

Cement

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Shipments of cement in 1994 were estimated to be 10.5 Mt valued at \$841.7 million, an increase of 12% in volume compared to 1993, based on preliminary figures. This increase resulted from an increase in demand throughout Canada, along with higher exports to the United States. Overall construction activity in Canada increased, boosted by a new two-year, \$6 billion cost-shared program for infrastructure renewal that was supported by all three levels of government. Housing starts in Canada, however, remained essentially the same as in 1993. Reported kiln capacity in 1993 was about 14.8 Mt/y, with about 13.1 Mt/y active.

THE CANADIAN INDUSTRY

The Canadian cement industry is diversified and mainly integrated with the primary construction materials and products sectors. Many cement manufacturers also supply ready-mix concrete, crushed stone aggregates, and concrete products such as slabs, bricks, and pre-stressed concrete units. Restructuring during recent years has tended to result in a decentralization of operations and greater foreign control, now estimated to account for about 80% of the industry's capacity. Major international companies include: Holnam Inc. (part of Holderbank Financière Glaris Ltd., headquartered in Zurich), which indirectly controls St. Lawrence Cement Inc.; Lafarge Corporation (part of the Lafarge Coppée Group, headquartered in Paris), which indirectly controls Lafarge Canada Inc.; S.A. Cimenteries CBR of Belgium (CBR), which owns Inland Cement Limited; and Société des Ciments Français (SCF) of France, which owns both Lake Ontario Cement Limited (LOC) and Ciment Québec Inc. SCF now uses the name "ESSROC" to identify all of its holdings in Canada and the United States. (Accordingly, LOC uses the name of ESSROC Canada Inc.)

Clinker-producing and finish-grinding capacities of cement plants, on a company-by-company basis, are

listed in Table 2. In 1993, active clinker capacity in Canada was about 13.1 Mt/y. Clinker production is more indicative of ultimate cement production capacity because clinker can be stockpiled for later use or sale. The average kiln capacity over a recent 10-year period (1982-92) increased from about 330 000 t/y to 450 000 t/y; the average kiln age is reported to be about 25 years.

In Atlantic Canada, two cement plants obtain raw materials on site or nearby. These account for about 4% of total Canadian clinker-producing capacity. Nova Scotia and Newfoundland are now the only producers of cement in the region since Lafarge Canada Inc. retired its Havelock, New Brunswick, plant in 1988.

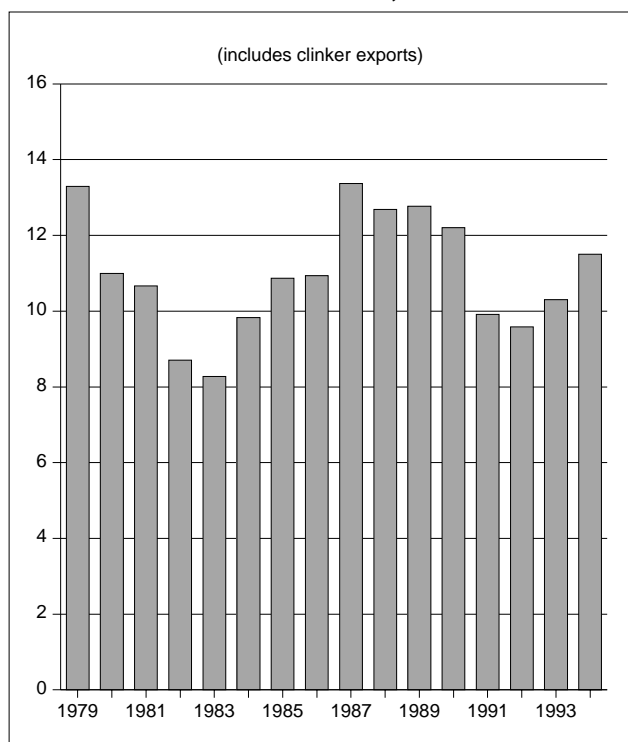
In Quebec, four clinker-producing plants and one grinding operation accounted for about 25% of national output. St. Lawrence Cement Inc. (SLC) is the dominant manufacturer of cement and a leading producer of concrete and aggregates in eastern Canada. Its major markets, in competition with Lafarge Canada Inc. and Ciment Québec Inc., are in Quebec, the Maritime provinces and the northeastern United States. Considering the northeastern region of North America as a whole, there are generally four to six distribution terminals for every cement clinker plant. Expansions of stone aggregate operations and raw material reserves remain major company objectives.

In Ontario, clinker-producing plants account for about 45% of Canadian capacity. Lafarge Canada Inc., with operations across Canada, is the largest producer in terms of both clinker and finish grinding capacity. Lafarge's raw materials handling is extensive; for example, limestone for its plant at Bath is quarried on site and silica is supplied from Potsdam sandstone near Pittsburgh, New York, about 65 km east of Bath. Iron oxide and gypsum are purchased from Hamilton and Nova Scotia, respectively. Lafarge's Woodstock plant obtains limestone on site, silica from Falconbridge Limited, iron oxide from Stelco Inc., and gypsum from sources in southern Ontario. At Picton, ESSROC Canada Inc. operates one of the largest cement plants in North America. In addition to the company's usual markets, the plant supplies cement and clinker to an associated company, ESSROC Materials Inc., in New York State and Michigan. Reflecting the growing importance of

recycling, SLC has an alliance with Philip Environmental Services, a major supplier of used and recycled waste industrial products. With extensive operations in Ontario and metropolitan Montréal, the fully integrated waste management company may be in a position to provide a range of inputs from supplemental fuels to low-cost substitutes for some cement raw materials.

