Cement

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Shipments of cement in 1996 were estimated to be 11.1 Mt valued at $931.5 million, an increase of nearly 6% in volume compared to 1995, based on preliminary figures. The demand for cement in Canada has been relatively stronger in Ontario and the Prairies region, and has moderated in the Atlantic region as engineering-related expenditures have decreased at the Hibernia project and at the fixed-link crossing to Prince Edward Island. Overall construction activity has increased mainly because of an increase in housing starts. The $6 billion cost-shared program for infrastructure renewal, supported by all three levels of government, has contributed to total activity. Reported kiln capacity in 1995 was about 15.0 Mt, with about 14.1 Mt active, according to the most recent figures available.

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).

THE CANADIAN INDUSTRY

The Canadian cement industry is diversified and mainly integrated with the primary construction materials and products sectors. Restructuring during recent years has tended to result in a decentralization of operations and greater foreign control, which is now estimated to account for about 80% of the industry's capacity. Major international companies include: Holderbank Financière Glaris Ltd., headquartered in Zurich, which controls St. Lawrence Cement Inc.; Lafarge Corporation (part of the Lafarge Coppée Group, headquartered in Paris), which indirectly controls Lafarge Canada Inc.; Heidelberger Zement AG of Germany, which in 1995 purchased controlling interests in both Inland Cement Limited and Tilbury Cement Limited from S.A. Cimenteries CBR; and Italcementi S.p.A., which controls Société des Ciments Français (SCF) of France, which in turn owns both Essroc Canada Inc. and Ciment Québec Inc. SCF now uses the name "ESSROC" to identify all of its holdings in Canada and the United States. (Accordingly, ESSROC Canada Inc. now operates the former Lake Ontario Cement Limited plant.)

Lafarge Corporation continued with construction of a new $95 million cement plant on the site of its Richmond, British Columbia operation. The new plant is scheduled for completion in 1998 and will result in production of about 1 Mt/y, an increase in capacity of 450 000 t/y compared to the capacity of the older plant. Its overall capital costs will be lower than a "greenfield" development because existing sites and substantial equipment and infrastructure are already in place.

St. Lawrence Cement Inc. announced plans to reduce its operations at Beauport, Quebec, and to close that plant in 1997. Because of relatively weak construction activity, the company will only operate its relatively large and more modern plant in Joliette, Quebec.

Cimbec Canada Inc. continued with plans for a 1-Mt/y cement plant at Port Daniel on the south-eastern side of the Gaspé Peninsula, Quebec. Entrepreneurs have been encouraged mainly by the proximity of high-quality limestone situated near water and rail transportation. Prospective partners continue to be sought to participate in comprehensive feasibility studies.

Lafarge Canada Inc. closed plants in Winnipeg and Montréal, and Inland Cement Limited closed plants in Winnipeg and Regina. There are now no "grinding only" plants operating in Canada. Clinker-producing and finish-grinding capacities of cement plants, on a company-by-company basis, are listed in Table 2. Clinker production is more indicative of ultimate cement production capacity because clinker can be stockpiled for later use or sale. Overall output of the cement industry is best represented by total cement shipments plus clinker exports, as shown in Table 3. The average kiln capacity in Canada has increased from about 305 000 t/y in 1980 to 468 000 t/y in 1995; the average kiln age is reported to be about 26 years.

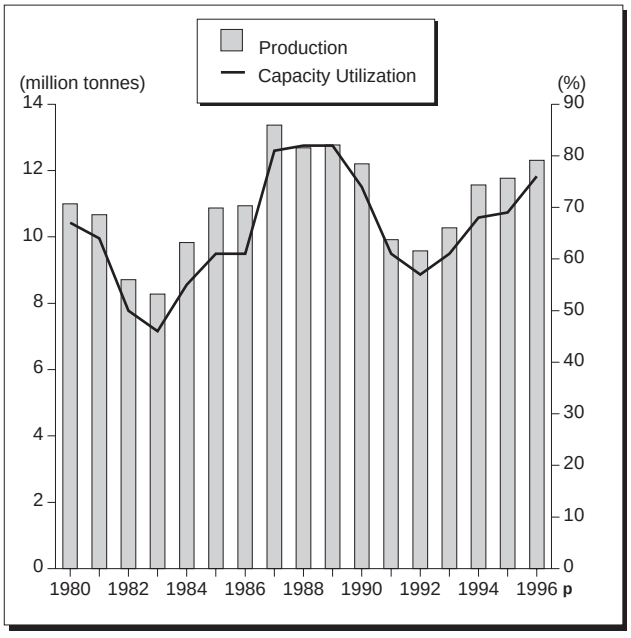
In **Atlantic Canada**, two cement plants obtain raw materials from on site or nearby. These plants account for about 5% of Canada's total clinker-producing capacity. Nova Scotia and Newfoundland are the only producers of cement in the region since Lafarge Canada Inc. retired its New Brunswick plant in 1988.

