Canadian firms in the global marketplace is a central element of the mandates of Industry, Science and Technology Canada and International Trade Canada. This Industry Profile is one of a series of papers in which Industry, Science and Technology Canada assesses, in a summary form, the current competitiveness of Canada's industrial sectors, taking into account technological, human resource and other critical factors. Industry, Science and Technology Canada and International Trade Canada assess the most recent changes in access to markets, including the implications of the Canada-U.S. Free Trade Agreement. Industry participants were consulted in the preparation of the profiles.

Ensuring that Canada remains prosperous over the next decade and into the next century is a challenge that affects us all. These profiles are intended to be informative and to serve as a basis for discussion of industrial prospects, strategic directions and the need for new approaches. This 1990-1991 series represents an updating and revision of the series published in 1988-1989. The Government will continue to update the series on a regular basis.

Michael H. Wilson
Minister of Industry, Science and Technology
and Minister for International Trade

Introduction

The plastics and rubber machinery industry consists of manufacturers of machinery, equipment, moulds and dies used to transform plastic resins and rubber into plastic and rubber products for everyday use. This industry is divided into two related subsectors: manufacturers of the machines and equipment and producers of the moulds and dies that are used on the machines to form the plastic and rubber products.

In 1988, these manufacturers operated 407 establishments and employed 8 600 people to ship \$942 million worth of output. Measured in constant 1988 dollars, shipments rose slightly in 1989 to \$958 million before declining to \$911 million in 1990.

The machinery subsector consists of manufacturers of machines and auxiliary equipment used to produce a wide range of plastic and rubber products. The primary users of

plastics-processing machinery are the packaging, construction and automotive industries. The packaging industry is the largest user of plastics-processing machinery, both in Canada and in the world. Typical packaging products are bottles, coffee cups, eating utensils, margarine and yogurt tubs, and audio and video cassette cases. Plastic products used within the construction field include pipes, tubing, window frames, siding, venting ducts, electrical outlets, switches and covers, bathtubs, sinks, shower surrounds, counter tops, flooring and roofing tiles. In the automotive field, plastic products include interior and exterior components (interior dashboard panels, exterior door panels, lighting lenses, wheel covers, etc.). Other plastic products include appliance components and film. Rubber products include automobile and appliance components, tires, conveyor belts, rubber mats, sheets and other items.



Manufacturers in the mould and die subsector specialize in making moulds and dies that are utilized in conjunction with the machines that form plastic and rubber products. Because the mould or die is proprietary to the plastics or rubber processor, the mould maker must establish a bond of trust and work very closely with the plastics or rubber processor to develop a custom-designed mould or die that meets the needs of the processor. Generally, moulds are purchased separately from the machines, primarily because over time many different products, each requiring a different mould or die, can be produced on a particular machine.

Structure and Performance

Structure Machinery

The highlight during 1990 for the machinery subsector was its strong export performance at \$218 million in constant or real 1988 dollars. With shipments that year of \$350 million in real dollars, exports dominated output. In 1988, shipments were slightly higher at \$362 million but exports were lower at \$185 million, 68 percent of which went to the United States. Imports were \$305 million in 1988, approximately 53 percent of which came from the United States. In that year, some 62 establishments, employing approximately 1 900 people, made up the machinery subsector.

The five largest firms together employ approximately 900 people; the smallest of these has 90 employees and the largest has 350. These five firms accounted for an estimated 50 percent of this subsector's shipments and employment and 90 percent of its exports. The remaining manufacturers are small and highly specialized, employing from 2 to 80 people each, with annual sales ranging from \$400 000 to \$8 million. Fifty-two establishments are located in Ontario, seven in Quebec, two in the western provinces and one in the Atlantic provinces (Figure 1). Over 90 percent of the firms in the machinery subsector are Canadian-owned.

In 1990, the machinery subsector of this industry was the smaller of the two in terms of shipments. Both subsectors experienced similar rates of growth from 1983 to 1989 as illustrated in Figure 2. By 1990, the machinery subsector constituted 38 percent of the industry's shipments. The machinery subsector plays a disproportionately large role in trade, accounting for 47 percent of exports and 80 percent of imports in 1990. The emphasis on imported machinery results in the machinery subsector having a larger Canadian market at \$492 million in current or "as spent" dollars in 1990 compared with the mould and die subsector at \$421 million and an industry total of \$913 million.

