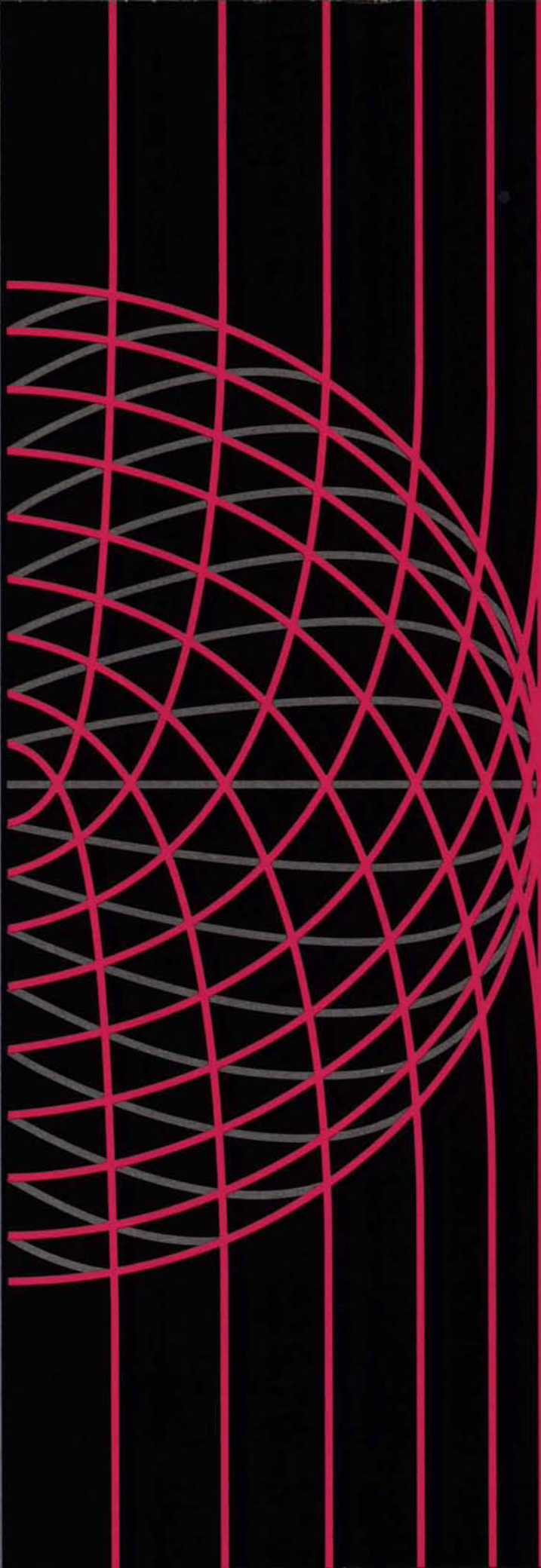


# Cement and Concrete

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## CEMENT AND CONCRETE

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### 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

### Structure and Performance

#### Structure

The cement and concrete industry comprises three distinct and regionally oriented subsectors. The first, cement manufacturing, includes firms producing the material that binds mineral aggregates, water and chemical admixtures to form concrete. Firms in the second, concrete products, manufacture a wide range of items including precast concrete, concrete block, brick and pipe. The third, ready-mix concrete, involves the mixing and delivery of an intermediate product that is used in all types of construction.

All three subsectors are highly cyclical, seasonal businesses that depend on construction activity. In 1988, the most recent year for which complete Statistics Canada data are available, employment was 27 235. Industry shipments that year were worth \$4 billion, while exports amounted to \$210 million and imports \$73 million (Figure 1). Cement

manufacturing accounted for 23 percent of shipment value, concrete products 30 percent and ready-mix concrete 47 percent (Figure 2).

There is a high degree of vertical integration in the Canadian cement manufacturing subsector, which is very capital-intensive. Thus, the dominant cement manufacturing firm in a particular region is frequently also the leading ready-mix concrete manufacturer, or a major concrete products producer, or all three.

By definition, the cement manufacturing subsector includes all operations engaged in the manufacture of hydraulic cement, which has the property of hardening when combined with water. Hydraulic cement includes Portland, Portland-slag, slag, natural, masonry and pozzolan cement.