In **Quebec**, four clinker-producing plants account for about 24% 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. The expansion of stone aggregate operations and raw material reserves continues to be a major company objective.

In **Ontario**, clinker-producing plants account for about 47% of Canadian capacity. St. Marys Cement Company, St. Lawrence Cement, and Lafarge Canada Inc. are the largest producers. 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 the states of New York and Michigan.

In **western Canada**, two companies, Cimenteries CBR/Heidelberger and Lafarge Canada Inc., operate two clinker-producing plants in the Prairie provinces and three in British Columbia. Western Canada accounts for about 24% of clinker-producing capacity, roughly in proportion to its share of total Canadian consumption. Cimenteries CBR/Heidelberger affiliate Inland Cement Limited continues to ship cement from its relatively large Edmonton operation to Regina and Winnipeg 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 obtained 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 nearby reserves.

Figure 1
Canadian Cement Production, 1980-96



Sources: Statistics Canada; Portland Cement Association.
Note: Production includes clinker exports.

WORLD DEVELOPMENTS

Multi-national 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 1995 was 1421 Mt, according to estimates by the U.S. Geological Survey. China ranked number one leading all countries with 446 Mt, followed by Japan with 90 Mt and the United States with 78 Mt.

The 32nd International Cement Seminar held in New Orleans, Louisiana, attracted more than 800 delegates from around the world. Some production and environmental/trade-related subjects were discussed, including: 1) important new investments directed toward new North American capacity; 2) the possible influences of climate change objectives on the U.S. cement industry; 3) trends in the use of value-added supplementary cementing materials (SCMs) as an economical means of producing blended cements for "high performance" concrete; and 4) the benefits associated with using industrial waste as a fuel in cement kilns.

In addition to numerous plant expansions and modernization projects in the United States, expansions

continued in Latin America, China and Eastern Europe. Florida Rock Industries proceeded with plans to construct a new state-of-the-art 700 000-t/y plant in Gainesville, Florida.

The U.S. anti-dumping order against grey Portland cement clinker from Mexico remained in effect in 1996. In accordance with earlier rulings, Cemex (Cementos Mexicanos, S.A.), Mexico's dominant cement producer and the largest cement producer in North America, must continue to tender cash deposits based on related customs values of imports.

CONSUMPTION AND TRADE

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 in 1996 were about 10.7 Mt, or 12% of apparent consumption based on estimates.

TECHNOLOGY

Energy conservation programs by the Canadian cement industry have reduced energy consumption per unit of production by about 24% since 1974. Although the number of kilns has decreased, their individual capacities have increased, and the more efficient dry-process plants will account for more than 95% of total clinker capacity when Lafarge Canada's Richmond plant becomes fully operational in the year 2000. 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 towards coal and/or coke. In 1995, of 18 clinker-producing plants, 10 reported using coal and/or coke as their primary fuel. Eight plants reported using waste as an alternative or supplemental fuel, according to the Canadian Portland Cement Association (CPCA). Waste was not used as a primary fuel. In 1995, the Canadian cement industry consumed, on average, 4729 megajoules per tonne of production, of which 3853 megajoules (81%) 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 30-40% 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 accepted by all jurisdictions 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.

Most research and development (R&D) activities concerning cement, as well as concrete, are sponsored by private companies, associations and departments of highways. However, the Canada Centre for Mineral and Energy Technology (CANMET) is involved with related R&D, and plays important technical and coordinating roles in several areas. This organization continued its Advanced Concrete Program, which contributes to infrastructure durability, waste reduction and energy saving.