In western Canada, two companies, CBR and Lafarge Canada Inc., normally operate four clinker-producing plants in the Prairie provinces and three in British Columbia. Western Canada accounts for about 26% of clinker-producing capacity, roughly in proportion to its share of total Canadian consumption. CBR affiliate Inland Cement Limited ceased production of clinker at its Regina and Winnipeg plants in 1992, and cement continues to be shipped from the larger Edmonton operation for wide distribution. Most raw materials for Lafarge's Exshaw plant are from on-site sources. However, gypsum is provided by Westroc Industries Limited, while iron oxide is from IPSCO Inc. in Regina and the Oregon Steel Co. at Portland, Oregon. Lafarge's Vancouver plant at Richmond and Tilbury Cement Limited's plant at Delta use limestone from Texada Island. Lafarge's Kamloops plant is supplied from reserves nearby.

Figure 1
Canadian Cement Production, 1979-94



Source: Statistics Canada.

WORLD DEVELOPMENTS

Multinational companies with widespread production and distribution networks have now become much more dominant in world markets. A recent example of this is the partial consolidation of markets in the United States, Canada and Mexico, with companies competing on a regional basis. An estimated 70% of the U.S. industry is now controlled by European and Pacific Rim cement producers.

World cement production in 1993 was 1277 Mt, according to the U.S. Bureau of Mines. China ranked number one, leading all countries with 356 Mt, followed by Japan with 87 Mt and the United States with 76 Mt.

Reviews of the anti-dumping orders on grey Portland cement clinker from Mexico were concluded by the U.S. Department of Commerce. Final anti-dumping margins ranged from 42.7% to 52.3%. Trade data suggest that imports of cement and clinker into the United States during the period 1988-93, including quantities from other countries impacted by anti-dumping orders, decreased more than 80% since their peak in 1989.

The Commission of the European Communities imposed fines equivalent to more than C\$300 million on some of the world's leading cement companies operating within the European Union. The companies, all of which have subsidiaries serving North American markets, were charged with infringing European competition law over a 10-year period by colluding to fix cement prices across member states.

CONSUMPTION AND TRADE

Portland cement clinker is produced by burning, usually in a rotary kiln, an accurately proportioned, finely ground mixture of limestone, silica, alumina and iron oxide. The three most commonly used types of cement produced by most Canadian cement producers are: Normal Portland (Type I), Moderate Sulphate-Resistance Portland (Type II), and High-Early-Strength Portland (Type III).

Cement and clinker cross-border trade with the United States varies considerably from year to year depending on demand. Canadian cement production efficiencies and a lower-valued Canadian dollar continue to make Canadian cement and clinker competitive in U.S. markets. Low-cost marine transportation has influenced world trade considerably. Total U.S. imports of cement for consumption were about 11.8 Mt, or 13% of apparent consumption.

TECHNOLOGY

Energy conservation programs by the Canadian cement industry have reduced energy consumption per unit of production by about 22% since 1974. Although the number of kilns has decreased, their individual capacities have increased and the more efficient dry-process plants now account for more than 80% of total cement production. Work continues toward using cheaper fuels, improving methods for defining optimal particle sizes based on grinding, and using waste materials in kilns. The fuel mix has changed considerably away from natural gas and petroleum products toward coal/coke. In 1993, of 18 clinker-producing plants, 15 reported using coal and/or coke as their primary fuel. Ten plants in 1993 reported using waste as an alternate fuel or supplemental fuel, according to the Canadian Portland Cement Association (CPCA). Waste was not used as a primary fuel. In 1993, the Canadian cement industry consumed, on average, 4648 megajoules per tonne of production, of which 3820 megajoules (82.2%) were derived from fossil fuels (Table 2).

Suitable waste materials are an attractive alternative fuel because pyro-processing accounts for more than 80% of total energy needs, or about 30% of total production costs. In the United States and Europe in particular, the use of waste-derived fuels and spent organic solvents has grown. The waste materials generally established as being very satisfactory include paints and coatings, surplus oils and greases, solvents, inks, and cosmetics. In the context of sustainable development, it seems apparent that improved waste management involving combustion technology could lead to greater conservation of some non-renewable fossil fuels.

The Canada Centre for Mineral and Energy Technology (CANMET), through its Industrial Targeted Program (ITP) under the new *National Energy Efficiency Act*, is developing long-term energy efficiency R&D (research and development) strategies for major industrial sectors. The cement and concrete sector study was completed in 1993; it is expected that there will be cooperative investments in energy efficiency research leading to field trials and technical transfer.