Portland cement is by far the most important product on the basis of volume and value. It is manufactured by heating (calcining) an accurately proportioned, finely ground mixture of limestone, silica, alumina and iron oxide, usually in a



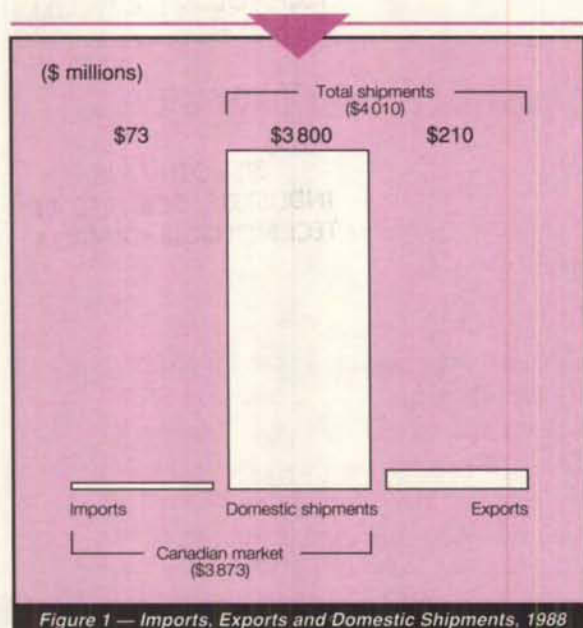


Figure 1 — Imports, Exports and Domestic Shipments, 1988

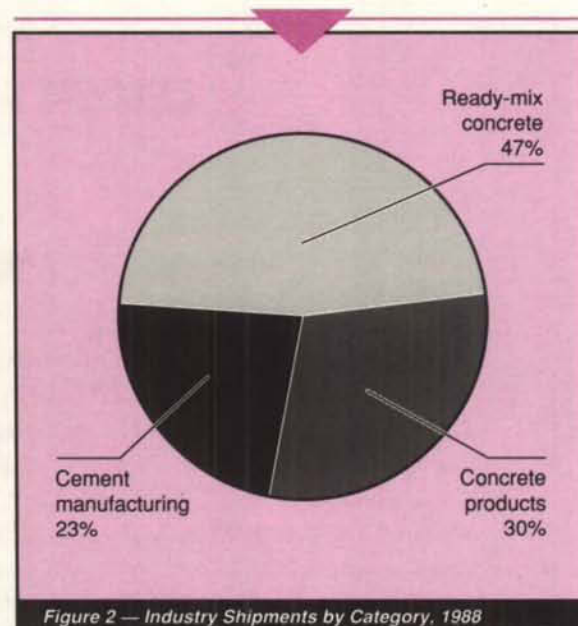


Figure 2 — Industry Shipments by Category, 1988

rotary kiln, to form a grey granular material called clinker. The clinker is then further finely ground with the addition of gypsum to form a cement powder.

The cement manufacturing subsector had shipments valued at \$938 million in 1988. In the same year, total exports including cement clinker were worth \$144 million, 96.5 percent of which went to the United States. Exports of cement in 1989 were \$120 million, a 17 percent reduction from the 1988 level. Imports, valued at \$56 million in 1988, originated primarily from the United States, but the European Community (EC) also exported significant volumes to Canada; this level declined by 18 percent to \$45 million in 1989, mainly because of a reduction in cement imports from Europe.

There were eight cement manufacturing enterprises in 1988, employing 3 400 workers at 22 establishments. The cement manufacturing subsector is concentrated in Ontario and Quebec, which have 43 percent and 25 percent, respectively, of Canadian production capacity. The Prairie provinces have 17 percent of capacity, British Columbia 11 percent and the Atlantic provinces 4 percent (Figure 3).

Cement plants are frequently located close to the source of raw materials, mainly limestone. Because of its low value-to-weight ratio, cement is usually distributed by truck within a radius of several hundred kilometres of a plant, most shipments being within 100 kilometres. Export shipments to more distant destinations are possible only because of low-cost water transport. Thus coastal cement plants have a competitive advantage over inland plants.

