

Cement

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Shipments of cement in 1997 were estimated to be 12.0 Mt valued at \$1.0 billion, an increase of about 4% in volume compared to 1996, based on preliminary figures. The demand for cement in Canada remained relatively strong in Ontario and the Prairie region, and decreased in the Atlantic region following completion of the Hibernia project and the fixed-link crossing to Prince Edward Island. Overall construction activity in Canada continued to increase, led by an increase in housing starts. The extended \$6 billion cost-shared program for infrastructure renewal contributed to total activity. (Funding for the existing program expires in 1998.) Reported kiln capacity in 1996 was about 14.6 Mt, with about 13.7 Mt active, according to the most recent figures available.

THE CANADIAN INDUSTRY

The Canadian cement industry is diversified and mainly integrated with the construction aggregates and concrete products sectors. Information on the aggregates sector is included in a separate chapter entitled *Mineral Aggregates*.

Restructuring during recent years has led to a decentralization of operations and several changes in ownership of the industry's clinker capacity. In 1997, St. Marys Cement Company of Toronto became a wholly owned subsidiary of Blue Circle America Inc., which in turn is owned by Blue Circle Industries PLC of England. Also in 1997, Lafarge SA of France purchased approximately 30% of the shares of Redland Plc. This latter takeover does not involve ownerships associated with Canadian-based cement operations; however, it does involve Redland's Canadian operations that produce both construction aggregates and lime.

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. The 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 has increased from about 300 000 t/y in 1980 to 455 000 t/y in 1996; the average kiln age is reported to be about 25 years.

In **Atlantic Canada**, two cement plants obtain raw materials from on site or nearby. These plants account for less than 5% of Canada's total clinker-producing capacity. Nova Scotia and Newfoundland are the only producers of cement in the region.

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 north-eastern United States. Considering the northeastern region of North America as a whole, there are generally four to six distribution terminals for each cement clinker plant.

In 1997, SLC closed its plant at Beauport, Quebec. The company also expanded its cement-grinding capacity at Joliette to better serve its customers in Quebec and the Maritimes.

Cimbec Canada Inc. continued with plans for a 1-Mt/y cement plant at Port-Daniel on the southeastern side of the Gaspé Peninsula in Quebec. Entrepreneurs have been encouraged mainly by the proximity of high-quality limestones situated near water and rail transportation. Partners are being sought to participate in the \$300 million project.

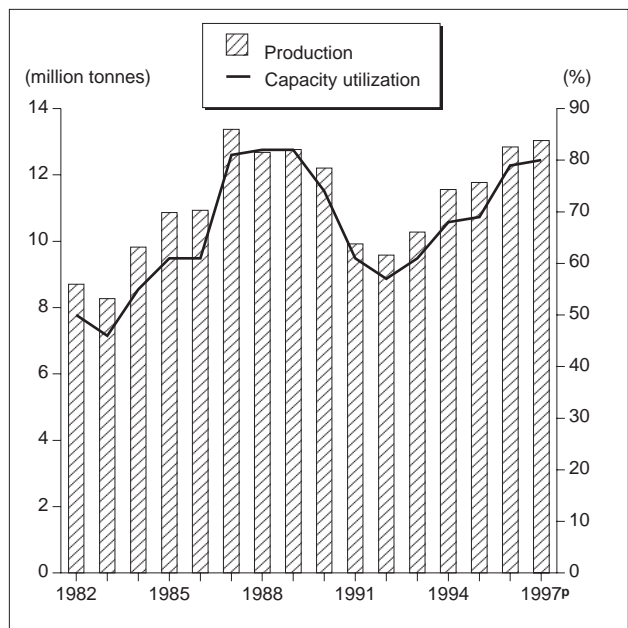
In **Ontario**, clinker-producing plants account for about 47% of Canadian capacity. SLC, Blue Circle Canada Inc. and Lafarge Canada Inc. are the largest producers. Lafarge's raw materials handling is extensive; for example, limestone for its plant at Bath is quarried on site and silica is supplied from Potsdam sandstone in Pittsburgh Township, about 50 km east of Bath. Iron oxide and gypsum are purchased from Hamilton and Nova Scotia, respectively. Lafarge's Woodstock plant, which is expected to undergo an expansion, obtains limestone on site and other raw materials mainly 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 associate company in the states of New York and Michigan.