CANMET has established cooperative arrangements for investigating the properties of concrete made with a high proportion of fly ash. The work, based on CANMET's technology allowing up to 60% of Portland cement replacement by fly ash, is being funded by the Electric Power Research Institute (EPRI) of Palo Alto, California, and the Canadian Electrical Association (CEA) of Montréal. Also, Hydro-Québec has joined the project. Past cooperative research into supplementary cementing materials led to the production of a ground granulated blast furnace slag for use as a cementitious material in concrete. Lafarge Canada Inc. (operating a plant formerly owned by Koch Minerals of Canada Limited)

now produces this type of material, often called "slag cement," at Spragge, Ontario. Granulated slag is from The Algoma Steel Corporation, Limited's plant at Sault Ste. Marie. The capacity of the Spragge plant is about 150 000 t/y, with the product being used for complete or partial replacement of Portland cement.

In 1994, CANMET, along with the American Concrete Institute (ACI), sponsored the Third CANMET/ACI International Conference on Durability of Concrete, held in Nice, France. Also, again with ACI as a sponsor and the National Research Council of Canada (NRC) as a co-sponsor, CANMET organized in Montréal the fourth International Conference on Super Plasticizers and Other Chemical Admixtures in Concrete.

Along with co-sponsors, including the ACI, the EPRI, the CEA and the NRC, CANMET is planning the Fifth CANMET/ACI International Conference on Flyash, Silica Fume, Slag and Natural Pozzolans in Concrete. The conference will be held in Milwaukee, Wisconsin, in June 1995. Its purpose is to present new developments and to continue the transfer of related technology as widely as possible. Also in 1995, CANMET, along with the ACI and the NRC, will sponsor the Second CANMET/ACI International Symposium on Advances in Concrete Technology to be held in Las Vegas, Nevada.

Moderate Sulphate-Resistance Cement (Type II) and Low-Heat-of-Hydration Cement (Type IV), designed for concrete poured in large masses, as in dam construction, are manufactured by several companies in Canada. Masonry cement (a generic name) includes such proprietary product names as Mortar Cement, Mortar Mix (unsanded), Mason's Cement, Brick Cement, and Masonry Cement. The latter product, produced by Portland cement manufacturers, is a mixture of Portland cement, finely ground high-calcium limestone (35-65% by weight), and a plasticizer. The generic products do not necessarily consist of Portland cement and limestone, but may include mixtures of Portland cement, hydrated lime, and/or other plasticizers.

OUTLOOK

Shipments of cement in 1995 are expected to increase moderately based on marginal increases in construction activity in Canada and continuing strength in exports to the United States. If demand continues to be firm, this will represent a continuation in the recovery of shipments from the recessionary levels that persisted during the 1990-92 period.

An analysis by the Industrial Minerals Division of Natural Resources Canada's Mining Sector has confirmed a high statistical association between cement shipments on the one hand, and housing starts and one- and five-year mortgage rates on the other.

In 1994, housing starts remained relatively firm at 155 300, according to the Canada Mortgage and Housing Corporation. By way of comparison, housing starts were 168 300 in 1992, 155 400 in 1993, and are expected to be about 156 000 in 1995. With real economic growth in both Canada and the United States forecast to continue, the outlook is positive in the office and industrial building sectors. Engineering-related construction will continue to benefit from the two-year (1994 and 1995) \$6 billion cost-shared program for infrastructure renewal initiated by the federal government.

Energy management will continue to concentrate on gains in efficiency based on timely switching among the available choices of common fuels. However, most longer-term cost savings are expected to result from the partial substitution of fossil fuels by waste-derived fuels. For example, in the case of Refuse

Derived Fuel (RDF), about 70% (by volume) of municipal solid waste from post-recycled curbside garbage could be extracted for use by the cement industry. This would reduce by about two thirds the volume of material for disposal as landfill. Under certain circumstances using RDF, reductions in requirements for traditional fuels, such as coal, have been predicted to be as high as 20-25%.

The use of supplementary cements incorporating pozzolans or slags, and classified accordingly as various types of blended cements, is expected to become more important in modern concrete practice.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 60. (2) Information in this review was current as of February 1, 1995.

TARIFFS

| Item No. | Description | Canada | | | United States |
|----------|---|----------|-----------|------|---------------|
| | | MFN | GPT | USA | Canada |
| 25.23 | Portland cement, aluminous cement, slag cement, supersulphate cement and similar hydraulic cements, whether or not coloured or in the form of clinker | | | | |
| 2523.10 | Cement clinker | Free | Free | Free | Free |
| 2523.21 | Portland cement: White cement, whether or not artificially coloured | 76.15¢/t | 54.25¢/t | Free | Free |
| 2523.29 | Other | Free | Free | Free | Free |
| 2523.30 | Aluminous cement | Free | Free | Free | Free |
| 2523.90 | Other hydraulic cements | Free | Free | Free | Free |
| 68.10 | Articles of cement, of concrete or of artificial stone, whether or not reinforced Tiles, flagstones, bricks and similar articles: | | | | |
| 6810.11 | Building blocks and bricks | 4.7% | Free | Free | Free |
| 6810.19 | Other | 7.5% | Free | Free | Free |
| 6810.20 | Pipes | 9.1% | 6.5% | Free | Free |
| 6810.91 | Prefabricated structural components for building or civil engineering | 6.3-7.5% | Free-4.5% | Free | Free |
| 6810.99 | Other | 7.5% | Free | Free | Free |

Sources: Customs Tariff, effective January 1995, Revenue Canada; Harmonized Tariff Schedule of the United States, 1995.