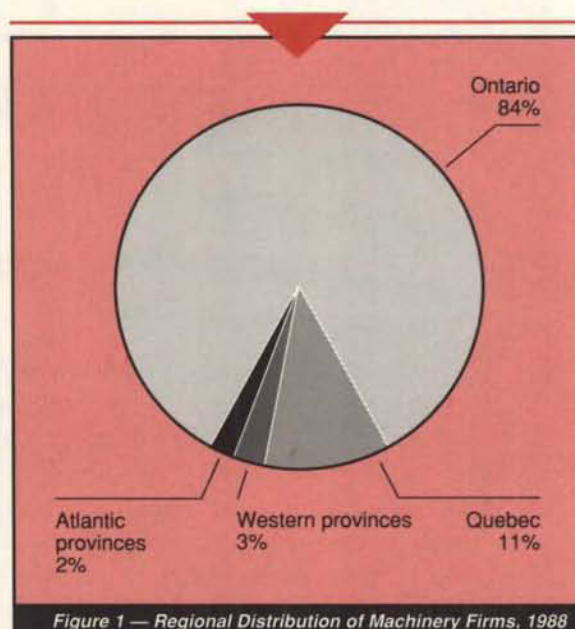


Figure 1 — Regional Distribution of Machinery Firms, 1988

The Canadian manufacturers of machinery are typically small and owner-operated. These companies have become highly specialized in order to compete in domestic and international markets. Notwithstanding the fact that the Canadian market is small by world standards, Canadian machinery manufacturers have gained an international reputation in the production of injection-moulding systems and extrusion systems for blown film, corrugated or smooth-walled plastic pipe and tubing, and plastic profiles such as mouldings and vinyl sidings. However, with respect to extrusion, Canadian machinery production is limited to single-screw machines (as opposed to the more sophisticated twin-screw machines) and to narrow size ranges. On the other hand, Canadian injection-moulding machinery is sophisticated and production extends to machines with up to four injection units for multi-material moulding and co-injection.

Canadian firms also have capabilities with respect to sheet-moulding compound (SMC) presses, with capacities ranging from 100 to 4 800 tonnes, used for the production of automobile components. In addition, Canada has expertise in computerized rotational moulding machines (including clamshell types) and a wide array of auxiliary equipment for high-volume precision moulding of plastic parts.

Some smaller auxiliary production machines and hot stamping (plastic decorating) machines are also produced and compete internationally. Canadian manufacturers of blown-film machinery are recognized as major world producers of air rings and other central components of blown-film

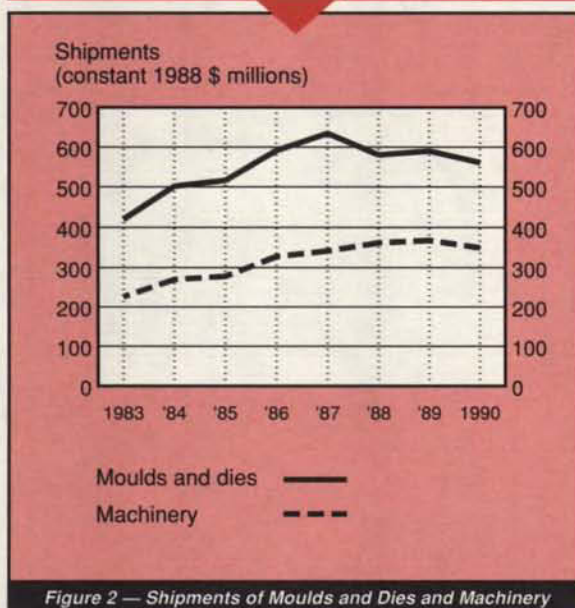


Figure 2 — Shipments of Moulds and Dies and Machinery

machines used for producing plastic film. Other auxiliary plastics-processing machinery and equipment includes dryers, loaders, feeders, granulators, shredders, chillers, sealer-welders, robots, extruder screws and machine controls.

Canadian manufacturers have very limited capability to design and manufacture rubber-production machinery. Canada's capabilities include machinery for the preparation of raw rubber materials and for the production of rubber components. Preparation machinery includes rubber mills, hot-feed and cold-feed extruders, batch-offs, calenders and mixers. Production machines and equipment include presses, rubber extruders and injection-moulding machines; belt-making machines and tire-building equipment. The major tire-building equipment manufacturer in Canada is Uniroyal-Goodrich Canada's R.M.S. Machinery Division, and most of its tire-building machines are proprietary items manufactured for its American parent company, Uniroyal-Goodrich Tire Company, which, in turn, is owned by Michelin Tires of France.

In the context of world competition, the dominant firms in the machinery subsector are located in Germany, Italy, Japan and the United States. These major firms include Battenfeld, Krupp, Reifenhäuser, Krauss-Maffei and the Klockner/Ferromatik/Desma Group of Germany; Sandretto, Negri Bossi, MIR and Amut of Italy; Meike, Sumitomo/Nestal, Kawaguchi, J.S.W., Toshiba and Nissei ASB of Japan; and Cincinnati Milacron, HPM and Van Dorn of the United States. The four dominant countries account for approximately 90 percent of world production and trade. The remaining