From 1986 to 1990, the cement manufacturing subsector has undergone important restructuring, which has resulted in decentralization of company operations and greater foreign control, estimated to be about 80 percent of production capacity in 1990. In 1986, Genstar Limited, a Western Canadian cement producer, was sold to S.A. Cimenteries CBR of Belgium. Later in the same year, Ciments Français Limitée of France purchased the Toronto-based company Lake Ontario Cement (now ESSROC Canada). In 1989, Ciments Français Limitée extended its Canadian interests by buying Miron Inc. of Montreal. Lafarge Coppée of France (parent company of Lafarge Canada) reorganized its North American operations in 1987 into four regions (three of which involve Canadian operations) and set up corporate headquarters in Reston, Virginia.

The concrete products subsector shipped products worth \$1.2 billion in 1988. Exports were worth \$65 million in 1988, declining to \$52 million in 1989. Imports were not significant.

There were 388 concrete products establishments in 1988, employing 11 300 people. Most of them are small, independent Canadian manufacturers. Many of the remaining medium-sized to large establishments are owned by cement manufacturing companies, the majority of which are foreign-controlled multinationals.

Concrete products plants are generally located near the market and consequently are concentrated in Central Canada. In 1988, approximately 42 percent of the establishments were in Ontario, 27 percent in Quebec, 15 percent in the Prairie provinces, 10 percent in British Columbia and 6 percent in the Atlantic provinces.

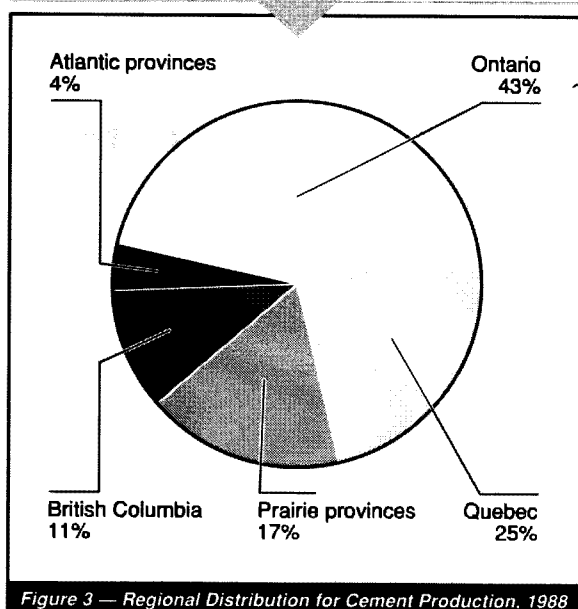


Figure 3 — Regional Distribution for Cement Production, 1988

The ready-mix concrete subsector in 1988 had shipments worth \$1.9 billion from 634 establishments employing 12 500 people. Although this is a significant subsector, it is not dealt with specifically in the remainder of this profile, because it is a local service, delivering ready-mix concrete from a mixing plant to a nearby customer, and international trade is negligible.

### Performance

The cement and concrete industry is dependent on the level of construction activity. During its 100-year history in Canada, it has undergone a number of cycles of expansion, retrenchment and rationalization in response to periods of growth and recession. Following the 1981–1982 recession, both total shipments and employment in these subsectors increased each year, reaching a new peak of industrial activity in 1988 (Figure 4). Since then, there has been a slowdown in construction activity, with significant cyclical pressures on the industry. In 1991, housing starts are expected to be approximately 150 000 units, a decline of about 17 percent relative to the 1990 level. Similarly, the strength of non-residential construction activity has ebbed.

The cement manufacturing subsector is in a healthy financial position, although profits are cyclical and show no specific upward or downward trends. Profits after tax on sales were 3.3 percent in 1987. The debt-to-equity ratio has fluctuated within a narrow range of 10 percentage points on either side of a 50:50 ratio between 1983 and 1987.