TABLE 1. CANADA, CEMENT PRODUCTION AND TRADE, 1992-94

| Item No. | 1992 | | 1993 | | 1994p | |
|---|------------|---------|-----------|---------|------------|---------|
| | (tonnes) | (\$000) | (tonnes) | (\$000) | (tonnes) | (\$000) |
| PRODUCTION¹ (all forms) | | | | | | |
| Ontario | 3 789 125 | 269 861 | 3 446 593 | 243 863 | 3 905 138 | 289 294 |
| Quebec | 1 909 264 | 129 662 | 2 343 453 | 138 047 | 2 530 000 | 146 482 |
| Alberta | x | x | x | x | x | x |
| British Columbia | 1 336 304 | 119 313 | 1 522 436 | 139 102 | 1 724 985 | 165 016 |
| Manitoba | x | x | x | x | x | x |
| Nova Scotia | x | x | x | x | x | x |
| Saskatchewan | x | x | x | x | x | x |
| Newfoundland | x | x | x | x | x | x |
| Total | 8 593 399r | 682 422 | 9 393 581 | 724 091 | 10 518 097 | 841 704 |
| IMPORTS | | | | | | |
| 2523.10 Cement clinker | | | | | | |
| United States | 2 458 | 177 | 3 709 | 481 | 855 | 136 |
| Colombia | 9 953 | 321 | - | - | - | - |
| Total | 12 411 | 499 | 3 709 | 481 | 855 | 136 |
| 2523.21 Portland cement, white, whether or not artificially coloured | | | | | | |
| United States | 9 875 | 1 543 | 9 830 | 1 647 | 8 055 | 1 232 |
| Japan | 306 | 53 | 472 | 90 | 522 | 89 |
| Spain | - | - | - | - | 177 | 32 |
| Italy | - | - | - | - | 210 | 26 |
| United Kingdom | - | - | - | - | 15 | 2 |
| Other countries | 130 | 24 | - | - | 18 | 2 |
| Total | 10 311 | 1 620 | 10 302 | 1 737 | 8 997 | 1 386 |
| 2523.29 Portland cement, n.e.s. | | | | | | |
| United States | 500 267 | 29 313 | 486 109 | 31 355 | 471 837 | 31 790 |
| France | - | - | 145 | 17 | 279 | 33 |
| Germany | 340 | 40 | 8 | ... | 222 | 26 |
| United Kingdom | - | - | - | - | 863 | 25 |
| Other countries | 5 689 | 442 | 205 | 24 | 366 | 19 |
| Total | 506 296 | 29 796 | 486 467 | 31 397 | 473 567 | 31 896 |
| 2523.30 Aluminous cement | | | | | | |
| United States | 9 714 | 4 279 | 10 499 | 4 730 | 12 970 | 6 204 |
| United Kingdom | - | - | - | - | 35 | 23 |
| South Africa | 37 | 20 | - | - | 27 | 20 |
| France | - | - | 20 | 3 | - | - |
| Total | 9 751 | 4 299 | 10 519 | 4 734 | 13 032 | 6 248 |
| 2523.90 Hydraulic cement, n.e.s. | | | | | | |
| United States | 31 376 | 3 871 | 27 882 | 3 984 | 49 881 | 5 498 |
| United Kingdom | 720 | 143 | 1 414 | 154 | 1 306 | 124 |
| Belgium | 136 | 14 | 300 | 29 | 286 | 32 |
| Germany | 21 | 5 | 51 | 1 | 118 | 29 |
| Japan | - | - | - | - | 90 | 23 |
| Other countries | 165 | 37 | 413 | 65 | 261 | 25 |
| Total | 32 418 | 4 072 | 30 060 | 4 235 | 51 942 | 5 734 |
| 6810.11 Building blocks and bricks of cement, concrete or artificial stone | | | | | | |
| United States | .. | 4 110 | .. | 3 810 | .. | 2 877 |
| Other countries | - | - | - | - | .. | 11 |
| Total | .. | 4 110 | .. | 3 810 | .. | 2 888 |
| 6810.19 Tiles, flagstones and similar articles of cement/concrete or artificial stone | | | | | | |
| United States | .. | 7 370r | .. | 9 276 | .. | 9 146 |
| Italy | .. | 1 182 | .. | 1 190 | .. | 582 |
| Mexico | .. | 185 | .. | 425 | .. | 488 |
| Spain | .. | 82 | .. | 181 | .. | 85 |
| Portugal | .. | 162 | .. | 47 | .. | 19 |
| Netherlands | - | - | .. | 5 | .. | 18 |
| People's Republic of China | .. | 20r | .. | 31 | .. | 12 |
| Other countries | .. | 54r | .. | 96 | .. | 29 |
| Total | .. | 9 055 | .. | 11 251 | .. | 10 379 |

