Forestry Equipment

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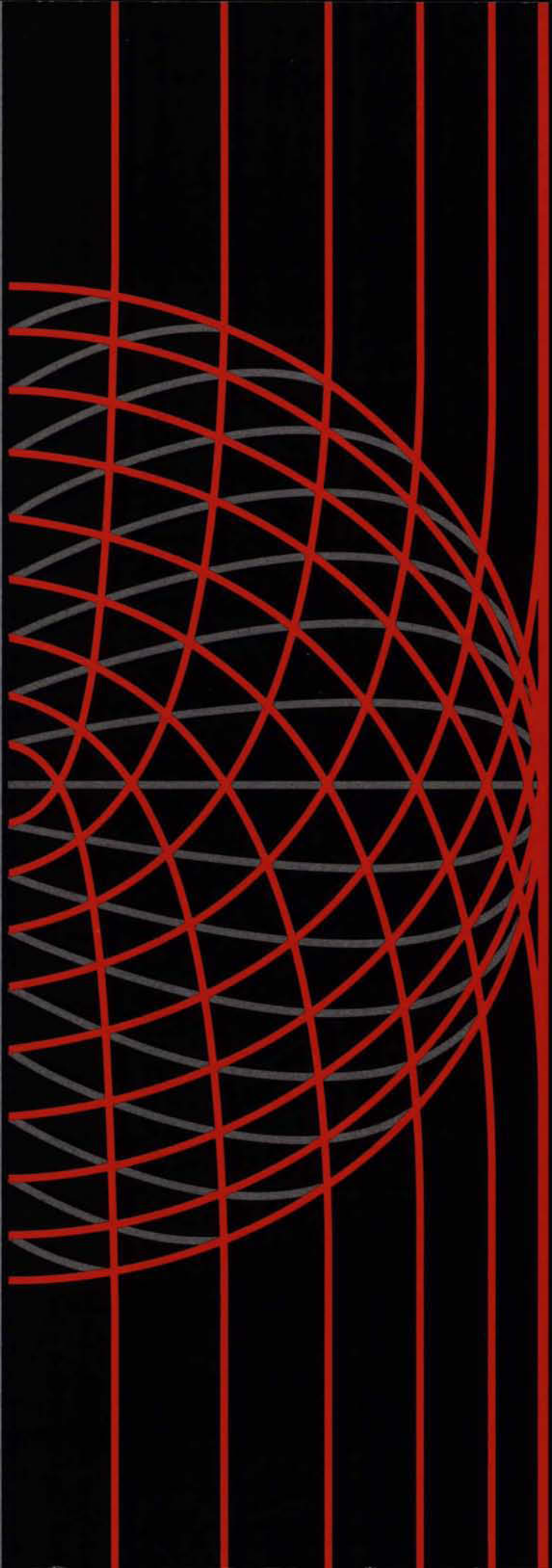
INDUSTRY PROFILE



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I N D U S T R Y P R O F I L E

1990–1991

FORESTRY EQUIPMENT

FOREWORD

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

Several firms making forestry equipment in Canada also make similar equipment for other industries. The category assigned by Statistics Canada to a piece of equipment therefore frequently depends on how it is used rather than on its physical characteristics. Statistics Canada groups data on machinery and equipment under SIC 3192.[1] Five profiles have been prepared from this SIC category:

- *Construction Machinery*
- *Forestry Equipment*
- *Materials Handling Equipment*
- *Mining Equipment*
- *Oil and Gas Field Equipment*

In preparing these industry profiles, the Statistics Canada data have been sorted by Industry, Science and Technology Canada (ISTC) according to the industry in which the machinery or equipment is used or the service is performed. Care has been taken to avoid double-counting in the disaggregation of these statistics.

The value of shipments for the industries in SIC 3192 in 1991 was estimated by Statistics Canada to be $2 841 million. Figure 1 shows the share of that total allocated to the particular industries. ISTC estimates that forestry equipment was the fifth largest, representing 7 percent of total shipments.

Structure and Performance

Structure

The forestry equipment industry produces machinery, equipment and tools for use by the forest companies. These products extract commercial wood from forest stands, process

[1]See *Standard Industrial Classification, 1980*, Statistics Canada Catalogue No. 12-501 (SIC 3192, construction and mining machinery and materials handling equipment industry).