In western Canada, two companies, CBR/Heidelberg and Lafarge Canada Inc., operate two clinker-producing plants in the Prairie provinces and three in British Columbia. Western Canada accounts for about 25% of the country's clinker-producing capacity, roughly in proportion to its share of total Canadian consumption. Lafarge Canada Inc. continued construction of its new \$140 million cement plant on site at its Richmond, British Columbia, operation. This new plant is scheduled for completion in 1999, and will double the operation's current cement capacity to about 1.1 Mt/y. Overall capital costs will be lower than a "greenfield" development because existing sites and substantial equipment and infrastructure are already in place. An expansion has been completed at the company's Edmonton plant. Most raw materials for Lafarge's Exshaw plant are from on-site sources. However, gypsum and some other raw materials are purchased off site. Lafarge's Vancouver plant at Richmond and Tilbury Cement Limited's plant at Delta obtain limestone from Texada Island. Lafarge's Kamloops plant is supplied from nearby sources.

CBR/Heidelberg affiliate Inland Cement Limited continues to ship cement from its relatively large Edmonton operation to Regina and Winnipeg for wide distribution.

Figure 1
Canadian Cement Production, 1982-97



Sources: Statistics Canada; Portland Cement Association.

^PPreliminary.

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 65% of the U.S. industry is now controlled by European and Pacific Rim cement producers.

World cement production in 1996 was 1485 Mt, according to estimates by the U.S. Geological Survey. China is the world's largest producer (490 Mt), followed by Japan (94 Mt) and the United States (81 Mt).

Several plant expansions and modernization projects continued in the United States and Latin America, China and Eastern Europe. In the United States, Florida Rock Industries proceeded with plans to construct a new state-of-the-art 700 000-t/y plant in Florida.

The U.S. anti-dumping order against grey Portland cement clinker from Mexico remained in effect in 1997. In accordance with earlier rulings, Cemex (Cementos Mexicanos, S.A.), which is the largest cement producer in North America, must continue to tender cash deposits based on related customs values of imports and dumping margins.

CONSUMPTION AND TRADE

Cross-border trade of both cement and clinker 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. Annual exports of cement to the United States amount to 3-4 Mt and account for 20-40% of total Canadian shipments. These shipments are mainly destined for the southern Great Lakes region and the northwestern Pacific states. Canada's annual imports of cement are about 0.5 Mt directed mainly to the northern Great Lakes region and the two most westerly provinces.

Low-cost marine transportation has influenced world trade considerably. Total U.S. imports of cement (excluding clinker) for consumption were about 13.5 Mt in 1997, or 14% of apparent consumption.

TECHNOLOGY

Energy conservation programs by the Canadian cement industry have reduced the 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 is fully on stream 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 toward coal and/or coke. In 1996, 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 1996, the Canadian cement industry consumed, on average, 4751 megajoules per tonne of production, of which 3813 megajoules (80%) 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. The use of waste-derived fuels and spent organic solvents has grown, particularly in the United States and Europe. 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.

Research and development (R&D) concerning cement, as well as concrete, is sponsored by private companies, associations and departments of highways. However, the Canada Centre for Mineral and Energy Technology (CANMET) is involved with specialized R&D, and some important technical and coordinating roles. This organization continued its Advanced Concrete Programs, which contribute 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 is involved in a multi-year, cost-shared contract on blended cements. 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 1997, CANMET, along with the American Concrete Institute, sponsored the Fourth CANMET/ACI International Conference on Durability of Concrete, which was held in Sydney, Australia. In addition, again with the ACI and the National Research Council of Canada (NRC) as co-sponsors, CANMET organized the Fifth CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete in Venice, Italy, in 1997.