Based on an agreement signed in 1996 with the Electric Power Research Institute (EPRI) of Palo Alto, California, CANMET will proceed with a major cost-shared contract on blended cements spanning two and a half years. 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.

In 1996, CANMET, along with the American Concrete Institute (ACI), the National Research Council of Canada (NRC), the University of New Brunswick, and the Canadian Portland Cement Association (CPCA), sponsored the Third CANMET/ACI International Conference on Concrete in a Marine Environment, which was held in New Brunswick. The main theme was related to concrete technology and the durability of marine structures, including those made with various cementitious systems. More that 100 delegates from 12 countries participated, with a highlight being a field visit to a marine exposure facility in Maine that is available to CANMET for the long-term monitoring of test specimens.

In 1996, CANMET also co-sponsored a major conference relating to high-performance concrete in Florianopolis, Brazil. Discussions concerning joint programs related mainly to problems concerning alkali-aggregate reactivity and long-term performance.

Also in 1996, CANMET, the ACI and the NRC sponsored the CANMET/ACI Three-Day Intensive Course On Fly Ash, Slag, Silica Fume, Other Pozzolanic Materials and Superplasticizers in Concrete in Ottawa, Ontario. A related CANMET and Environment Canada two-day workshop, held in Calgary, Alberta, focussed on technology transfer.

In 1997, workshops and conferences sponsored by the Committee for the Organization of CANMET/ACI Conferences, as well as others, will include the following: 1) the Two-Day CANMET/NRC/ACI International Workshop on Developments in Repair

Materials and Strategies for the Rehabilitation of Infrastructure and Buildings to be held in Toronto, Ontario in February; 2) the Fourth CANMET/ACI International Conference on Durability of Concrete, to be held in Sydney, Australia in August; 3) the Third CANMET/ACI International Symposium on Advances in Concrete Technology, to be held in Auckland, New Zealand in August; and 4) the Fifth CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete to be held in Venice, Italy in October. In 1998, planned conferences by the same committee include the Sixth CANMET/ACI International Conference on Fly Ash, Silica Fume, Slag and Natural Pozzolans in Concrete to be held in May/June 1998 in Bangkok, Thailand, and the CANMET/ACI/JCI Fourth International Conference on Recent Advances in Concrete Technology to be held in June 1998 in Tokushima, Japan.

Natural Resources Canada, mainly in collaboration with the Canadian Industry Program for Energy Conservation (CIPEC), continues to develop long-term strategies relating to some major energy-consuming sectors, including cement, lime and silica/glass.

OUTLOOK

Shipments of cement in 1997 are expected to increase based on the trend toward lower interest rates, continued strength in domestic housing construction, and a stable demand for exports. If overall demand in North America 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.

In 1996, housing starts increased to about 125 000, according to the Canada Mortgage and Housing Corporation. By way of comparison, housing starts were 155 300 in 1994, 112 000 in 1995, and are expected to be about 135 000 in 1997. 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 $6 billion cost-shared program for infrastructure renewal, which has been extended from 1994/95 to 1998/99.

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 destined for disposal as landfill. Under certain circumstances using RDF, reductions in requirements for traditional fuels have been predicted to be as high as 20-25%.

The use of supplementary cements incorporating fly ash, silica fume or other pozzolans, and classified accordingly as various types of blended cements, is expected to become more important in modern cement and concrete practice.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 70. (2) Information in this review was current as of February 1, 1997.

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
	Portland cement:				
2523.21	White cement, whether or not artificially coloured	65.27¢/t	Free	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%	Free	Free	Free
6810.19	Other	6.4%	Free	Free	Free
6810.91	Prefabricated structural components for building or civil engineering	5.4-6.4%	Free-2%	Free	Free
6810.99	Other				
6810.99.10	Pipes	3.9%	1%	Free	Free
6810.99.90	Other	6.4%	Free	Free	Free

Sources: Customs Tariff, effective January 1997, Revenue Canada; Harmonized Tariff Schedule of the United States, 1997.