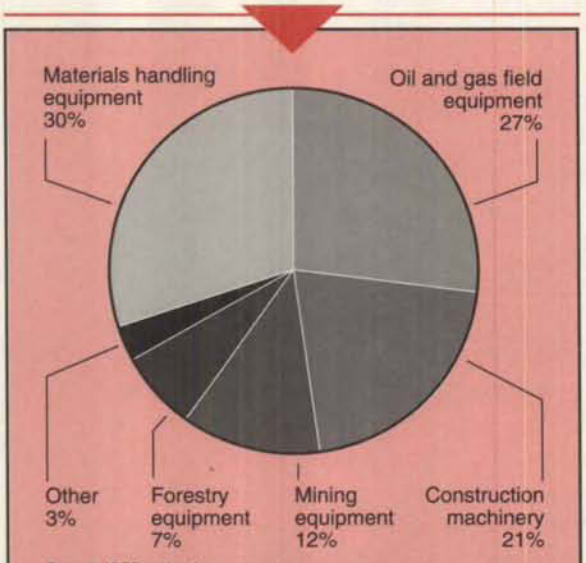

Figure 1 — Distribution of Shipments for SIC 3192, 1991

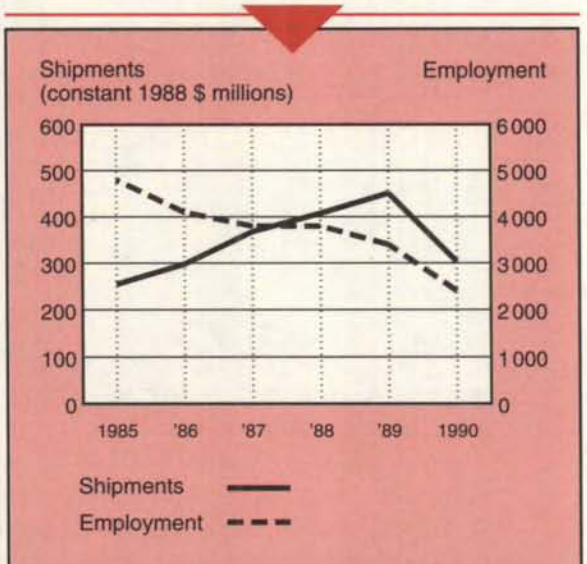

Figure 2 — Total Shipments and Employment

the wood into forms usable for secondary processing, assist rapid reforestation of the logged areas and treat growing stands. The principal users of this equipment, directly or through specialized subcontractors, are forest industry firms, including those producing primarily lumber, pulp and paper, or both, as well as provincial governments.

The main types of forestry equipment are feller-bunchers, skidders and forwarders (specialized tractors), yarders, delimbers, multi-function machines, log loaders, slashers, scarifiers, planting machines and specialized attachments or accessories.

There are two basic methods for harvesting trees, the full-tree method and the cut-to-length method.

The product line of the Canadian forestry equipment industry is well-suited to the full-tree method. In this method, the work is broken down into a series of simple tasks, each of which is performed by a different machine designed to do a limited number of operations. Because this method requires a series of specialized, highly productive machines, its use is limited to large operations. A typical production line will comprise one feller-buncher, two wheeled grapple skidders to move the cut trees, one delimber/topper and, sometimes, a mobile slasher. The wood is then removed, either as whole trees or as logs of a specified length, by means of a loader and specially adapted trailer-trucks.

The cut-to-length method is used occasionally in North America but is receiving increasing support. In the mechanized version of the cut-to-length logging method, the trees are felled, then delimbed, topped and cut into logs of predetermined lengths right at the stump. These operations are performed in one or two sequences, using just one or two machines, each of which performs several tasks. The logs are then collected and taken out by a forwarder with a hydraulic log loader. Most of the specialized machines required for this method have been developed and perfected in Scandinavia. Nevertheless, the interest shown by the forest industry in these systems has recently led several Canadian manufacturers to develop, adapt and perfect specialized attachments that can be used on carrier vehicles that are common in Canada, either for cut-to-length logging or for new variations on the full-tree method.

In 1988, this industry employed 3 800 people and had shipments of $408 million (Figure 2). By 1990, employment was 2 400 and shipments were estimated by ISTC to have fallen to $303 million in constant 1988 dollars. There were 54 Canadian companies registered as forestry equipment manufacturers in 1985 and 1986, but that number had dropped to 40 manufacturers by 1990 (Figure 3). Of those, only 10 manufacturers reported annual sales exceeding $10 million. In addition, many small and medium-sized manufacturers of general machinery, as well as a few machine shops in logging regions, also produce specialized equipment for the forest industry. This output is excluded from the industry data in this profile because forestry equipment represents a very small proportion of these manufacturers' total output. Consequently, statistical coverage is not total.