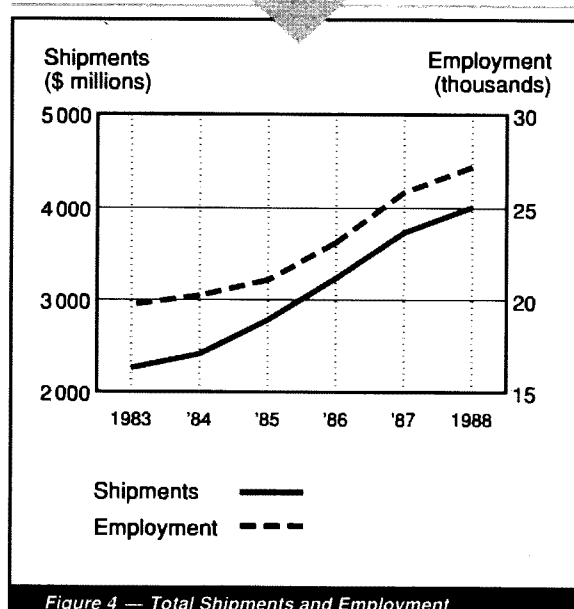


Figure 4 — Total Shipments and Employment

Over the past decade, the cement manufacturing subsector has improved its operating costs substantially through the introduction of larger, more efficient processing equipment and the reduction of labour and energy costs. According to the Canadian Portland Cement Association, labour productivity improved by 52.8 percent between 1980 and 1989, while energy consumption declined by 20.1 percent between 1974 and 1989. Capacity utilization increased between 1984 and 1989, levelling off at 82 percent in 1989.

The profitability of the concrete products subsector has shown an upward trend since the beginning of the 1980s, reaching 6 percent (after-tax profit as a percentage of sales) in 1987. Companies in this subsector have shown a consistent pattern in the debt-to-equity ratio in the period from 1983 to 1987, following which debt declined slightly in 1987 to a 63:37 ratio. The companies in the concrete products subsector have been less successful in reducing costs than cement manufacturers.

## Strengths and Weaknesses

### Structural Factors

While the Canadian cement manufacturing subsector is domestically oriented, firms have built a strong distribution network in the United States, initially in the eastern border states and in recent years on the West Coast. Canadian and





U.S. cement manufacturers have world-scale plants and similar production costs. Between 1984 and 1989, exports represented about one-quarter of total sales. The proximity to the U.S. border state markets keeps transportation costs low, which is a key component of the competitiveness of Canadian cement exporters.

Canada faces strong competition in offshore cement markets from certain countries in Latin America, Europe, and Asia. These countries generally have lower production costs than Canada does and usually have an advantage in shipping costs to overseas markets.

Since the 1950s, Canadian imports of cement have been small because of surplus domestic capacity. This situation may be changing in Eastern Canada, since Miron Inc., a major cement distributor, has closed its cement manufacturing plant.

Canadian fabricators of precast architectural and structural components have been very successful in expanding their markets in the United States through their entrepreneurial skills, competitive pricing and high quality. However, a slowdown in the U.S. construction industry along with the recent strength of the Canadian dollar have reduced export opportunities. Exports of other concrete products are relatively small.

Imports of concrete products have been relatively small because of the subsector's strong competitive position.

### **Trade-Related Factors**

The Canadian and American Most Favoured Nation (MFN) tariffs on cement are zero, with the exception of white Portland cement, which accounts for a very small proportion of trade. The MFN tariff on white Portland cement is 81.59 cents per tonne, but the tariff has been reduced to zero under the Canada-U.S. Free Trade Agreement (FTA). The Canadian tariffs on concrete products range from 2.0 percent to 3.2 percent, while U.S. tariffs are 2.9 percent, with the exception of the tariff on floor and wall tiles, which is 12.6 percent. Tariffs will be eliminated on concrete products by 1 January 1993 under the FTA. The EC tariff rate is 3.2 percent on both cement and concrete products. The Japanese tariff is 3.2 percent on cement and 4.9 percent on concrete products.

At the federal level, the "Buy America" policy, the *Surface Transportation Assistance Act* and the *Cargo Preference Act* have restricted or could restrict access for Canadian exporters to the U.S. market. Some states have similar legislation. In an effort to maintain access to the U.S. market, some cement manufacturers have built or purchased plants in the United States.

### **Technological Factors**

The Canadian cement manufacturing subsector uses current technology and is efficient by world standards. In comparison, the level of technology in the concrete products subsector varies widely. The larger companies usually have access to modern technology, but many small companies cannot afford it.

About two-thirds of the Canadian cement clinker capacity of 14.5 million tonnes a year uses an energy-efficient "dry production" process, about the same percentage as in the U.S. industry. The Canadian Portland Cement Association reports that average kiln age in Canada in 1989 was 20 years, compared with 21 years in the United States.