Also in 1997, CANMET was a co-sponsor of the Third CANMET/ACI International Symposium on Advances in Concrete Technology in Auckland, New Zealand. Similarly, these organizations, along with the NRC, co-sponsored a two-day CANMET/NRC/ACI International Workshop on Developments in Repair Materials and Strategies for the Rehabilitation of Infrastructure and Buildings.

In 1998, international conferences sponsored by the Committee for the Organization of CANMET/ACI Conferences, as well as others, will include the Sixth CANMET/ACI International Conference on Fly Ash, Silica Fume, Slag and Natural Pozzolans in Concrete, in May/June 1998 in Bangkok, Thailand, and the CANMET/ACI/JCI Fourth International Conference on Recent Advances in Concrete Technology in June in Tokushima, Japan.

Research efforts to develop new superplasticizers for use in conjunction with supplementary cementing materials for high-performance concrete have increased in recent years. As a result of this, a new publication entitled *Superplasticizers: Properties and Applications in Concrete*, by Ramachandran, Malhotra, Jolicoeur and Spiratos, was compiled to integrate the chemistry and applications concerned. This publication, which includes 14 chapters and more than 400 pages, can be obtained from the Materials Technology Laboratory (MTL), of NRC's Canada Centre for Mineral and Energy Technology (CANMET), by contacting Lynn Stafford at telephone (613) 995-8815.

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 1998 are expected to remain firm based on relatively low interest rates, expenditures on energy-related projects, continued strength in domestic housing construction, and a stable demand for exports.

In 1997, housing starts increased to about 148 600, according to the Canada Mortgage and Housing Corporation. By way of comparison, housing starts were 111 000 in 1995, 125 000 in 1996, and are expected to be about 162 000 in 1998. With real economic growth in both Canada and the United States forecast to continue, the outlook continues to be 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 that 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 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 practices.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of February 1, 1998.

TARIFFS

Item No.	Description	Canada		USA	United States Canada
		MFN	GPT		
25.23	Portland cement, aluminous cement, slag cement, supersulphate cement and similar hydraulic cements, whether or not coloured or in the form of clinkers				
2523.10	Cement clinkers	Free	Free	Free	Free
2523.21	Portland cement: White cement, whether or not artificially coloured	Free	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	3%	Free	Free	Free
6810.19	Other	5%	Free	Free	Free
6810.91	Prefabricated structural components for building or civil engineering	5%	Free	Free	Free
6810.99	Other				
6810.99.10	Pipes	5%	Free	Free	Free
6810.99.90	Other	5%	Free	Free	Free

Sources: Customs Tariff, effective January 1998, Revenue Canada; Harmonized Tariff Schedule of the United States, 1998.