Except for the wheeled skidder manufacturers, which are subsidiaries of foreign firms, the companies in this sector are generally Canadian-owned. Most manufacturers of felling and

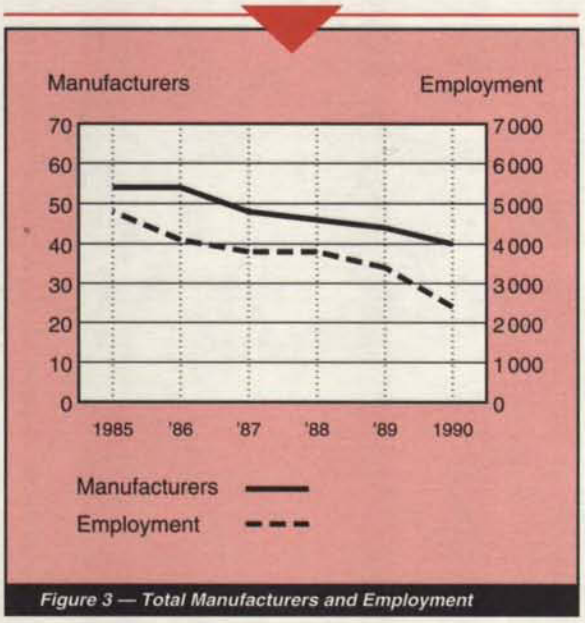

Figure 3 — Total Manufacturers and Employment

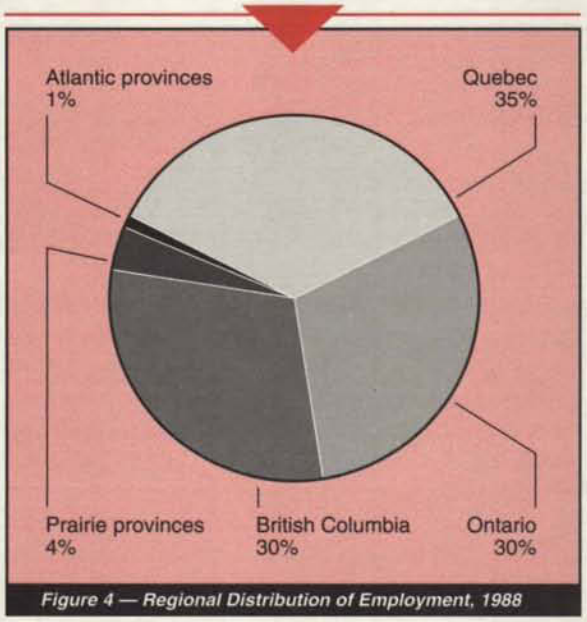

Figure 4 — Regional Distribution of Employment, 1988

delimbing attachments are concentrated in Quebec and Alberta, while all of the manufacturers of wheeled skidders are located in Ontario, near their parts suppliers. In British Columbia, the main companies in this sector build yarders and various attachments and accessories specially adapted to local forest conditions.

In 1988, employment in the forestry equipment industry was fairly evenly divided among Quebec (35 percent), Ontario (30 percent) and British Columbia (30 percent), while the Prairie provinces accounted for 4 percent of employment, and the Atlantic provinces, 1 percent (Figure 4).

The production capacity of this industry exceeds domestic market demand, and exports are significant. In 1982, the forestry equipment industry was operating at only about 40 percent capacity, whereas in 1988, it was operating at 90 percent. This expansion of the forestry equipment industry was related to the recovery phase of the business cycle, the mechanization of the North American forest industry and the rapid improvement of the available line of products. With the recent recession, the Canadian market is estimated to have fallen by 54 percent, from the 1989 peak of $479 million (constant 1988 dollars) down to $222 million in 1990. This figure is abnormally low due to the impact of the recession on lumber and pulp and paper manufacturers.

In 1990, imports were $140 million (constant 1988 dollars) representing 63 percent of the Canadian market. The United States accounted for the majority of imports (81.6 percent) in 1990, followed by the European Community (EC) with 3.8 percent, Asia (1.3 percent) and other countries (13.3 percent).

Exports were $221 million (constant 1988 dollars) in 1990, representing about 73 percent of the industry's shipments. Canada's export markets for forestry equipment and parts in 1990 were the United States (81.0 percent), the EC (2.0 percent), Asia (1.0 percent) and other countries (16.0 percent), mainly Latin America and the South Pacific. Canadian forestry equipment manufacturers are in competition with American and Scandinavian manufacturers in the United States; with Scandinavian manufacturers in Western Europe, Eastern Europe and the Commonwealth of Independent States (CIS); with the Americans, Scandinavians and Japanese in Japan; with the Americans, Brazilians and Scandinavians in Latin America; and with the Americans and Scandinavians in the South Pacific.