TABLE 1 (cont'd)

| Item No. | 1992 | | 1993 | | 1994p | |
|-------------------------|--|----------|-----------|---------|-----------|---------|
| | (tonnes) | (\$000) | (tonnes) | (\$000) | (tonnes) | (\$000) |
| IMPORTS (cont'd) | | | | | | |
| 6810.20 | Pipes of cement or concrete | | | | | |
| | United States | | | | | |
| | .. | 16 | .. | 21 | .. | 16 |
| | Total | | | | | |
| | .. | 16 | .. | 21 | .. | 16 |
| 6810.91 | Prefabricated structural components of buildings, etc., of cement/concrete, etc. | | | | | |
| | United States | | | | | |
| | .. | 4 853 | .. | 2 997 | .. | 3 360 |
| | United Kingdom | | | | | |
| | .. | 112 | .. | 67 | .. | 156 |
| | France | | | | | |
| | - | - | .. | 7 | .. | 10 |
| | Netherlands | | | | | |
| | .. | 4 | .. | 4 | .. | 3 |
| | Germany | | | | | |
| | - | - | - | - | .. | ... |
| | Italy | | | | | |
| | - | - | .. | 7 | - | - |
| | Total | | | | | |
| | .. | 4 969 | .. | 3 083 | .. | 3 530 |
| 6810.99 | Articles of cement, of concrete or of artificial stone, n.e.s. | | | | | |
| | United States | | | | | |
| | .. | 8 191r | .. | 10 185 | .. | 10 950 |
| | United Kingdom | | | | | |
| | .. | 92 | .. | 628 | .. | 235 |
| | Italy | | | | | |
| | .. | 91 | .. | 123 | .. | 118 |
| | Mexico | | | | | |
| | .. | 340 | .. | 336 | .. | 95 |
| | Other countries | | | | | |
| | .. | 148r | .. | 121 | .. | 187 |
| | Total | | | | | |
| | .. | 8 862 | .. | 11 393 | .. | 11 585 |
| EXPORTS | | | | | | |
| 2523.10 | Cement clinker | | | | | |
| | United States | | | | | |
| | 988 348 | 34 256 | 882 935 | 36 686 | 939 923 | 45 049 |
| | Dominican Republic | | | | | |
| | - | - | - | - | 21 951 | 636 |
| | Belgium | | | | | |
| | - | - | - | - | 20 | 6 |
| | Total | | | | | |
| | 988 348 | 34 256 | 882 935 | 36 686 | 961 894 | 45 692 |
| 2523.21 | Portland cement, white, whether or not artificially coloured | | | | | |
| | United States | | | | | |
| | 107 399 | 13 970 | 123 150 | 17 971 | 98 114 | 13 380 |
| | Taiwan | | | | | |
| | - | - | - | - | 18 | 43 |
| | Korea, South | | | | | |
| | - | - | - | - | 17 | 7 |
| | St. Pierre and Miquelon | | | | | |
| | 138r | 15r | 131 | 15 | 52 | 5 |
| | Belgium | | | | | |
| | - | - | - | - | 20 | 2 |
| | France | | | | | |
| | 33 | 3 | 958 | 29 | - | - |
| | Total | | | | | |
| | 107 570r | 13 988r | 124 239 | 18 016 | 98 221 | 13 438 |
| 2523.29 | Portland cement, n.e.s. | | | | | |
| | United States | | | | | |
| | 1 845 814r | 103 117r | 2 619 514 | 142 780 | 3 255 636 | 182 618 |
| | St. Pierre and Miquelon | | | | | |
| | 46 | 4 | 282 | 35 | 152 | 22 |
| | Mexico | | | | | |
| | - | - | 79 399 | 2 300 | - | - |
| | France | | | | | |
| | 1 566 | 133 | 327 | 41 | - | - |
| | Kuwait | | | | | |
| | - | - | 1 | 2 | - | - |
| | Other countries | | | | | |
| | 322 | 54 | 10 | ... | ... | ... |
| | Total | | | | | |
| | 1 847 748r | 103 310r | 2 699 533 | 145 161 | 3 255 788 | 182 641 |
| 2523.30 | Aluminous cement | | | | | |
| | United States | | | | | |
| | 10 | 3 | 90 | 3 | - | - |
| | Total | | | | | |
| | 10 | 3 | 90 | 3 | - | - |
| 2523.90 | Hydraulic cement, n.e.s. | | | | | |
| | United States | | | | | |
| | 17 890 | 2 032 | 7 110 | 1 339 | 674 | 413 |
| | Taiwan | | | | | |
| | - | - | 34 | 33 | 169 | 47 |
| | Singapore | | | | | |
| | - | - | - | - | 44 | 26 |
| | Belgium | | | | | |
| | - | - | 39 | 8 | 100 | 24 |
| | Other countries | | | | | |
| | 47 | 18 | 505 | 150 | 133 | 79 |
| | Total | | | | | |
| | 17 937 | 2 050 | 7 688 | 1 530 | 1 120 | 589 |
| 6810.11 | Building blocks and bricks of cement, concrete or artificial stone | | | | | |
| | United States | | | | | |
| | .. | 3 489 | .. | 7 011 | .. | 9 240 |
| | Japan | | | | | |
| | .. | 85 | - | - | .. | 340 |
| | France | | | | | |
| | .. | 2 | - | - | .. | 3 |
| | Other countries | | | | | |
| | .. | 2 | .. | 41 | - | - |
| | Total | | | | | |
| | .. | 3 580 | .. | 7 052 | .. | 9 584 |