TABLE 1. CANADA, CEMENT PRODUCTION AND TRADE, 1995-97

Item No.	1995		1996		1997p	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
PRODUCTION¹ (all forms)						
Ontario	4 182 883	294 485	5 211 930	384 570	5 404 278	407 680
Alberta	x	x	x	x	x	x
Quebec	2 525 799	172 686	2 849 392	207 379	2 954 550	219 841
British Columbia	1 668 757	162 058	1 743 203	176 566	1 807 536	187 176
Nova Scotia	x	x	x	x	x	x
Newfoundland	x	x	x	x	x	x
Total	10 440 329	842 491	11 587 365	964 380	12 015 000	1 022 332
IMPORTS						
2523.10	Cement clinker					
	Mexico	-	-	-	58 195	3 316
	Bermuda	-	-	-	27 096	1 807
	Belgium	-	-	-	25 730	1 712
	United States	29	3	41	15	1
Total	29	3	41	2	111 036	6 836
2523.21	Portland cement, white, whether or not artificially coloured					
	United States	3 645	715	3 834	670	9 042
	Other countries	553	32	96	23	189
Total	4 198	747	3 930	693	9 231	1 509
2523.29	Portland cement, n.e.s.					
	United States	543 624	39 966	569 570	41 945	579 251
	United Kingdom	128	15	126	15	6 915
	Colombia	-	-	-	-	2 423
	France	349	42	-	-	977
	Belgium	250	31	3 065	1 610	-
	Other countries	1 583	89	2 342	139	1 057
Total	545 934	40 143	575 103	43 709	590 623	44 160
2523.30	Aluminous cement					
	United States	12 546	6 263	10 391	5 434	10 873
	France	-	-	84	66	140
	Other countries	180	90	77	49	3
Total	12 726	6 353	10 552	5 549	11 016	6 555
2523.90	Hydraulic cement, n.e.s.					
	United States	25 860	3 724	37 232	5 043	29 575
	Belgium	4 670	1 327	-	-	3 425
	United Kingdom	7 656	445	1 329	343	2 412
	Colombia	515	58	2 020	203	1 638
	Japan	242	62	681	134	275
	South Africa	-	-	167	43	169
	Other countries	1 109	95	654	163	81
Total	40 052	5 711	42 083	5 929	37 575	6 574
6810.11	Building blocks and bricks of cement, concrete or artificial stone					
	United States	..	1 465	..	1 301	..
	United Kingdom	-	-	..	155	..
	Other countries	..	15	..	17	..
Total	..	1 480	..	1 473	..	1 894
6810.19	Tiles, flagstones and similar articles of cement/concrete or artificial stone					
	United States	..	10 469	..	11 963	..
	Italy	..	529	..	1 058	..
	Malta	-	-	-	-	..
	India	-	-	..	46	..
	Germany	..	45	..	85	..
	Spain	..	171	..	55	..
	Mexico	..	207	..	252	..
	Other countries	..	153	..	183	..
Total	..	11 574	..	13 642	..	17 591

TABLE 1 (cont'd)

Item No.	1995		1996		1997P	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
IMPORTS (cont'd)						
6810.20	Pipes of cement or concrete					
	United States					
	..	1 284	-	-	-	-
	Total					
	..	1 284	-	-	-	-
6810.91	Prefabricated structural components of buildings, etc., of cement/concrete, etc.					
	United States					
	..	2 879	..	3 060	..	2 538
	United Kingdom					
	..	333	..	474	..	962
	Netherlands					
	..	26	-	-	..	52
	Other countries					
	..	38	..	43	..	82
	Total					
	..	3 276	..	3 577	..	3 634
6810.99	Articles of cement, of concrete or of artificial stone, n.e.s.					
	United States					
	..	10 328	..	11 912	..	14 204
	People's Republic of China					
	..	198	..	929	..	1 126
	United Kingdom					
	..	162	..	234	..	646
	Italy					
	..	350	..	422	..	310
	Mexico					
	..	140	..	94	..	140
	Philippines					
	..	49	..	46	..	83
	Germany					
	..	27	..	398	..	13
	Other countries					
	..	103	..	241	..	203
	Total					
	..	11 357	..	14 276	..	16 725
EXPORTS						
2523.10	Cement clinker					
	United States					
	1 329 489	62 580	1 252 863	72 324	1 023 859	72 326
	Other countries					
	59	13	-	-	-	-
	Total					
	1 329 548	62 593	1 252 863	72 324	1 023 859	72 326
2523.21	Portland cement, white, whether or not artificially coloured					
	United States					
	166 811	19 992	134 818	17 317	215 058	25 062
	St. Pierre and Miquelon					
	32	4	153	23	92	17
	Other countries					
	53	10	221	34	-	-
	Total					
	166 896	20 006	135 192	17 374	215 150	25 079
2523.29	Portland cement, n.e.s.					
	United States					
	3 359 225	199 433	3 953 140	259 010	4 086 245	290 498
	St. Pierre and Miquelon					
	868	121	1 087	188	451	83
	Fiji					
	-	-	-	-	60	5
	Belgium					
	40	9	60	13	-	-
	Other countries					
	76	22	56	27	-	-
	Total					
	3 360 209	199 585	3 954 343	259 238	4 086 756	290 586
2523.30	Aluminous cement					
	United States					
	7	6	-	-	-	-
	Spain					
	17	16	-	-	-	-
	Philippines					
	-	-	172	6	-	-
	Total					
	24	22	172	6	-	-
2523.90	Hydraulic cement, n.e.s.					
	United States					
	2 357	852	10 942	2 649	28 901	7 114
	Egypt					
	-	-	167	160	56	75
	Trinidad and Tobago					
	1	2	3	4	100	36
	Singapore					
	-	-	10	9	77	33
	Japan					
	-	-	3	2	66	31
	Czech Republic					
	59	83	84	86	10	2
	Other countries					
	612	471	589	222	121	72
	Total					
	3 029	1 408	11 798	3 132	29 331	7 363