The current range of Canadian products is especially well-suited to conditions in the major government-owned forests of Eastern Europe and the CIS because the tree species, soils, topography, climate and harvesting methods are very similar to those in Canada.

Canadian skidders can be used in any forest, regardless of tree species. But Canadian fellers, delimbers, and slashers are designed for trees less than one metre in diameter that have relatively low wood density. Although these three types of machines cannot be used for logging the dense, large-diameter trees found in tropical hardwood forests, they are suitable for planted forests of eucalyptus, rubber trees and coniferous trees anywhere in the world where the scale of operations is adequate. There are many countries, however, where the forest resources are broken up into small management units, thus

eliminating those countries as potential markets for the kind of equipment made in Canada.

Performance

The industry is highly cyclical (Figure 5). In 1981, total shipments were $202 million (constant 1988 dollars) while the Canadian market was $192 million. The 1981–1982 recession resulted in a drop in the demand for forest products in North America and had a very marked effect on the associated forestry equipment industry, which reached its lowest point in output and demand in 1982. The domestic market was most affected; the value of domestic shipments (measured in constant 1988 dollars) was about $34 million in 1982, barely 32 percent of the figure for the preceding year ($105 million) and 18 percent of that for 1979 ($192 million). Imports also dropped dramatically, amounting to about $34 million (constant 1988 dollars) in 1982, or 18 percent of the 1979 value of $189 million. Exports did not fall as badly, although the 1982 export value of $85 million (constant 1988 dollars) amounted to only 44 percent of 1979 exports of $192 million. Exports began a strong comeback in 1983, reaching $137 million, or 71 percent of the 1979 figure. Shipments also began to grow due to a strong demand for skidders. Total shipments were $254 million in 1985 and continued to grow, reaching a level of $451 million (constant 1988 dollars) in 1989, before dropping off to an estimated $303 million in 1990.

The trade statistics for 1988 through 1990, along with announcements of temporary layoffs and business mergers, confirm that the sector is confronting the same kind of domestic and export market conditions that prevailed in the early 1980s. From 1978 to 1983, shipments (measured in constant 1988 dollars) fell at an annual rate of 15.7 percent, while the Canadian market shrank at an annual rate of 22.0 percent. These declines in shipments and the Canadian market were more than offset by growth during the upturn in the business cycle from 1983 to 1989. During this period, shipments grew in real (constant 1988 dollar) terms from $225 million to $451 million, and the Canadian market increased from $184 million to $479 million.

This volatility appears to be repeating its cyclical pattern. Since peaking at $451 million in 1989, shipments declined to an estimated $303 million in 1990, measured in constant 1988 dollars. Further, the Canadian market has also receded from $479 million in 1989 to $222 million in 1990, measured in constant 1988 dollars. A trade deficit in forestry equipment of $28 million in 1989 was converted to a surplus of

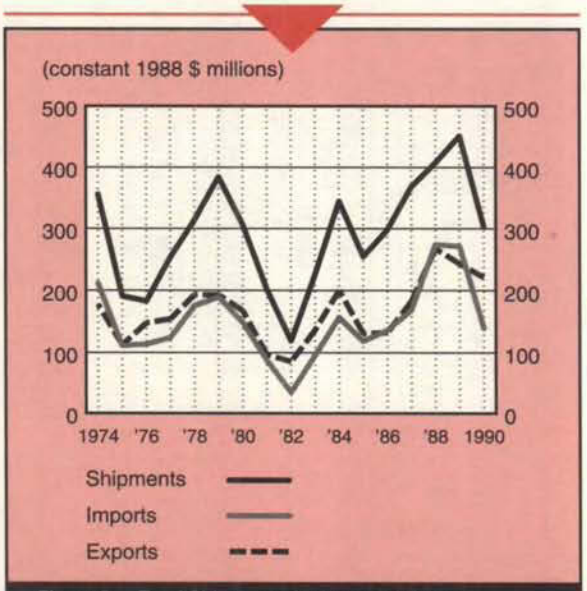

Figure 5 — Total Shipments, Imports and Exports

$81 million in 1990. This turnaround in Canada's trade position arose from a $131 million reduction in imports, which decreased from $271 million in 1989 to $140 million in 1990, accompanied by a relatively small fall in exports of $22 million, which dropped from $243 million in 1989 to $221 million in 1990.[2]

Several large manufacturers of heavy equipment, such as International Harvester of Canada, Massey Ferguson, Bombardier and Pettibone of Canada, left the industry during the 1970s and early 1980s. Since 1984, citing economic reasons, other manufacturers have left or are in the process of leaving the country. For example, Hawker Siddeley's forestry equipment operations left Canada in 1986, and Caterpillar of Canada departed on 12 July 1991. As part of restructuring, other large firms in this sector have rationalized their operations or have been purchased by competitors, two examples being Koehring Canada (purchased by FMG Timberjack) and Chapman Industries (purchased by Cypress Equipment). Additionally, FMG Timberjack was sold by its U.S. owners to Finnish interests. The pace of corporate restructuring and concentration has accelerated since 1986. Since that year, the number of companies has decreased while the relative size of those companies remaining has increased.