For the most part, new technology in the cement subsector has been transferred from Europe and, more recently, Japan. Production technology is widely available and there are no obstacles to its continued importation. New technology in the concrete products sector is diverse and readily available in Canada, the United States and Europe.

With the exception of Lafarge Canada, which operates a cement and concrete products research centre in Montreal, most of the research and development (R&D) in Canada is carried out by either government or universities. A major research project on high-performance concrete led by the Université de Sherbrooke, involving seven universities and two consulting firms, has recently been approved under the Networks of Centres of Excellence Program of the federal government. Ongoing basic research on cement and concrete products is conducted by the National Research Council of Canada, while the Canada Centre for Mineral and Energy Technology (CANMET) is involved with applied R&D. In addition, the Canadian cement manufacturing and concrete products subsectors benefit from R&D conducted by the Portland Cement Association in the United States, funded by both Canadian and U.S. producers.

### **Other Factors**

The level of demand in both the cement manufacturing and concrete products subsectors depends on construction activity. To the extent that changes in interest rates influence construction activity, they also affect these subsectors.

Historically, the volume of cement exported to the United States has not been influenced significantly by Canada-U.S. exchange rate fluctuations. By comparison, the concrete products subsector is much more sensitive to such changes because of the narrower profit margin.

Some environmental regulations administered by the provinces and municipalities affect the cement and concrete industry. Capital investment expenditures in the cement





industry for pollution control equipment are very large, particularly to control emissions such as sulphur dioxide and nitrous oxide. Waste kiln dust, which is produced in large volumes, is also collected by pollution control equipment. Canadian cement companies in recent years have been experimenting with recycling waste materials, such as rubber tires, as a fuel for firing their kilns. Concrete waste is generally disposed of in landfill sites, but some material is now being crushed and recycled on construction sites.

In certain areas of Canada, salt used to clear roads of snow has caused widespread deterioration of concrete in bridges, parking structures, etc. Salt damage has become an important issue in the concrete products sector. Considerable efforts are being made to correct this problem through use of new aggregate and other materials in the concrete mixture.

## Evolving Environment

The prospects for the cement and concrete industry will be determined by the outlook for construction activity. Any action that further facilitates access to the U.S. market will be very important. Other factors including the potential impact of multilateral trade negotiations (MTN), the economic integration of Europe after 1992 and the evolving situation in Eastern Europe should have limited impact on the cement and concrete subsectors.

International trade in cement is undergoing significant changes. Countries such as Spain and the Republic of Korea, which have been major exporters, are now selling much of their output in their growing domestic markets. Eastern Europe will require large volumes of cement from Western countries to rebuild its economy. In contrast, the United States is becoming less dependent on offshore imports, although they are still significant.

Concrete products are continuing to improve in strength, durability, impermeability and corrosion resistance. These improvements have resulted in more widespread usage. However, they face strong competition from alternative building materials including steel, aluminum, stone, wood and plastics. Concrete products will probably continue to improve their properties and maintain their market share, but substantial improvement in demand for new product applications is not foreseen.

The competitiveness of Canadian concrete products in the United States will be enhanced by the removal of tariffs by the end of 1992.

## Competitiveness Assessment

The Canadian cement manufacturing subsector is competitive in existing U.S. markets where it is well entrenched and is expected to remain so with the full implementation of the FTA. The industry is not able to compete successfully in offshore markets, where competition is keen and prices are extremely low. Although the relative international competitiveness of Canadian cement manufacturers has improved recently with the rise in exchange rates and ocean freight costs facing some offshore exporters, low-cost cement producers in Latin America, Europe and Asia are maintaining their potential for increased export markets.

The concrete products subsector has been successful in the U.S. market and should maintain its competitive edge after existing tariffs are removed under the FTA. Increased imports of concrete products are not anticipated. Offshore trade is minimal and no significant changes are foreseen.