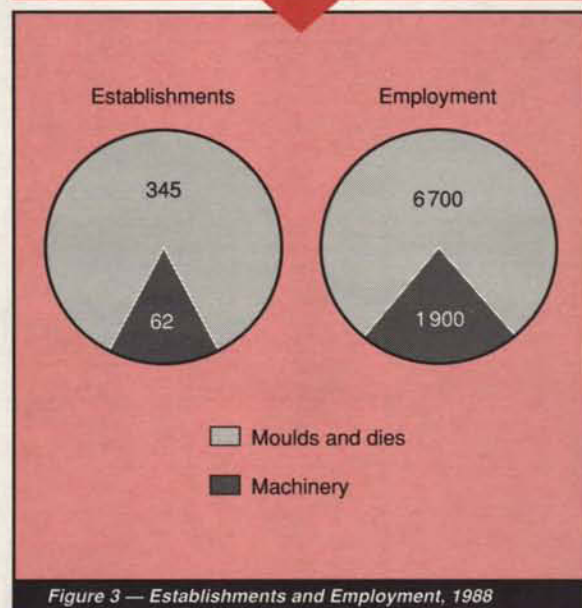


Figure 3 — Establishments and Employment, 1988

10 percent is accounted for by other firms in Austria, Canada, France and the United Kingdom.

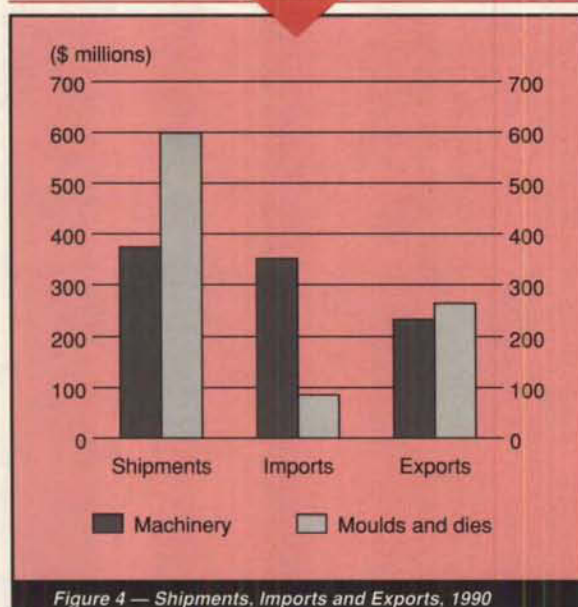
Moulds and Dies

In real or constant 1988 dollars, shipments in 1989 reached \$590 million before receding to \$561 million in 1990, despite strong exports of \$248 million in 1990. About 50 percent of total shipments go to the automotive industry, with the packaging industry being the second-largest user.

Shipments in 1988 were estimated to be worth \$580 million in current dollars, of which 36 percent, or \$211 million, were exported. Most of the subsector's exports (93 percent) went to the United States, primarily for its automotive industry. Mould and die imports were valued at \$115 million, 78 percent of which came from the United States.

The mould and die subsector comprised some 345 establishments, most of which were Canadian-owned, small and owner-managed. There were approximately 6700 people employed in this subsector. Figure 3 illustrates that this part of the industry dominates the number of establishments and employment. This dominance is much less in terms of shipments and exports and disappears with respect to imports (Figure 4).

The subsector is made up of small shops employing an average of 20 people each. Eighty percent of the subsector is located in southern Ontario, with other firms located in Quebec, British Columbia and the Prairie provinces (Figure 5). Most mould-making firms are private, Canadian-owned



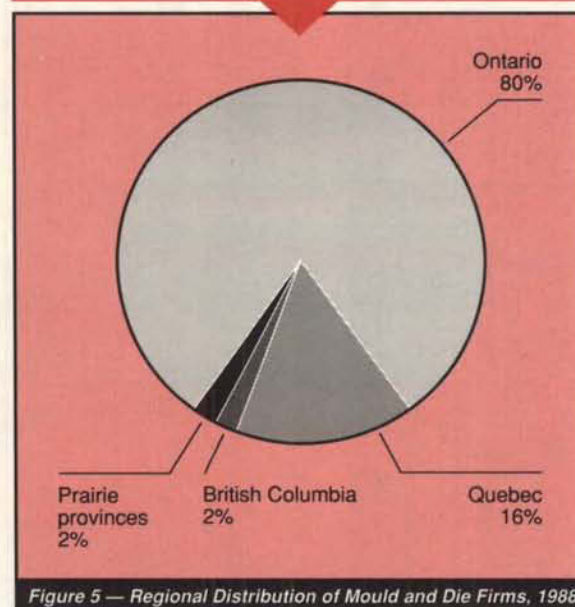
companies employing people who are highly skilled in their crafts. These skills were acquired over many years through apprenticeship training programs. More recently, computer applications are finding wider acceptance in tooling firms and are changing the skills requirements. High quality, custom designs, quick delivery and after-sales service are attributes on which Canadian mould and die makers have built their reputations.

Performance

The steady growth in shipments experienced from 1983 to 1987 was replaced by a more oscillating pattern after that time. Shipments for the industry during the period 1983 to 1988 experienced substantial growth, approximating 8 percent per year in real terms. However, the real value of shipments peaked in 1987 before declining slightly in 1988, rising by less than 2 percent in 1989 and eroding still further below 1988 levels in 1990 (Figure 6).