A limited survey of the industry, conducted by ISTC in 1990, indicates that investment in production equipment,

[2]Care should be taken in using these numbers. They are based on six-digit Harmonized Commodity Description and Coding System (HS) codes rather than the more refined 10-digit codes for trade data. Preliminary work suggests that if the 10-digit codes had been used, imports and the Canadian market estimates would have been larger.

research and development (R&D) and marketing networks continued to increase, and companies' net profits held steady until the start of 1989. Since then, profits and investment have followed the downward movement of shipments. These data are subject to error since there is a high proportion of privately owned companies in this sector who are not required to publish data on profits and investments.

Strengths and Weaknesses

Structural Factors

Until 1988, Canadian manufacturers of forestry equipment enjoyed a slight advantage over their U.S. competitors in certain production costs such as labour, raw materials and energy. However, these advantages have almost completely disappeared. More recently, some production in this industry has been transferred to the United States, especially for types of machines whose development is regarded as practically complete, such as wheeled skidders and log loaders. Among Canadian skidder manufacturers, the main strengths are the concentration of production in southern Ontario, close to parts suppliers; the large size of the factories; the introduction of computerized manufacturing equipment; economies of scale; and access to a large pool of specialized labour. In addition, three of the world's five largest manufacturers of wheeled skidders (including the second-largest one) produced their equipment in Canada in 1988. In that year, Canadian-based manufacturers of skidders captured 62 percent of the market in the United States and 55 percent in the rest of the world. These percentages can definitely be expected to decrease in the future because, as noted, Caterpillar of Canada moved its entire production of wheeled skidders to the United States in mid-1991 to rationalize its operations.

Manufacturers of attachments specialize in innovative products that are adapted to the specific regional needs of users. Relatively few imported components are used in manufacturing these products, and their distribution networks are less developed than those of the multinationals and are often linked to the networks of the carrier-vehicle manufacturers whose products they convert. Because of the effort and resources that Canadian companies invest in developing products in very close co-operation with their customers, they have been able to overtake the competition by updating their product lines frequently. Unfortunately, a number of manufacturers in this group are experiencing expansion problems due to a lack of working capital, insufficient means of production, and time lags in training managers and specialized labour. These problems prevent them from deriving the full benefit from their product lines in the domestic and export markets.

Scandinavian machines, which are used mainly in the mechanized version of cut-to-length harvesting, have not represented a serious challenge in the North American market. They consist mostly of multiple-function machinery, which is less productive than the series of single-function machines used in full-tree harvesting. Moreover, these Scandinavian machines are not well-suited to the varied conditions found in Canadian natural forests, nor to the way logging is carried out under subcontract. Scandinavian forests are smaller than many Canadian forests, so their machinery is designed for longer-term, lighter use. Another difference between the forests of the two countries is that Canadian forests are often first-growth, and their roots are close to the surface, while Scandinavian forests are third- and fourth-growth.

At present, competition from the Japanese forestry equipment producers is based on economies of scale and concentrated mainly in the production of carrier vehicles. Since the Japanese manufacturers have offered very little specialized equipment so far, their activities have been limited to replacing imports of carrier vehicles and parts from elsewhere. Consequently, Japanese manufacturers do not pose an immediate threat to the Canadian forestry equipment industry.

Trade-Related Factors

While Canadian exports of forest harvesting equipment to the United States, which represented 81 percent of this industry's total exports in 1990, are not subject to a customs tariff, some Canadian forestry equipment imports from the U.S. continued to be subject to tariffs. In 1992, these tariffs ranged from 1.8 percent up to 4.6 percent, depending on the product category. However, under the Canada-U.S. Free Trade Agreement (FTA), Canadian tariffs on skidders imported from the U.S. are being eliminated in ten annual, equal steps dating from implementation of the FTA on 1 January 1989. Tariffs on most other products in the sector imported from the U.S. underwent elimination in five annual, equal steps, and have now been removed. The provisions for arbitration to settle trade disputes are a very important aspect of the FTA, both for the forestry industry and for the forestry equipment industry.