TABLE 1 (cont'd)

Item No.	1995		1996		1997P	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)						
6810.11	Building blocks and bricks of cement, concrete or artificial stone					
	United States	.. 11 035	..	15 034	..	24 493
	Japan	.. 273	..	163	..	257
	Ukraine	-	-	-	..	87
	Australia	-	-	-	..	70
	United Arab Emirates	.. 402	..	1 188	-	-
	Other countries	.. 44	..	235	..	91
	Total	.. 11 754	..	16 620	..	24 998
6810.19	Tiles, flagstones and similar articles of cement/concrete or artificial stone					
	United States	.. 14 091	..	15 497	..	16 188
	Japan	.. 133	..	29	..	954
	United Kingdom	-	-	-	..	139
	Australia	.. 2	..	18	..	58
	Malaysia	-	..	254	-	-
	Other countries	.. 194	..	126	..	78
	Total	.. 14 420	..	15 924	..	17 417
6810.20	Pipes of cement or concrete					
	United States	.. 505	-	-	-	-
	St. Pierre and Miquelon	.. 16	-	-	-	-
	Total	.. 521	-	-	-	-
6810.91	Prefabricated structural components of buildings, etc., of cement/concrete, etc.					
	United States	.. 73 926	..	62 836	..	60 339
	United Kingdom	.. 12	..	120	..	444
	Russia	.. 44	-	-	..	128
	Chile	-	-	-	..	31
	Japan	-	-	-	..	30
	Taiwan	-	..	120	-	-
	Malaysia	.. 322	-	-	-	-
	Other countries	.. 94	..	56	..	29
	Total	.. 74 398	..	63 132	..	61 001
6810.99	Articles of cement, of concrete or of artificial stone, n.e.s.					
	United States	.. 16 212	..	30 243	..	41 831
	United Kingdom	-	..	24	..	3 259
	Malaysia	-	..	104	..	256
	Japan	.. 54	..	76	..	216
	Phillipines	-	..	29	..	77
	Taiwan	-	..	168	-	-
	Other countries	.. 41	..	196	..	66
	Total	.. 16 307	..	30 840	..	45 705

Sources: Natural Resources Canada; Statistics Canada.

- Nil; . . Not available; 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 1996

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,Wa	2	600	476
North Star Cement Limited	Corner Brook, Nfld.	Dx	O,Wa	1	245	153
Subtotal, Atlantic region				3	845	629
QUEBEC						
Lafarge Canada Inc.	St. Constant	D	C,Wa	2	1 160	950
Ciment Québec Inc.	St. Basile	W,Dc	O,G,Wa	3	940	1 077 ^a
St. Lawrence Cement Inc.	Beauport	W	C, O,Wa	2	777	574 ^b
(Independent Cement Inc.)	Joliette	D	C,Wa	4	1 075	900
Subtotal, Quebec region				11	3 952	3 501
ONTARIO						
Lafarge Canada Inc.	Woodstock	W	C	2	775	509
	Bath	D	C	1	1 140	1 019
Federal White Cement Ltd.	Woodstock	Dx	O	1	200	182
ESSROC Canada Inc.	Picton	D,Dx	C,G	2	818	1 064
St. Lawrence Cement Inc.	Mississauga	W,Dc	C,O,Wa	3	1 969	1 800
Blue Circle Canada Inc.	Bowmanville	Dc	C	1	1 085	1 600
	St. Marys	Dx	C,G	1	800	651
Subtotal, Ontario region				11	6 787	6 825
PRAIRIE REGION						
Lafarge Canada Inc.	Exshaw, Alta.	D,Dc	G	2	1 400	1 075
Inland Cement Limited (Cimenteries CBR/Heidelberger)	Edmonton, Alta.	Dc	G	1	1 512	725
Subtotal, Prairie region				3	2 912	1 800
BRITISH COLUMBIA						
Lafarge Canada Inc.	Kamloops	D	C,G	1	278	200
	Richmond	W	G,Wa	2	478	544
Tilbury Cement Limited (Cimenteries CBR/Heidelberger)	Delta	Dx	C,G,Wa	1	1 000	1 052
Subtotal, B.C. region				4	1 756	1 796
Total Canada (9 companies)				32	16 252	14 551