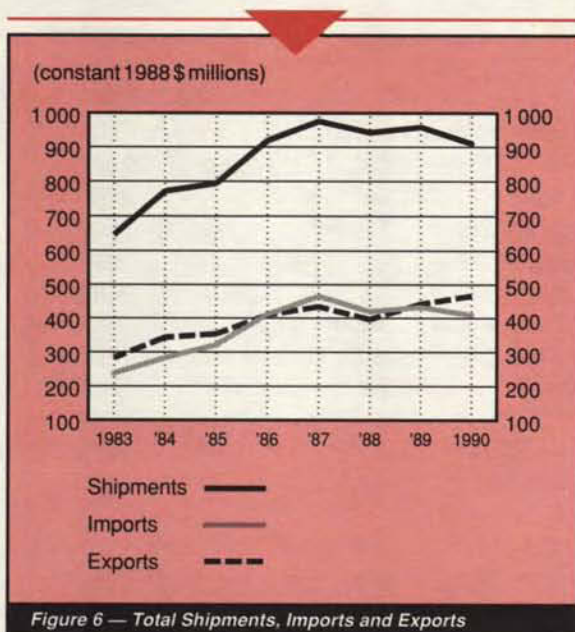
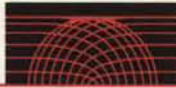
Machinery

Shipments in the machinery subsector experienced 9 percent growth per year in real terms from 1983 to 1988, but most of this growth took place from 1983 to 1986. In 1987 and 1988, the growth rate of shipments slowed. The rate continued to be sluggish in 1989 and actually declined in 1990. In the early half of the 1980s, growth in this subsector was driven by the rapid development and the substitution of new plastics materials that were used in the packaging,



construction and automotive industries, whereas the slower growth in 1987 and 1988 was in keeping with the slowdown in new applications for plastics materials.

During the first half of the 1980s, exports of the machinery subsector averaged 44 percent of the subsector's shipments. Exports as a share of shipments declined after 1978 until 1983 because Canadian machinery manufacturers focused their efforts on increasing their market share in Canada to compensate for the global reduction in markets accompanying the 1981–1982 recession. However, by 1990, exports as a percentage of shipments jumped significantly to about 62 percent. This market reorientation may be linked to the evolution of technologies that have made the Canadian market size insufficient to sustain long-term growth so that world markets must be penetrated to ensure survival. Despite a small drop in 1985, export growth was steady throughout the 1983 to 1988 period, increasing from \$101 million in 1983 to \$185 million in 1988, representing an annual growth rate of 11 percent. In 1989 and 1990, exports continued to grow to \$218 million in 1990, an 8.6 percent annual growth rate. Exports to the United States, as a proportion of total exports, declined from 80 percent in 1986 (the historic level is about 77 percent) to 68 percent in 1988, but under the influence of the Canada-U.S. Free Trade Agreement (FTA) implemented on 1 January 1989, increased to 72 percent in 1989 and 1990. The European Community (EC) has become increasingly important as a destination for Canadian exports,



taking about 12 percent of exports in 1987 and 1988 and rising to a 17 percent share in 1990.

Imports of machinery into Canada during the 1983 to 1988 period experienced significant growth, increasing from \$211 million (constant 1988 dollars) in 1983 to \$305 million in 1988, an annual growth rate of 10 percent. To a large extent, these imports were made up of the large and more sophisticated plastics- and rubber-processing machines not manufactured in Canada. However, during the 1986 to 1988 period, imports of machinery were in a state of flux: in 1986, imports were \$374 million; in 1987, they increased to \$408 million, a 9 percent increase; and in 1988, imports declined sharply to \$305 million, a decrease of 25 percent. In 1989 and 1990, they rose again to \$315 million and \$329 million, respectively, a more modest annual growth rate of 4 percent. As a percentage of the Canadian market, imports of machinery fluctuated during the period — 68 percent in 1986, 71 percent in 1987 and 63 percent in 1988. By 1990, imports accounted for 71 percent of the Canadian market, an increase from the 68 percent average from 1979 to 1986.

Traditionally, imports of machinery flowed from three main sources — the United States, the European Community and Japan. Imports from the United States accounted for 53 percent of this subsector's Canadian imports in 1988 and 47 percent in 1990. Imports from the EC, accounting for approximately 31 percent of imports in 1988, grew to 38 percent by 1990, mostly from Germany and Italy. The remaining 15 percent was mainly from Japan.

Moulds and Dies

The growth rate in shipments by Canadian mould and die manufacturers paralleled that of the machinery subsector. Shipments rose at a real rate of 7 percent annually from 1983 to 1988, increasing from \$421 million in 1983 to \$580 million in 1988. This growth rate slowed to 2 percent in 1989 before a real decline of 5 percent in 1990.