TABLE 1. CANADA, CEMENT PRODUCTION AND TRADE, 1994-96

Item No.		1994		1995		1996p	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
PRODUCTION[1] (all forms)							
	Ontario	4 088 557	291 261	4 182 883	294 485	4 531 840	327 116
	Alberta	x	x	x	x	x	x
	Quebec	2 840 138	182 246	2 525 799	172 687	2 475 200	187 474
	British Columbia	1 653 748	159 027	1 668 757	162 058	1 807 973	180 015
	Nova Scotia	x	x	x	x	x	x
	Newfoundland	x	x	x	x	x	x
	Total	10 584 414	838 129	10 440 329	842 492	11 050 000	931 499
IMPORTS							
2523.10	Cement clinker						
	United States	855	136	29	3	41	2
	Total	855	136	29	3	41	2
2523.21	Portland cement, white, whether or not artificially coloured						
	United States	8 055	1 232	3 645	715	3 834	670
	Denmark	9	2	46	9	67	18
	Germany	9	2	2	...	29	5
	Japan	522	90	505	23	–	–
	Other countries	402	61	–	–	–	–
	Total	8 997	1 387	4 198	747	3 930	693
2523.29	Portland cement, n.e.s.						
	United States	499 681	33 902	543 624	39 966	569 570	41 945
	Belgium	–	–	250	31	3 065	1 610
	Canada	352	19	1 543	84	2 203	123
	United Kingdom	863	26	128	15	126	15
	Germany	222	27	40	5	77	9
	Other countries	293	34	349	42	62	7
	Total	501 411	34 008	545 934	40 143	575 103	43 709
2523.30	Aluminous cement						
	United States	12 970	6 204	12 546	6 263	10 391	5 434
	France	–	–	–	–	84	66
	People's Republic of China	–	–	–	–	57	28
	South Africa	27	20	40	22	20	21
	United Kingdom	35	24	140	68	–	–
	Total	13 032	6 248	12 726	6 353	10 552	5 549
2523.90	Hydraulic cement, n.e.s.						
	United States	22 037	3 387	25 860	3 724	37 232	5 043
	United Kingdom	1 306	124	7 656	445	1 329	343
	Colombia	106	10	515	58	2 020	203
	Japan	90	23	242	62	681	134
	France	137	11	45	11	444	115
	Belgium	286	33	4 670	1 327	–	–
	Other countries	136	34	1 064	84	377	91
	Total	24 098	3 622	40 052	5 711	42 083	5 929
6810.11	Building blocks and bricks of cement, concrete or artificial stone						
	United States	..	2 877	..	1 465	..	1 301
	Other countries	..	11	..	15	..	172
	Total	..	2 888	..	1 480	..	1 473
6810.19	Tiles, flagstones and similar articles of cement/concrete or artificial stone						
	United States	..	9 147	..	10 469	..	11 936
	Italy	..	582	..	529	..	1 058
	Mexico	..	489	..	207	..	252
	Germany	..	5	..	45	..	85
	People's Republic of China	..	12	..	–	..	57
	United Kingdom	..	6	..	33	..	56
	Spain	..	85	..	171	..	55
	Other countries	..	52	..	120	..	116
	Total	..	10 378	..	11 574	..	13 615

TABLE 1 (cont'd)