TABLE 1 (cont'd)

| Item No. | 1992 | | 1993 | | 1994 ^P | |
|-------------------------|--|------------------------|-----------|-----------|-------------------|---------|
| | (tonnes) | (\$000) | (tonnes) | (\$000) | (tonnes) | (\$000) |
| EXPORTS (cont'd) | | | | | | |
| 6810.19 | Tiles, flagstones and similar articles of cement/concrete or artificial stone | | | | | |
| | United States | .. 3 227 | .. 4 822 | .. 8 786 | | |
| | United Kingdom | - | - | - | - | 81 |
| | Czech Republic | - | - | - | - | 52 |
| | Bermuda | - | - | - | - | 44 |
| | Costa Rica | - | - | - | - | 13 |
| | Other countries | .. 19 | .. 36 | .. 12 | | |
| | Total | .. 3 246 | .. 4 859 | .. 8 988 | | |
| 6810.20 | Pipes of cement or concrete | | | | | |
| | United States | .. 110 | .. 249 | .. 1 331 | | |
| | Total | .. 110 | .. 249 | .. 1 331 | | |
| 6810.91 | Prefabricated structural components of buildings, etc., of cement/concrete, etc. | | | | | |
| | United States | .. 21 904 ^r | .. 31 672 | .. 46 360 | | |
| | United Kingdom | .. 1 082 | .. 36 | .. 2 156 | | |
| | People's Republic of China | - | .. 442 | .. 313 | | |
| | Taiwan | .. 59 | .. 38 | .. 306 | | |
| | Chile | - | - | .. 262 | | |
| | Other countries | .. 779 | .. 282 | .. 198 | | |
| | Total | .. 23 824 ^r | .. 32 470 | .. 49 595 | | |
| 6810.99 | Articles of cement, of concrete or of artificial stone, n.e.s. | | | | | |
| | United States | .. 8 775 | .. 12 766 | .. 15 715 | | |
| | Estonia | - | .. 26 | .. 20 | | |
| | Czech Republic | - | - | .. 12 | | |
| | Saint Lucia | - | - | .. 5 | | |
| | Other countries | .. 16 | .. 115 | - | | |
| | Total | .. 8 791 | .. 12 908 | .. 15 753 | | |

Sources: Natural Resources Canada; Statistics Canada.

- Nil; .. Not available; . . . Amount too small to be expressed; n.e.s. Not elsewhere specified; ^P Preliminary; ^r Revised; ^x Confidential.

1 Producers' shipments plus quantities used by producers.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CEMENT PLANTS, APPROXIMATE ANNUAL GRINDING CAPACITY, END OF 1993

| Company | Plant | Wet (W) Dry (D) Preheater (x) Precalciner (c) | Fuel (Coal, Oil, Gas, Waste) | No. of Kilns | Grinding Capacity | Clinker Capacity |
|---|---------------------|--|------------------------------------|-----------------|----------------------|---------------------|
| (000 t/y) | | | | | | |
| ATLANTIC REGION | | | | | | |
| Lafarge Canada Inc. | Brookfield, N.S. | D | C,O,Wa | 2 | 600 | 527 ^a |
| North Star Cement Limited | Corner Brook, Nfld. | Dx | O,Wa | 1 | 245 | 152 |
| Subtotal, Atlantic region | | | | 3 | 845 | 679 |
| QUEBEC | | | | | | |
| Lafarge Canada Inc. | Montréal East | | – | | 328 | – |
| Lafarge Canada Inc. | St. Constant | D | C,O,G,Wa | 2 | 1 000 | 991 |
| Ciment Québec Inc. | St. Basile | W,Dc | O,G,C | 3 | 940 | 1 074 ^b |
| St. Lawrence Cement Inc. (Independent Cement Inc.) | Beauport | W | C, Wa | 2 | 700 | 611 |
| | Joliette | D | C,O | 4 | 1 200 | 991 ^a |
| Subtotal, Quebec region | | | | 11 | 4 168 | 3 667 |
| ONTARIO | | | | | | |
| Lafarge Canada Inc. | Woodstock | W | C,G | 2 | 570 | 546 ^a |
| | Bath | Dx | C,G | 1 | 1 000 | 1 045 |
| Federal White Cement Ltd. | Woodstock | D | C,O,G | 1 | 180 | 170 |
| ESSROC Canada Inc. | Picton | D,Dx | C,G | 2 | 927 | 1 124 |
| St. Lawrence Cement Inc. | Mississauga | W,Dc | C,Wa | 3 | 1 600 | 1 876 ^b |
| St. Marys Cement Company | Bowmanville | Dc | C | 1 | 1 300 | 1 550 |
| | St. Marys | Dx | C,G | 1 | 735 | 645 |
| Subtotal, Ontario region | | | | 11 | 6 312 | 6 956 |
| PRAIRIES REGION | | | | | | |
| Lafarge Canada Inc. | Fort Whyte, Man. | | – | – | 474 | – |
| | Exshaw, Alta. | D,Dc | G | 2 | 900 | 1 029 |
| Inland Cement Limited | Winnipeg, Man. | W | – | 1 | 430 | inactive |
| (S.A. Cimenteries CBR) | Regina, Sask. | D | – | 1 | 400 | inactive |
| | Edmonton, Alta. | Dc | G | 1 | 1 500 | 726 |
| Subtotal, Prairies region | | | | 5 | 3 704 | 1 755 |
| BRITISH COLUMBIA | | | | | | |
| Lafarge Canada Inc. | Kamloops | D | C | 1 | 300 | 194 |
| | Richmond | W | C,G | 2 | 515 | 474 |
| Tilbury Cement Limited (S.A. Cimenteries CBR) | Delta | Dx | C,G | 1 | 980 | 1 040 |
| Subtotal, B.C. region | | | | 4 | 1 795 | 1 708 |
| Total Canada (9 companies) | | | | 34 | 16 824 | 14 765 |

Source: Market and Economic Research Department, Portland Cement Association.