Exports of moulds and dies during the period 1983 to 1988 grew from \$183 million to \$211 million, an annual growth rate of 4 percent. However, during the period 1986 to 1988, exports of moulds and dies actually decreased, falling from \$261 million in 1986 to \$211 million in 1988. This dip was reversed in 1989 and 1990 so that exports reached \$248 million in 1990. The proportion of exports to the United States, however, remained constant at about 93 percent during the period 1983 to 1988 but fell to 88 percent in 1990. The dip in exports in 1988 was a result of the majority of industry shipments being dedicated to meet domestic demand brought about by increased investment in tooling by the automotive industry. As a result, there was insufficient capacity to satisfy the export demand.

During the period 1983 to 1988, imports of moulds and dies increased more than fourfold, rising from \$27 million in 1983 to \$115 million in 1988, representing an annual rate of growth of approximately 27 percent. In 1988, imports were more than triple their 1986 level of \$37 million. Real growth slowed in 1989 to 2.6 percent when imports peaked at \$118 million before dropping to \$80 million in 1990. The proportion of imports from the United States stayed unchanged at approximately 78 percent up to and including 1988, but declined to 70 percent in 1990. Japan increased its share of the import market significantly, which in 1986 was about 1 percent of imports but in 1988 stood at approximately 5 percent prior to falling back to 1 percent in 1990. Generally, the substantial import gains were a result of the Canadian demand exceeding domestic capability; consequently, increased imports were necessary to meet the market demand.

Strengths and Weaknesses

Structural Factors Machinery

Canadian machinery manufacturers involved in the production of injection-moulding systems, extrusion machines, and blown-film machinery and equipment compete internationally, but generally within limited product and size ranges. The vast majority of the machinery sold is custom-engineered, with particular emphasis on quality, innovation, performance, price and delivery.



Within specific size ranges and types of injection-moulding machinery, Canada is able to offer complete, totally automated systems on a turnkey basis and is competitive internationally despite the fact that its main competitors are large machinery conglomerates in Germany, Japan and the United States. However, in most cases, these foreign companies can offer a broader range of machinery sizes.

Canadian blown-film machinery manufacturers, which continue to diversify, are the exception to the trend towards specialized lines of machinery. The quality of the full product range is equal to that of any of the other major world machinery producers.

Moulds and Dies

Factors that determine the competitiveness of the mould and die subsector include a demonstrated capability to design and build high-quality custom tools, modern production facilities and a skilled work force. Other considerations are price and delivery.

With a recognized reputation for high quality, Canadian mould and die producers have a strong position in a wide range of custom-designed moulds and dies. An increasing number of mould and die producers have adopted computer-aided design and computer-aided manufacturing (CAD/CAM) technology that has the capability to enhance the design function and shorten delivery time. This capability is higher among larger firms, which have the resources to acquire expensive equipment and the technicians to operate it, but the mould and die subsector overall appears to be adopting new process technology at a satisfactory rate.

The growth of the mould and die market over the past decade combined with the lack of trainees has created a shortage of skilled mould makers. In addition, the expanded use of CAD/CAM and computer-controlled machines and systems has created a heavy demand for employees with computer skills for which the supply is inadequate. These skill shortages represent a constraint on growth and are a major concern to the subsector.

Canadian producers in the mould and die subsector have a strong position in a wide range of injection-moulding and blow-moulding capabilities. They are able to sell into the U.S. market because of their strong technical skills, high quality, specialization in specific mould types and relatively short delivery times. Many shops have computer numerically controlled (CNC) machine tools; a few have full CAD/CAM capabilities; and some are using stereolithography to build prototype moulds. One of the most essential elements within this subsector is the fostering of a close business relationship between the mould and die producers and the plastics and rubber processors. This relationship is of particular

importance where the processor requires a mould for a proprietary product.

Trade-Related Factors

Plastics and rubber machinery, parts and moulds are imported into Canada with a Most Favoured Nation (MFN) duty of 9.2 percent. Under Revenue Canada's Machinery Program, if equivalent machinery is not available from Canadian producers, the duty otherwise payable on imported machinery may be remitted.

Because of the limited Canadian manufacturing capability, it is estimated that 80 percent of plastics and rubber machinery imports into Canada are not subject to duty. Once the full tariff reductions under the FTA are realized for this industry in 1993, the percentage of imports not subject to duty will increase.

Three years after its implementation, the FTA appears to have had a positive impact on the industry. The balance of trade has improved, as has the cross-border mobility of service and repair personnel. A few problems have been caused by certain U.S. border measures that have unduly delayed Canadian goods; however, these irritants are currently being investigated.

The economic union of the EC after 1992 (Europe 1992), which will effectively harmonize the markets and standards of the EC countries, is not expected to have a serious adverse impact upon the machinery manufacturers and mould and die makers. There are three reasons for this optimism. First, Canadian exports from within this industry are typically custom-engineered machinery and moulds; consequently, the requisite standards will be inherent in any order received from an EC customer. When a Canadian manufacturer accepts an order, it will do so in full realization that it can meet the EC standard set for that particular piece of machinery or mould. Second, only 17 percent of Canada's machinery exports and only 9 percent of the mould and die exports were destined for the EC in 1990. Third, some of the larger Canadian companies within the industry have established operations in the EC, and they are certain to be recognized as domestic suppliers to the EC.