Imported equipment from other countries having Most Favoured Nation (MFN) status with Canada has been subject to a 9.2 percent customs duty since 1987. If there is no equivalent Canadian equipment, the importer can claim duty remission under the Machinery Program of Revenue Canada, Customs and Excise. In practice, most Canadian imports of forestry equipment are eligible for duty remission, since the forestry industry generally uses Canadian equipment first and imports only those specialized pieces of equipment that are not available locally.

In Latin America, Canadian products are subject to customs tariffs that vary by country from 10 percent to 50 percent. Brazil, the main producing country, receives preferential treatment in Latin America under various bilateral arrangements. No known non-tariff barriers (NTBs) exist between Canada and its major trading partners in this sector.

Technological Factors

In 1970, Canadian manufacturers of specialized accessories, working closely with the logging industry, began to mechanize felling and delimbing operations. Subsequent innovations began with pulpwood producers and spread rapidly to the sawmill industry where, for example, circular-saw type felling heads were introduced. The development of higher-capacity felling heads has broadened the market to include logging operations in Alberta and British Columbia in Canada as well as in New England, the Pacific Northwest, the Midwest and the Southeast in the United States.

In large logging operations, the full-tree harvesting method (which involves a production line of feller-bunchers, wheeled skidders and a delimber) has displaced the older cut-to-length method. Because the feller-bunchers and delimbers greatly reduce downtime during skidding operations, grapple skidders are beginning to replace smaller-model skidders. However, despite a major increase in the volume of wood felled by the full-tree method, the new grapple skidders are so much more productive that the number of skidders in service in the North American forest industry is on the decline, indicating that the market for these products may be maturing.

The major firms in the sector all use computer-aided design and computer-aided manufacturing (CAD/CAM) systems, and programmable, digitally controlled machine tools. Some manufacturers also have computer-controlled test beds. Microelectronics have been introduced in a number of machines to facilitate the operator's task and maximize performance.

Manufacturers in the industry spend between 2 percent and 8 percent of their revenue on applied R&D, and their efforts are integrated with those of their customers. With respect to technological innovation, the Canadian sector is ahead of its competitors in its range of products, production facilities and ability to adapt to the needs of the logging industry. In the United States, there are few forestry equipment manufacturers who are so specialized and who work so closely with the logging industry. As a result, the U.S. sector has been slower to adapt to technological changes.

Precompetitive R&D on forestry equipment and other related wood and paper processing machinery is being assisted by ISTC's Forest Industries R&D and Innovation Program (see "Sectoral Studies and Initiatives" on page 11). Over 50 cost-shared R&D programs have been approved since the beginning of 1990. These programs include cost-efficient solutions to environmental problems.

Evolving Environment

British Columbia and Quebec rank first and second, respectively, among Canada's provinces that produce forest products. In the late 1980s, these provinces completely revised their legislation governing the forest industry. In both cases, users of the forest resources have been made responsible for regenerating the areas they log and for absorbing the costs of this regeneration. The forest industry must now use harvesting methods and equipment that let it preserve new growth already established in overmature stands, promote the rapid establishment of new growth in mature stands and overcome the inability of logged areas to produce useful tree species by appropriate interventions (burning or removing cutting debris, scarification, seeding or planting).

One immediate impact of this new legislation has been a substantial increase in the demand for equipment used to dispose of cutting waste, to scarify soil, to collect and prepare seed, to produce seedlings outdoors or in greenhouses, and to plant seedlings. The new laws have also forced several large forest-resource companies to revise their logging methods so that they can limit these types of interventions to forest stands that cannot regenerate naturally within a prescribed period of time.

To protect regeneration in stands that have some logging potential, some companies are experimenting with a mechanized version of the cut-to-length harvesting method. This older method was almost totally replaced by the full-tree method during the wave of mechanization in the forest industry because operating costs for the latter were so much lower. However, the high cost of regenerating cut-overs logged by the full-tree method, coupled with the abundance of forest stands that require such intervention, is forcing the industry in some regions to reconsider this decision. This change may increase the competition from Scandinavian suppliers who specialize in equipment for cut-to-length logging.

A number of developing countries are striving for self-sufficiency in forest products. Accordingly, they have planted new forests and have built new forest-products processing plants. These new users are looking for highly productive logging equipment; hence, new markets have opened up to Canadian forestry equipment manufacturers. This trend should continue for the next decade, and Canadian exports overseas should increase.

The imposition of an export charge in January 1987 on softwood lumber exported from Canada to the United States, and subsequent replacement measures involving higher stumpage fees on timber, have had a continuing indirect impact on the forestry equipment industry. Though these charges had been expected to result in a shift in demand for forestry equipment to the United States, no such effects were observed up to 1990 due to continuing strong demand for lumber for construction. From 1986 to 1989, the Canadian forest industry undertook a rapid modernization of its equipment. Strong demand was mirrored in the U.S. and extended by continued strength in its market, which suggests that a similar modernization is under way in the U.S. forest industry.