– Nil.

^a One kiln inactive. ^b Two kilns inactive.

Note: Total active kiln capacity is approximately 13.1 Mt/y.

TABLE 3. CANADA, CEMENT PLANTS, KILNS AND CAPACITY UTILIZATION, 1979-94

| | Clinker-Producing Plants | Kilns | Approximate Cement Grinding Capacity ¹ | Portland and Masonry Cement Production ² | Clinker Exports | Approximate Total Production ³ | Capacity Utilization |
|-------------------|--------------------------|-----------------|---|---|-----------------|---|----------------------|
| | | | (t/y) | (t) | | (t) | (t) |
| 1979 | 24 | 51 | 15 985 000 | 11 765 248 | 1 530 537 | 13 295 785 | 83 |
| 1980 | 23 | 47 | 16 363 000 | 10 274 000 | 726 087 | 11 000 087 | 67 |
| 1981 | 23 | 48 | 16 771 000 | 10 145 000 | 524 006 | 10 669 006 | 64 |
| 1982 | 23 | 48 | 16 771 000 | 8 418 000 | 290 329 | 8 708 329 | 50 |
| 1983 | 23 | 49 | 17 900 000 | 7 870 878 | 404 793 | 8 275 671 | 46 |
| 1984 | 23 | 49 | 17 900 000 | 9 387 466 | 440 297 | 9 827 763 | 55 |
| 1985 | 23 | 49 | 17 900 000 | 10 192 442 | 676 596 | 10 869 038 | 61 |
| 1986 | 23 | 49 | 17 900 000 | 10 611 223 | 324 000 | 10 935 223 | 61 |
| 1987 | 20 | 40 | 16 600 000 | 12 603 164 | 767 338 | 13 370 502 | 81 |
| 1988 | 20 | 40 | 15 506 000 | 12 349 873 | 331 796 | 12 681 669 | 82 |
| 1989 | 20 | 38 | 15 546 000 | 12 590 637 | 178 491 | 12 769 128 | 82 |
| 1990 | 20 | 38 | 16 439 000 | 11 745 152 | 460 075 | 12 205 227 | 74 |
| 1991 | 20 | 34 | 16 262 000 | 9 372 219 | 544 870 | 9 917 089 | 61 |
| 1992 | 18 | 34 ^a | 16 800 000 | 8 593 399 | 988 348 | 9 581 747 | 57 |
| 1993 | 18 | 34 ^a | 16 800 000 | 9 393 581 | 882 935 | 10 276 516 | 61 |
| 1994 ^p | 18 | 34 ^a | 16 800 000 | 10 518 097 | 961 894 | 11 479 991 | 68 |

Sources: Statistics Canada; U.S. Bureau of Mines; Portland Cement Association (PCA).

^p Preliminary.

^a Includes inactive kilns.

¹ Includes plants that grind only. ² Producers' shipments and amounts used by producers. ³ Cement shipments plus clinker exports.

TABLE 4. CANADA, HOUSE CONSTRUCTION, BY PROVINCE, 1993 AND 1994

| | Starts | | | Completions | | | Under Construction | | |
|------------------------------|---------|---------|---------|-------------|---------|---------|--------------------|--------|---------|
| | 1993 | 1994 | % Diff. | 1993 | 1994 | % Diff. | 1993 | 1994 | % Diff. |
| Newfoundland | 2 405 | 2 243 | | 2 457 | 2 590 | | 2 378 | 1 991 | |
| Prince Edward Island | 645 | 669 | | 674 | 742 | | 296 | 207 | |
| Nova Scotia | 4 282 | 4 748 | | 4 545 | 4 920 | | 2 298 | 2 038 | |
| New Brunswick | 3 693 | 3 203 | | 3 631 | 3 696 | | 1 676 | 1 202 | |
| Subtotal, Atlantic provinces | 11 025 | 10 863 | -1 | 11 307 | 11 948 | +6 | 6 648 | 5 438 | -18 |
| Quebec | 34 015 | 34 154 | - | 34 859 | 36 345 | +4 | 9 811 | 7 730 | -21 |
| Ontario | 45 140 | 46 645 | +3 | 51 130 | 49 106 | -4 | 25 047 | 22 444 | -10 |
| Manitoba | 2 425 | 3 197 | | 2 572 | 2 996 | | 1 002 | 1 206 | |
| Saskatchewan | 1 880 | 2 098 | | 2 020 | 1 851 | | 710 | 836 | |
| Alberta | 18 151 | 17 692 | | 17 859 | 18 671 | | 7 595 | 6 703 | |
| Subtotal, Prairie provinces | 22 456 | 22 987 | +2 | 22 451 | 23 518 | +5 | 9 307 | 8 745 | -6 |
| British Columbia | 42 807 | 39 408 | -8 | 42 047 | 41 168 | -2 | 28 998 | 27 205 | -6 |
| Total Canada | 155 443 | 154 057 | -1 | 161 794 | 162 085 | - | 79 761 | 71 562 | -10 |

Source: Canada Mortgage and Housing Corporation.