Item No.		1994		1995		1996p	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
IMPORTS (cont'd)							
6810.20	Pipes of cement or concrete						
	United States	..	17	..	1 284	–	–
	Total	..	17	..	1 284	–	–
6810.91	Prefabricated structural components of buildings, etc., of cement/concrete, etc.						
	United States	..	3 360	..	2 879	..	3 004
	United Kingdom	..	156	..	333	..	474
	Switzerland	–	–	–	–	..	23
	Mexico	–	–	–	–	..	20
	Other countries	..	15	..	64	..	–
	Total	..	3 531	..	3 276	..	3 521
6810.99	Articles of cement, of concrete or of artificial stone, n.e.s.						
	United States	..	10 951	..	10 328	..	11 895
	People's Republic of China	..	43	..	198	..	1 986
	Italy	..	119	..	350	..	422
	Germany	..	4	..	27	..	398
	United Kingdom	..	236	..	162	..	187
	Mexico	..	95	..	140	..	94
	Other countries	..	137	..	152	..	287
	Total	..	11 585	..	11 357	..	15 269
EXPORTS							
2523.10	Cement clinker						
	United States	959 053	45 728	1 329 489	62 580	1 252 863	72 324
	Belgium	20	6	–	–	–	–
	Dominican Republic	21 951	637	–	–	–	–
	St. Pierre and Miquelon	–	–	24	3	–	–
	Switzerland	–	–	35	10	–	–
	Total	981 022	46 371	1 329 548	62 593	1 252 863	72 324
2523.21	Portland cement, white, whether or not artificially coloured						
	United States	98 114	13 380	166 811	19 992	134 818	17 317
	Czech Republic	–	–	–	–	218	32
	St. Pierre and Miquelon	52	6	32	4	153	23
	Other countries	55	52	53	10	3	2
	Total	98 221	13 438	166 896	20 006	135 192	17 374
2523.29	Portland cement, n.e.s.						
	United States	3 255 636	182 618	3 359 225	199 433	3 953 140	259 010
	St. Pierre and Miquelon	152	23	868	121	1 035	180
	Belgium	–	–	40	9	60	13
	Other countries	–	–	76	22	56	27
	Total	3 255 788	182 641	3 360 209	199 585	3 954 291	259 230
2523.30	Aluminous cement						
	Philippines	–	–	–	–	172	6
	United States	–	–	7	6	–	–
	Spain	–	–	17	16	–	–
	Total	–	–	24	22	172	6
2523.90	Hydraulic cement, n.e.s.						
	United States	674	413	2 357	852	10 942	2 649
	Egypt	–	–	–	–	167	160
	Czech Republic	14	13	59	83	84	86
	St. Pierre and Miquelon	–	–	26	4	283	49
	Taiwan	169	47	101	107	–	–
	Hong Kong	21	11	96	97	12	7
	Other countries	242	105	390	265	255	173
	Total	1 120	589	3 029	1 408	11 743	3 124

TABLE 1 (cont'd)

Item No.		1994		1995		1996p	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
EXPORTS (cont'd)							
6810.11	Building blocks and bricks of cement, concrete or artificial stone						
	United States	. .	9 241	. .	11 035	. .	15 034
	United Arab Emirates	–	–	. .	402	. .	1 188
	Japan	. .	340	. .	273	. .	163
	France	. .	4	–	–	. .	81
	Other countries	. .	–	. .	44	. .	144
	Total	. .	9 585	. .	11 754	. .	16 610
6810.19	Tiles, flagstones and similar articles of cement/concrete or artificial stone						
	United States	. .	8 783	. .	14 091	. .	15 497
	Malaysia	–	–	–	–	. .	254
	Philippines	–	–	–	–	. .	89
	Taiwan	. .	3	. .	62	. .	37
	Japan	. .	4	. .	133	. .	29
	Other countries	. .	195	. .	134	. .	18
	Total	. .	8 985	. .	14 420	. .	15 924
6810.20	Pipes of cement or concrete						
	United States	. .	1 332	. .	505	–	–
	St. Pierre and Miquelon	–	–	. .	16	–	–
	Total	. .	1 332	. .	521	–	–
6810.91	Prefabricated structural components of buildings, etc., of cement/concrete, etc.						
	United States	. .	46 299	. .	73 926	. .	62 840
	United Kingdom	. .	2 157	. .	12	. .	120
	Taiwan	. .	306	–	–	. .	120
	Hong Kong	. .	–	–	–	. .	22
	Czech Republic	. .	–	–	–	. .	17
	Malaysia	. .	11	. .	322	–	–
	People's Republic of China	. .	314	–	–	–	–
	Other countries	. .	476	. .	138	. .	17
	Total	. .	49 563	. .	74 398	. .	63 136
6810.99	Articles of cement, of concrete or of artificial stone, n.e.s.						
	United States	. .	15 820	. .	16 212	. .	30 255
	Taiwan	–	–	–	–	. .	168
	Malaysia	–	–	–	–	. .	104
	Japan	–	–	. .	54	. .	76
	Other countries	. .	37	. .	41	. .	183
	Total	. .	15 857	. .	16 307	. .	30 786