The elimination of customs tariffs provided for in the FTA favours the entry into Canada of products that are in direct competition with equivalent Canadian-made equipment, such as wheeled skidders. Canadian builders of these types of equipment are likely to face a slight increase in competition from U.S. manufacturers. The elimination of the U.S. tariffs on forestry equipment is of benefit to the Canadian sector selling into the U.S. market. Access to the U.S. market, essentially without obstacles or threat of restrictions, increases the Canadian suppliers' interest in this market. Likewise, however, U.S. producers have increased their efforts to penetrate the Canadian market.

On 12 August 1992, Canada, Mexico and the United States completed the negotiation of a North American Free Trade Agreement (NAFTA). The Agreement, when ratified by each country, will come into force on 1 January 1994. The NAFTA will phase out tariffs on virtually all Canadian exports to Mexico over 10 years, with a small number being eliminated over 15 years. The NAFTA will also eliminate most Mexican import licensing requirements and open up major government procurement opportunities in Mexico. It will also streamline customs procedures, and make them more certain and less subject to unilateral interpretation. Further, it will liberalize Mexico's investment policies, thus providing opportunities for Canadian investors.

Additional clauses in the NAFTA will liberalize trade in a number of areas including land transportation and other lservice sectors. The NAFTA is the first trade agreement to contain provisions for the protection of intellectual property rights. The NAFTA also clarifies North American content rules and obliges U.S. and Canadian energy regulators to avoid disruption of contractual arrangements. It improves the dispute settlement mechanisms contained in the FTA and reduces the scope for using standards as barriers to trade. The NAFTA extends Canada's duty drawback provisions for two years, beyond the elimination provided for in the FTA, to 1996 and then replaces duty drawback with a permanent duty refund system.

Competitiveness Assessment

In the domestic market, the forestry equipment industry is very competitive because it offers a complete line of machines for full-tree harvesting that are well adapted to Canadian forests and that are known and accepted by Canadian users.

In the area of specialized attachments for cut-to-length harvesting, the sector is currently trying to make up for lost time by various means: manufacturing Scandinavian-designed attachments under licence; adapting European accessories to Canadian conditions; designing and developing totally new machines; and modifying existing Canadian machines. The threat of significant penetration of the Canadian market by European and U.S. products should be stemmed presently.

The Canadian market share for skidders in the United States was 62 percent in 1988 and 1989. Subsequent transfers of production to the United States reduced Canadian manufacturers' shares in the U.S. market in 1991 and 1992.

Fellers and delimbers manufactured in Canada are also very competitive and continue to be used in large, full-tree logging operations. In regions where the harvestable forest management units are smaller and more subdivided, the relative weakness of Canadian products for cut-to-length logging limits their penetration into these markets.

Canadian products must offer a clear technological advantage to be accepted in the U.S. market. Canadian producers now compete with U.S. producers more on the basis of service, technology, reliability and quality than on price.

In the CIS and Eastern Europe, Canadian products have the sturdiness and productivity needed to log the large, government-owned forests. However, distribution networks for forestry equipment are almost non-existent in these countries or they are controlled by European competitors. The difficulties in penetrating these markets can be overcome through co-operation with neighbouring countries or with countries that have bilateral trade agreements with them, such as Finland, Japan, the Republic of Korea and Germany. Many types of Canadian machines are competitive in Japan, Australia and New Zealand.

Because of its range of innovative machinery, its ability to adapt to changing markets, its close ties with the Canadian logging industry, and its production facilities, the Canadian forestry equipment industry should be able both to maintain its share of the domestic market for full-tree harvesting equipment and quickly to adapt its product line for cut-to-length harvesting.

If the forestry equipment industry continues to innovate, invest heavily in product development and restructure itself into larger production units, it can maintain the reputation of its products as well as its presence in world markets.

For further information concerning the subject matter contained in this profile or in the initiative listed on page 11, contact

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Industry, Science and Technology Canada
Attention: Forestry Equipment
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PRINCIPAL STATISTICS[a]

	1982	1983	1984	1985	1986	1987	1988	1989	1990
Manufacturers	N/A	N/A	N/A	54	54	48	46	44	40
Employment	N/A	N/A	N/A	4 800	4 100	3 800	3 800	3 400	2 400
Shipments									
($ millions)	96	188	301	235	281	353	408	469	325
(constant 1988 $ millions)	119	225	345	254	298	368	408	451	303

[a]ISTC estimates. For complete industry statistics, see *Machinery Industries, Except Electrical Machinery*, Statistics Canada Catalogue No. 42-250, annual (SIC 3192, construction and mining machinery and materials handling equipment industry).