TABLE 5. CANADA, VALUE OF CONSTRUCTION BY PROVINCE,¹ 1991-93

| | 1991 | | | 1992 | | | 1993 | | |
|--|---------------------------------------|--|--------|---------------------------------------|--|--------|---------------------------------------|--|--------|
| | Building Construction ² | Engineering Construction ² | Total | Building Construction ² | Engineering Construction ² | Total | Building Construction ² | Engineering Construction ² | Total |
| | (\$ millions) | | | | | | | | |
| Newfoundland | 906 | 871 | 1 777 | 824 | 1 048 | 1 873 | 836 | 1 438 | 2 275 |
| Nova Scotia | 1 544 | 955 | 2 499 | 1 460 | 696 | 2 157 | 1 526 | 602 | 2 129 |
| New Brunswick | 1 150 | 837 | 1 987 | 1 160 | 1 057 | 2 217 | 1 120 | 712 | 1 832 |
| Prince Edward Island | 257 | 99 | 356 | 242 | 106 | 348 | 227 | 98 | 326 |
| Quebec | 14 032 | 6 369 | 20 401 | 13 106 | 7 027 | 20 133 | 13 261 | 7 323 | 20 584 |
| Ontario | 24 980 | 8 978 | 33 958 | 23 132 | 8 941 | 32 074 | 23 473 | 9 502 | 32 974 |
| Manitoba | 1 500 | 1 226 | 2 725 | 1 517 | 1 200 | 2 717 | 1 578 | 1 135 | 2 713 |
| Saskatchewan | 1 269 | 2 254 | 3 523 | 1 306 | 1 754 | 3 060 | 1 286 | 1 449 | 2 735 |
| Alberta | 5 577 | 7 170 | 12 747 | 6 204 | 5 995 | 12 199 | 6 030 | 6 348 | 12 378 |
| British Columbia, Yukon and Northwest Territories | 9 684 | 4 497 | 14 182 | 10 995 | 4 088 | 15 083 | 11 978 | 4 488 | 16 465 |
| Total Canada | 60 901 | 33 254 | 94 155 | 59 948 | 31 913 | 91 861 | 61 315 | 33 096 | 94 411 |

Sources: Natural Resources Canada; Statistics Canada, Catalogue no. 64-201 discontinued, to be replaced with Catalogue no. 61-223.

¹ Actual expenditures 1991, preliminary 1992, intentions 1993. ² Includes total value of new and repair work purchased.

Note: Numbers may not add to totals due to rounding.

TABLE 6. CANADA, VALUE OF CONSTRUCTION BY TYPE,¹ 1991-93

| | 1991 | 1992 | 1993 |
|---|---------------|--------|--------|
| | (\$ millions) | | |
| BUILDING CONSTRUCTION² | | | |
| Residential | 34 768 | 37 315 | 38 432 |
| Industrial | 3 642 | 2 777 | 2 594 |
| Commercial | 13 436 | 11 185 | 11 146 |
| Institutional | 5 845 | 5 964 | 6 205 |
| Other building | 3 210 | 2 707 | 2 937 |
| Subtotal | 60 901 | 59 948 | 61 315 |
| ENGINEERING CONSTRUCTION² | | | |
| Marine | 553 | 556 | 576 |
| Highways, airport runways | 6 334 | 6 374 | 6 800 |
| Waterworks, sewage systems | 2 660 | 2 701 | 3 026 |
| Dams, irrigation | 399 | 306 | 334 |
| Electric power | 6 859 | 7 867 | 7 645 |
| Railway, telephones | 3 135 | 3 053 | 3 070 |
| Gas and oil facilities | 9 629 | 7 790 | 8 081 |
| Other engineering | 3 686 | 3 267 | 3 565 |
| Subtotal | 33 254 | 31 913 | 33 096 |
| Total construction | 94 154 | 91 861 | 94 411 |

Sources: Natural Resources Canada; Statistics Canada, Catalogue no. 64-201 discontinued, to be replaced with Catalogue no. 61-223.

¹ Actual expenditures 1991, preliminary 1992, intentions 1993. ² Includes total value of new and repair work purchased.

Note: Numbers may not add to totals due to rounding.

TABLE 7. WORLD PRODUCTION OF CEMENT, 1993 AND 1994

| | 1993 | 1994 ^e |
|----------------------------|--------------|-------------------|
| | (000 tonnes) | |
| People's Republic of China | 356 000 | 360 000 |
| Japan | 87 000 | 90 000 |
| United States | 76 000 | 81 000 |
| Russia, Republic of | 60 000 | 62 000 |
| India | 52 000 | 55 000 |
| Korea, Republic of | 47 000 | 50 000 |
| Italy | 42 000 | 45 000 |
| Germany | 37 000 | 40 000 |
| Brazil | 28 000 | 29 000 |
| France | 22 000 | 24 000 |
| Canada | 9 400 | 10 500 |
| Other | 460 600 | 495 500 |
| Total world | 1 277 000 | 1 342 000 |

Sources: Natural Resources Canada; U.S. Bureau of Mines' Mineral Commodity Summaries, January 1995.

^e Estimated.