On 12 August 1992, Canada, Mexico and the United States agreed to the North American Free Trade Agreement (NAFTA). Subject to ratification or passing by the legislatures in each country, it will become effective on 1 January 1994. The NAFTA will phase out tariffs on virtually all Canadian exports to Mexico in time periods ranging from immediately to 10 years, eliminate Mexican import licensing requirements for most goods and open up bidding on major Mexican government procurement. It will also eliminate custom user fees by 1 January 1994, streamline customs procedures, and make



them more certain and consistent. Further, it will liberalize Mexico's restrictive investment policies, thus providing opportunities for Canadian investors.

Additional clauses in NAFTA modify the FTA in the following areas. NAFTA covers rights over both transportation and intellectual property, clarifies North American content rules and obliges energy regulators to both avoid discrimination against NAFTA partners and minimize disruption of contractual arrangements. It improves dispute settlement mechanisms and reduces the scope for using standards as barriers to trade. It also extends the use of duty drawbacks or similar programs that provide for a refund or waiver of customs duties on materials used in the production of goods subsequently exported to another NAFTA country.

Canada's decision to participate in NAFTA will place Canadian plastics and rubber machinery manufacturers on an equal footing with their U.S. competition.

Technological Factors

Machinery

There is a wide array of technologies relating to the machinery subsector for the various applications, including injection-moulding, injection blow-moulding, blow-moulding, blown-film, thermoforming, vacuum-forming, rotational moulding, extrusion, calendaring and mixing. Canada is a technological leader in injection-moulding, blown-film and extrusion machinery.

Canada has world-class capability in blown-film lines and blown-film equipment such as blown-film co-extrusion dies, air rings, bubble chambers, nip assemblies and winders. During the last two years, many new entrants have emerged in this field, each bringing its own particular expertise and all competing in world markets.

Moulds and Dies

Mould and die producers generally design and build tools to customer part specifications. As their customers increasingly use computer technologies to design both their products and processes, the mould manufacturers must have the capability to build tools from part designs that can often be received electronically. There is an increasing requirement by North American automotive assemblers that their suppliers participate in the engineering and design of new automobile parts. This concurrent engineering draws parts manufacturers and mould producers into closer co-operation as they strive to shorten delivery times and reduce costs.

A 1989 survey of manufacturing technologies by Statistics Canada shows that mould-making firms in Canada are adopting advanced manufacturing technologies at a higher rate than other manufacturers.¹ For example, among all manufacturers, 17 percent used CAD or computer-aided engineering (CAE), and 14 percent used numerically controlled (NC) or CNC machine tools. In comparison, of the mould producers, 21 percent of the companies surveyed used CAD or CAE, and 25 percent used NC or CNC machine tools. The adoption of advanced manufacturing technologies (AMT) requires highly skilled machinists and technicians to operate the equipment. Currently, there is a shortage of machinists and technicians in the work force with the requisite skills.

Canada, and Ontario in particular, has become, through concentrated research and development and investment efforts, a major world centre for the mould and die subsector in thin-wall packaging containers and in automotive applications.

Evolving Environment

At present, Canadian machinery manufacturers are facing recessionary pressures in their domestic market and unstable international markets brought about by uncertain oil prices resulting from changes in the Middle East and the Commonwealth of Independent States (CIS). In the short term, there will be virtually no real growth in the machinery sector and possibly even some shrinkage of about 3 to 5 percent in real terms. Within the next five to ten years, however, markets should be restored to the growth levels of the late 1980s. For example, it is expected that, notwithstanding the major challenges facing the automotive industry in the 1990s, the role of plastics to reduce the weight of automobiles and trucks is expected to increase substantially. This situation, coupled with the fact that newer generations of plastics are quickly becoming the materials of choice for designers of parts that otherwise would have been made of traditional materials such as glass, metal and paper, supports predictions of a sustained rate of growth for the 1990s.

The growing trend toward environmental reform introduces new challenges and uncertainties. Environmental legislation will influence the plastics industry in general and the machinery manufacturers in particular. Regulations will affect the materials used (by requiring greater recycled plastic content), markets (by encouraging the use of plastics in some products or discouraging its use in others) and machine design (to accommodate new materials or specifications).

¹See *Indicators of Science and Technology*, Statistics Canada Catalogue No. 88-002, quarterly.



Canada appears to be among the countries in the vanguard of the environment movement; consequently, any legislation enacted to protect the environment may have some short-term impact upon Canadian manufacturers in the domestic market. In the long term, however, such legislative requirements may provide a competitive advantage to Canadian manufacturers, particularly when they export to other countries that, at some future time, are expected to institute their own stringent environmental standards.