Sources: Natural Resources Canada; Statistics Canada.
– Nil; **. .** Not available; **. . .** Amount too small to be expressed; n.e.s. Not elsewhere specified; **p** Preliminary; 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 1995

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	543
North Star Cement Limited	Corner Brook, Nfld.	Dx	O,Wa	1	245	153
Subtotal, Atlantic region				3	845	696
QUEBEC						
Lafarge Canada Inc.	St. Constant	D	O,G	2	1 100	990
Ciment Québec Inc.	St. Basile	W,Dc	O,G,C, Wa	3	940	1 077[a]
St. Lawrence Cement Inc.	Beauport	W	C, O,Wa	2	700	608
(Independent Cement Inc.)	Joliette	D	C,Wa	4	1 200	992
Subtotal, Quebec region				11	3 940	3 667
ONTARIO						
Lafarge Canada Inc.	Woodstock	W	C,G	2	610	538
	Bath	Dx	C,G	1	1 000	1 066
Federal White Cement Ltd.	Woodstock	D	O	1	185	182
ESSROC Canada Inc.	Picton	D,Dx	C,G	2	818	1 123
St. Lawrence Cement Inc.	Mississauga	W,Dc	C,O,Wa	3	1 969	1 899[a]
St. Marys Cement Company	Bowmanville	Dc	C	1	1 300	1 550
	St. Marys	Dx	C,Wa	1	800	651
Subtotal, Ontario region				11	6 682	7 009
PRAIRIE REGION						
Lafarge Canada Inc.	Exshaw, Alta.	D,Dc	G	2	1 400	1 123
Inland Cement Limited (Cimenteries CBR/Heidelberger)	Edmonton, Alta.	Dc	G	1	1 512	725
Subtotal, Prairie region				3	2 912	1 848
BRITISH COLUMBIA						
Lafarge Canada Inc.	Kamloops	D	C,G	1	300	212
	Richmond	W	C,G,Wa	2	478	503
Tilbury Cement Limited (Cimenteries CBR/Heidelberger)	Delta	Dx	C,G	1	1 000	1 040
Subtotal, B.C. region				4	1 778	1 755
Total Canada (9 companies)				32	16 157	14 975

Source: Market and Economic Research Department, Portland Cement Association.
– Nil.
[a] Two kilns inactive.
Note: Total active kiln capacity is approximately 14.1 Mt/y.

TABLE 3. CANADA, CEMENT PLANTS, KILNS AND CAPACITY UTILIZATION, 1980-96

	Clinker-Producing Plants	Kilns	Approximate Cement Grinding Capacity	Portland and Masonry Cement Production[1]	Clinker Exports	Approximate Total Production[2]	Capacity Utilization
			(t/y)	(t)	(t)	(t)	(%)
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	18	34[a]	17 000 000	10 584 414	981 024	11 565 438	68
1995	18	34[a]	17 000 000	10 440 329	1 329 548	11 769 877	69
1996[p]	18	32	16 157 000	11 050 000	1 252 863	12 302 863	76

Sources: Statistics Canada; Portland Cement Association.
[p] Preliminary.
[a] Includes inactive kilns.
[1] Producers' shipments and amounts used by producers. [2] Cement shipments plus clinker exports.

TABLE 4. CANADA, HOUSE CONSTRUCTION, BY PROVINCE, 1995 AND 1996

	Starts			Completions			Under Construction		
	1995	1996	% Diff.	1995	1996	% Diff.	1995	1996	% Diff.
Newfoundland	1 712	2 034		1 749	1 958		1 928	2 003	
Prince Edward Island	422	554		467	525		163	194	
Nova Scotia	4 168	4 059		4 170	4 062		1 980	1 944	
New Brunswick	2 300	2 722		2 465	2 591		1 003	1 131	
Subtotal, Atlantic provinces	8 602	9 369	+9	8 851	9 136	+3	5 074	5 272	+4
Quebec	21 885	23 220	+6	23 363	22 194	–5	5 986	6 784	+13
Ontario	35 818	43 062	+20	36 278	40 729	+12	21 947	24 447	+11
Manitoba	1 963	2 318		2 153	1 588		808	1 538	
Saskatchewan	1 702	2 438		1 711	1 910		818	1 314	
Alberta	13 906	16 665		13 373	16 357		7 156	7 437	
Subtotal, Prairie provinces	17 571	21 421	+22	17 237	19 855	+15	8 782	10 289	+17
British Columbia	27 057	27 641	+2	33 772	25 920	–23	20 250	23 878	+18
Total Canada	110 933	124 713	+12	119 501	117 834	–1	62 039	70 760	+14