N/A: not available

TRADE STATISTICS

	1982	1983	1984	1985	1986	1987	1988[d]	1989[d]	1990[d]
Exports[a]									
($ millions)	69	114	175	121	125	175	267	253	237
(constant 1988 $ millions)	85	137	200	131	133	183	267	243	221
Domestic shipments[b]									
($ millions)	27	74	126	114	156	178	141	216	88
(constant 1988 $ millions)	34	88	145	123	165	186	141	208	82
Imports[c]									
($ millions)	28	80	137	110	129	162	274	282	150
(constant 1988 $ millions)	34	96	157	119	136	169	274	271	140
Canadian market[b]									
($ millions)	55	154	263	223	285	339	415	498	238
(constant 1988 $ millions)	68	184	302	242	302	354	415	479	222

[a]See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly, for data up to 1987. Export data for 1988 and after are ISTC estimates.

[b]ISTC estimates.

[c]See *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly, for data up to 1987. Import data for 1988 and after are ISTC estimates.

[d]It 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.

SOURCES OF IMPORTS[a] (% of total value)

	1982	1983	1984	1985	1986	1987	1988[b]	1989[b]	1990[b]
United States	94.3	97.2	94.6	92.7	95.3	68.8	71.2	70.9	81.6
European Community	2.5	1.6	3.3	3.2	4.5	15.8	18.9	14.8	3.8
Asia	2.9	0.6	0.1	1.3	0.1	5.7	5.2	4.0	1.3
Other	0.3	0.6	2.0	2.8	0.1	9.7	4.7	10.3	13.3

[a]See *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly, for data up to 1987. Data for 1988 and after are ISTC estimates.

[b]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 import trends, but also changes in the classification systems.

DESTINATIONS OF EXPORTS[a] (% of total value)

	1982	1983	1984	1985	1986	1987	1988[b]	1989[b]	1990[b]
United States	83.0	94.5	94.4	88.0	81.0	87.7	81.0	81.0	81.0
European Community	1.6	1.1	0.7	2.1	2.3	5.1	2.0	2.0	2.0
Asia	0.2	0.2	0.7	0.6	0.1	1.8	1.0	1.0	1.0
Other	15.2	4.2	4.2	9.3	16.6	5.4	16.0	16.0	16.0

[a]See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly, for data up to 1987. Data for 1988 and after are ISTC estimates.

[b]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 export trends, but also changes in the classification systems.

REGIONAL DISTRIBUTION[a] (1988)

	Atlantic	Quebec	Ontario	Prairies	British Columbia
Manufacturers (% of total)	2	35	25	5	33
Employment (% of total)	1	35	30	4	30
Shipments (% of total)	1	30	40	4	25

[a]ISTC estimates.

MAJOR FIRMS

Name	Country of ownership	Location of major plants
Caterpillar of Canada Ltd.[a] (skidders)	United States	Brampton, Ontario
Cypress Equipment Co. Limited	Canada	Delta, British Columbia
Denharco Inc.	Canada	Amos, Quebec Saint-Hyacinthe, Quebec
FMG Timberjack Inc. (skidders)	Finland	Woodstock, Ontario
Industries TANGUAY Inc.	Canada	Saint-Prime, Quebec
S. Madill Ltd.	Canada	Nanaimo, British Columbia
Risley Equipment Ltd.	Canada	Grande Prairie, Alberta
Weldco-Beales Mfg. Ltd.	Canada	Langley, British Columbia

[a]On 12 July 1991, Caterpillar of Canada Ltd. moved its entire production of wheeled skidders to the United States.

SECTORAL STUDIES AND INITIATIVES

The following initiative is supported by Industry, Science and Technology Canada (for additional information, see address on page 8).

Forest Industries R&D and Innovation Program

The overall objective of the three-year Forest Industries R&D and Innovation Program is to increase the international competitive position of the forest industry by encouraging, through government assistance, increased R&D activity by the industry. The strategic approach is to encourage R&D activity undertaken in alliances with other stakeholders and, thereby, to expand the transfer of technology and accelerate its implementation in advanced forest products and processes in the industry.

An important program delivery mechanism is through strategic memoranda of understanding (MOUs) with companies. The objective is to work with recognized industry leaders to stimulate R&D activity undertaken in co-operative alliances with other partners, including smaller companies and suppliers. A key MOU is with the Pulp and Paper Research Institute of Canada (PAPRICAN), which is to encourage research directed toward addressing the environmental challenges confronting the pulp and paper industry.

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