Markets for rubber machinery manufacturers have shrunk over the past decade, but there appears to be some renewed interest in rubber as a result of applications for synthetic rubbers. The decline over the last ten years was a result of strong offshore competition for the North American automotive tire industry, the largest market for rubber machinery products. Concurrently, changing technologies worldwide in rubber preparation equipment (cold-feed extruders and more efficient rubber mills) have reduced the overall demand for rubber machinery. Canadian rubber machinery manufacturers have kept pace with technological developments and the manufacture of state-of-the-art machinery.

The automotive industry remains the major customer for Canadian producers of moulds and dies, and it is expected that change for the subsector will continue to be dictated by the North American automobile producers. Foreign automotive companies with their new North American assembly plants fragment the market for Canadian mould and die producers. Initially, these new entrants sourced moulds from their traditional foreign suppliers, but they have recently announced their intentions to expand their North American content, which may lead to increased demand from Canadian companies. As automotive companies seek to reduce the weight of vehicles to achieve greater fuel economy, materials substitution could have a positive impact on the market for moulds through increased use of plastics.

Canadian mould and die producers will increasingly be required to design and build moulds and dies from electronic data supplied by their clients. Machine programming for the production functions will be linked to the design function as CAD and CAM become more closely integrated. As the life cycle of products shortens and production quantities lessen, buyers will seek to lower the cost of moulds and dies.

Strategic planning by Canadian producers will take on greater importance as firms strive to implement new technologies, to maintain existing markets or to exploit additional market opportunities. Strategic planning will be necessary, particularly for those Canadian producers marketing into the EC because, after 1992, they will be faced with common tariff rates, a uniform set of standards and a stronger domestic industry.

Markets for Canadian mould and die makers will continue to be strongly dependent upon the automotive industry located in North America, which will continue to insist that mould makers be equipped with state-of-the-art computerized technology. Major Canadian mould makers have, or are in the process of adopting, the requisite technology, and in some instances have developed unique technology. The establishment of foreign-based automotive producers in North America has not resulted in an appreciable increase in sales of Canadian-produced moulds and dies as such tooling has been sourced from traditional Asian suppliers. This situation is expected to evolve over time as the Canadian mould and die makers become more accepted for their high quality and technological capabilities.

Competitiveness Assessment

Canadian plastics machinery manufacturers possess world-class technology in injection moulding, blown-film systems and extrusion systems. These specialized product groupings account for the bulk of Canadian exports in the plastics machinery subsector. Outside these specialized product groupings, Canadian machinery manufacturers are typically utilizing less sophisticated technologies and are focused on serving the domestic and U.S. markets. Canadian machinery manufacturers continue to remain competitive in the North American context, as well as worldwide.

The Canadian mould and die subsector has enjoyed a strong competitive position in the North American marketplace, particularly with respect to the automotive and packaging industries. The larger firms will continue to enjoy their competitive position as they have adopted advanced manufacturing technologies. The majority of the firms within this subsector are small, and this restricts their ability to attract and access the requisite capital necessary for the acquisition of technology and for plant expansion and modernization.

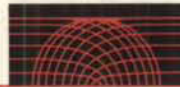
On balance, the FTA has enabled most firms in this industry to take greater advantage of the larger U.S. market. There is still some realignment taking place, and this situation is expected to resolve itself in the short term. Europe 1992 will undoubtedly put further pressure on the international competitiveness of the industry as large new capital investments for plants and equipment will be needed to conform to international standards for both products and plants in order to maximize market opportunities. With Canada's participation in the NAFTA, companies in this industry will have improved access to the Mexican market. Because Mexico has little indigenous plastics- and rubber-processing machinery manufacturing or mould-making capability, Mexican imports into



Canada will not be a problem in the immediate future.
In the longer term, trade flows will adjust to where new
plants are located.

For further information concerning the subject matter
contained in this profile, contact

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PRINCIPAL STATISTICS^a

	1983	1984	1985	1986	1987	1988	1989	1990
Establishments	N/A	N/A	280	310	360	407	N/A	N/A
Employment	N/A	N/A	7 100	7 400	8 100	8 600	N/A	N/A
Shipments								
(\$ millions)	506	656	708	844	928	942	994	973
(constant 1988 \$ millions)	648	772	794	919	977	942	958	911
Shipments — machinery								
(\$ millions)	177	230	248	301	325	362	382	374
(constant 1988 \$ millions)	227	270	278	328	342	362	368	350
Shipments — moulds and dies								
(\$ millions)	329	426	460	543	603	580	612	599
(constant 1988 \$ millions)	421	502	516	591	635	580	590	561

^aISTC estimates.