Source: Canada Mortgage and Housing Corporation.

TABLE 5. CANADA, VALUE OF CONSTRUCTION BY PROVINCE,[1] 1992-94

	1992[1]			1993[1]			1994[1]		
	Building Construction[1]	Engineering Construction[1]	Total	Building Construction[1]	Engineering Construction[1]	Total	Building Construction[1]	Engineering Construction[1]	Total
	($ millions)								
Newfoundland	699	876	1 575	696	1 308	2 004	742	1 728	2 470
Nova Scotia	1 160	744	1 904	1 255	647	1 902	1 330	451	1 781
New Brunswick	948	457	1 405	939	664	1 603	980	528	1 508
Prince Edward Island	194	88	282	211	65	276	174	155	329
Quebec	11 076	4 779	15 855	10 796	5 117	15 913	11 366	4 916	16 282
Ontario	20 244	7 032	27 276	17 634	5 953	23 587	18 541	6 027	24 568
Manitoba	1 103	885	1 988	1 174	735	1 909	1 417	669	2 086
Saskatchewan	949	1 376	2 325	961	1 481	2 442	1 125	1 866	2 991
Alberta	5 573	5 307	10 880	5 478	7 072	12 550	4 696	9 853	14 549
British Columbia, Yukon and Northwest Territories	10 014	2 913	12 927	10 094	3 262	13 356	10 687	4 193	14 880
Total Canada	51 960	24 457	76 417	49 238	26 304	75 542	51 058	30 386	81 444

Sources: Natural Resources Canada; Statistics Canada, Catalogue no. 61-223.
1 Expenditures include value of new as well as major renovation work purchased.
Note: Numbers may not add to totals due to rounding.

TABLE 6. CANADA, VALUE OF CONSTRUCTION BY TYPE, 1992-94

	1992	1993[a]	1994[a]
		($ millions)	
BUILDING CONSTRUCTION			
Residential	33 676	32 577	34 922
Industrial	2 563	2 219	3 006
Commercial	9 331	8 479	6 251
Institutional	4 536	4 123	4 931
Other building	1 854	1 840	1 948
Subtotal	51 960	49 238	51 058
ENGINEERING CONSTRUCTION			
Marine	415	243	492
Transportation	5 113	5 340	6 032
Waterworks	903	793	904
Sewage, dams, sanitary systems	1 175	1 303	1 501
Electric power	5 944	5 347	3 965
Railway, telephones	1 561	1 587	1 446
Gas and oil facilities	7 291	9 503	13 721
Other engineering	2 055	2 188	2 325
Subtotal	24 457	26 304	30 386
Total construction	76 417	75 542	81 444

Sources: Natural Resources Canada; Statistics Canada, Catalogue no. 61-223.
[a] Expenditures include value of new as well as major renovation work purchased.
Note: Numbers may not add to totals due to rounding.

TABLE 7. WORLD PRODUCTION OF CEMENT, 1995 AND 1996

	1995	1996[e]
	(000 tonnes)	
People's Republic of China	445 610	450 000
Japan	90 474	90 000
United States	78 320	84 000
India	70 000[e]	70 000
Korea, Republic of	55 130	56 500
Germany	40 000[e]	40 000
Russia, Republic of	36 400[e]	36 000
Italy	35 000[e]	35 000
Turkey	33 153	35 000
Thailand	26 500[e]	35 000
Canada	10 440	11 100
Other countries	499 089[e]	513 400
Total world	1 420 700	1 456 000

Sources: Natural Resources Canada; U.S. Geological Survey, January 1997.
[e] Estimated.