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

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## PRINCIPAL STATISTICS<sup>a</sup>

	1983	1984	1985	1986	1987	1988	1989	1990
Establishments	1 017	1 037	999	1 028	973	1 044	N/A	N/A
Employment	19 733	20 229	21 079	23 110	25 865	27 235	N/A	N/A
Shipments (\$ millions)	2 261	2 414	2 784	3 233	3 731	4 010	4 094 <sup>b</sup>	3 614
GDP <sup>c</sup> (constant 1981 \$ millions)	750	794	912	976	1 124	1 178	1 178	1 028
Investment <sup>d</sup> (\$ millions)	55	55	92	162	146	230	254	257
Profits after tax <sup>e</sup> (\$ millions)	77	225	411	101	225	N/A	N/A	N/A
(% of income)	3.0	7.0	11.3	2.8	4.8	N/A	N/A	N/A

<sup>a</sup>For establishments, employment and shipments prior to 1989, see *Non-Metallic Mineral Products Industries*, Statistics Canada Catalogue No. 44-250, annual (SICs 3521, hydraulic cement industry; 3541, concrete pipe industry; 3542, structural concrete products industry; and 3551, ready-mix concrete industry).

<sup>b</sup>See *Monthly Survey of Manufacturing*, Statistics Canada Catalogue No. 31-001, monthly.

<sup>c</sup>See *Gross Domestic Product by Industry*, Statistics Canada Catalogue No. 15-001, monthly.

<sup>d</sup>See *Capital and Repair Expenditures, Manufacturing Subindustries, Intentions*, Statistics Canada Catalogue No. 61-214, annual.

<sup>e</sup>See *Corporation Financial Statistics*, Statistics Canada Catalogue No. 61-207, annual.

N/A: not available

## TRADE STATISTICS<sup>a</sup>

	1983	1984	1985	1986	1987	1988 <sup>b</sup>	1989 <sup>b</sup>	1990 <sup>b</sup>
Exports (\$ millions)	130	179	210	231	232	210	172	220
Domestic shipments (\$ millions)	2 131	2 235	2 574	3 002	3 499	3 800	3 922	3 394
Imports (\$ millions)	25	26	31	36	43	73	66	67
Canadian market (\$ millions)	2 156	2 261	2 605	3 038	3 542	3 873	3 988	3 461
Exports (% of shipments)	5.7	7.4	7.5	7.1	6.2	5.2	4.2	6.1
Imports (% of Canadian market)	1.2	1.1	1.2	1.2	1.2	1.9	1.7	1.9

<sup>a</sup>See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly; and *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly.

<sup>b</sup>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<sup>a</sup> (% of total value)

	1984	1985	1986	1987	1988	1989
United States	97.9	85.1	72.7	78.9	63.2	75.2
European Community	1.4	3.4	26.8	18.6	22.0	17.1
Japan	0.7	0.5	0.5	0.1	2.1	0.2
Other	—	11.0	—	2.4	12.7	7.5

<sup>a</sup>See *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly.

### DESTINATIONS OF EXPORTS<sup>a</sup> (% of total value)

	1984	1985	1986	1987	1988	1989
United States	98.3	99.5	99.7	99.2	96.5	96.1
European Community	0.1	0.1	0.1	0.2	1.0	1.4
Japan	—	—	—	—	—	0.4
Other	1.6	0.4	0.2	0.6	2.5	2.1

<sup>a</sup>See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly.

### REGIONAL DISTRIBUTION (average over the period 1987 to 1989)

	Atlantic	Quebec	Ontario	Prairies	British Columbia
Establishments (% of total)	8	24	33	23	12
Employment (% of total)	X	26	43	X	X
Shipments (% of total)	X	22	48	X	X

X: confidential



## MAJOR FIRMS

Name	Country of ownership	Location of major plants
CBR Cement Canada Limited Inland Cement Limited	Belgium	Winnipeg, Manitoba Regina, Saskatchewan Edmonton, Alberta
Tilbury Cement Ltd.		Tilbury Island, British Columbia
Ciment Québec	Canada	Saint-Basile-de-Portneuf, Quebec
ESSROC Canada Inc. Miron Division	France	Picton, Ontario Montreal, Quebec
Lafarge Canada Inc.	France	Brookfield, Nova Scotia Saint-Constant, Quebec Bath, Ontario Woodstock, Ontario Fort Whyte, Manitoba Exshaw, Alberta Kamloops, British Columbia Richmond, British Columbia
St. Lawrence Cement Inc.	Switzerland	Beauport, Quebec Joliette, Quebec Mississauga, Ontario
St. Marys Cement Corporation	Canada	Bowmanville, Ontario St. Marys, Ontario

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