N/A: not available

TRADE STATISTICS

	1983	1984	1985	1986	1987	1988 ^a	1989 ^a	1990 ^a
Industry Total								
Exports ^b								
(\$ millions)	222	292	315	376	413	396	458	497
(constant 1988 \$ millions)	284	344	353	409	435	396	442	466
Domestic shipments ^c								
(\$ millions)	284	364	393	468	515	546	536	476
(constant 1988 \$ millions)	364	428	441	510	542	546	516	445
Imports ^d								
(\$ millions)	187	241	286	378	442	420	449	437
(constant 1988 \$ millions)	238	284	321	411	466	420	433	409
Canadian market ^e								
(\$ millions)	471	605	679	846	957	966	985	913
(constant 1988 \$ millions)	602	712	762	921	1 008	966	949	854



TRADE STATISTICS (continued)

	1983	1984	1985	1986	1987	1988 ^a	1989 ^a	1990 ^a
Machinery Subsector								
Exports ^b								
(\$ millions)	79	119	115	136	168	185	227	233
(constant 1988 \$ millions)	101	140	129	148	177	185	219	218
Domestic shipments ^c								
(\$ millions)	98	111	133	165	157	177	155	141
(constant 1988 \$ millions)	126	130	149	180	165	177	149	132
Imports ^d								
(\$ millions)	166	215	251	344	387	305	326	351
(constant 1988 \$ millions)	211	253	282	374	408	305	315	329
Canadian market ^c								
(\$ millions)	264	326	384	509	544	482	481	492
(constant 1988 \$ millions)	337	383	431	554	573	482	464	461
Mould and Die Subsector								
Exports ^b								
(\$ millions)	143	173	200	240	245	211	231	264
(constant 1988 \$ millions)	183	204	224	261	258	211	223	248
Domestic shipments ^c								
(\$ millions)	186	253	260	303	358	369	381	335
(constant 1988 \$ millions)	238	298	292	330	377	369	367	313
Imports ^d								
(\$ millions)	21	26	35	34	55	115	123	86
(constant 1988 \$ millions)	27	31	39	37	58	115	118	80
Canadian market ^c								
(\$ millions)	207	279	295	337	413	484	504	421
(constant 1988 \$ millions)	265	329	331	367	435	484	485	393

^aIt is important to note that data for 1988 and after are based on the Harmonized Commodity Description and Coding System (HS). Prior to 1988, the shipments, exports and imports data were classified using the Industrial Commodity Classification (ICC), the Export Commodity Classification (XCC) and the Canadian International Trade Classification (CITC), respectively. Although the data are shown as a continuous historical series, users are reminded that HS and previous classifications are not fully compatible. Therefore, changes in the levels for 1988 and after reflect not only changes in shipment, export and import trends, but also changes in the classification systems. It is impossible to assess with any degree of precision the respective contribution of each of these two factors to the total reported changes in these levels.

^bSee *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly.

^cISTC estimates.

^dSee *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly.



SOURCES OF IMPORTS^a (% of total value)

	1983	1984	1985	1986	1987	1988 ^b	1989 ^b	1990 ^b
United States	67	66	72	68	55	60	56	52
European Community	27	25	19	25	39	26	27	34
Asia	2	4	4	4	5	9	10	10
Other	4	5	5	3	1	5	7	4

^aSee *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly.

^bAlthough the data are shown as a continuous historical series, users are reminded that HS and previous classifications are not fully compatible. Therefore, changes in the levels for 1988 and after reflect not only changes in import trends, but also changes in the classification systems.

DESTINATIONS OF EXPORTS^a (% of total value)

	1983	1984	1985	1986	1987	1988 ^b	1989 ^b	1990 ^b
United States	86	87	89	88	85	81	83	82
European Community	6	5	5	6	7	8	9	11
Asia	4	3	2	2	3	4	3	3
Other	4	5	4	4	5	7	5	4

^aSee *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly.

^bAlthough the data are shown as a continuous historical series, users are reminded that HS and previous classifications are not fully compatible. Therefore, changes in the levels for 1988 and after reflect not only changes in export trends, but also changes in the classification systems.

REGIONAL DISTRIBUTION^a (average over the period 1986 to 1988)

	Atlantic	Quebec	Ontario	Prairies	British Columbia
Establishments (% of total)	1	10	86	1	2

^aISTC estimates.



MAJOR FIRMS

Name	Country of ownership	Location of major plants
Machinery Subsector		
Brampton Engineering (1983) Inc.	Canada	Brampton, Ontario
Corma Inc.	Canada	Concord, Ontario
Engel Canada Inc.	Austria	Guelph, Ontario
Husky Injection Molding Systems Ltd.	Canada/Japan	Bolton, Ontario
Uniroyal-Goodrich Canada Inc. (R.M.S. Machinery Division)	France	Kitchener, Ontario
Mould and Die Subsector		
Hallmark Tools (Division of Derlan Manufacturing Inc.)	Canada	Windsor, Ontario
Husky Injection Molding Systems Ltd.	Canada/Japan	Bolton, Ontario
Lamko Tool & Mold Inc.	Canada	London, Ontario
Mold-Masters Limited	Canada	Georgetown, Ontario
Wentworth Mold and Die Company Limited	Canada	Hamilton, Ontario

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