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

^a Two kilns inactive. ^b Entire plant closed in 1997.

Note: Total active kiln capacity including white cement is approximately 13.7 Mt/y.

TABLE 3. CANADA, CEMENT PLANTS, KILNS AND CAPACITY UTILIZATION, 1980-97

	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	17 021 000 ^r	10 584 414	981 024	11 565 438	68
1995	18	34 ^a	16 157 000 ^r	10 440 329	1 329 548	11 769 877	69
1996	18	32	16 252 000	11 587 365	1 252 863	12 840 228	79
1997 ^p	18	32	16 252 000	12 015 000	1 023 859	13 038 859	80

Sources: Statistics Canada; Portland Cement Association.

^p Preliminary ^r Revised.^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, 1996 AND 1997**

	Starts			Completions			Under Construction		
	1996	1997	% Diff.	1996	1997	% Diff.	1996	1997	% Diff.
Newfoundland	2 034	1 696		1 958	1 988		2 003	1 683	
Prince Edward Island	554	470		525	548		194	124	
Nova Scotia	4 059	3 813		4 062	3 756		1 944	1 926	
New Brunswick	2 722	2 702		2 591	3 084		1 131	729	
Subtotal, Atlantic provinces	9 369	8 681	-7	9 136	9 376	+3	5 272	4 362	-17
Quebec	23 220	25 896	+12	22 194	26 308	+19	6 784	6 289	-7
Ontario	43 062	54 072	+26	40 729	51 297	+26	24 447	27 239	+11
Manitoba	2 318	2 612		1 588	2 943		1 538	1 176	
Saskatchewan	2 438	2 757		1 910	2 409		1 314	1 662	
Alberta	16 665	23 671		16 357	20 259		7 437	10 744	
Subtotal, Prairie provinces	21 421	29 040	+36	19 855	25 611	+30	10 289	13 582	+32
British Columbia	27 641	29 351	+6	25 920	30 794	+19	23 878	22 412	-6
Total Canada	124 713	147 040	+18	117 834	143 386	+22	70 670	73 984	+5

Source: Canada Mortgage and Housing Corporation.

TABLE 5. CANADA, VALUE OF CONSTRUCTION BY PROVINCE, 1993-95

	1993			1994			1995		
	Building Construction	Engineering Construction	Total	Building Construction	Engineering Construction	Total	Building Construction	Engineering Construction	Total
	(\$ millions)								
Newfoundland	696	1 308	2 004	742	1 728	2 470	567	1 704	2 271
Nova Scotia	1 255	647	1 902	1 330	451	1 781	1 300	514	1 813
New Brunswick	939	664	1 603	980	528	1 508	837	743	1 580
Prince Edward Island	211	65	276	174	155	329	175	189	364
Quebec	10 796	5 117	15 913	11 366	4 916	16 282	9 643	4 636	14 278
Ontario	17 634	5 953	23 587	18 541	6 027	24 568	16 814	6 135	22 949
Manitoba	1 174	735	1 909	1 417	669	2 086	1 292	870	2 161
Saskatchewan	961	1 481	2 442	1 125	1 866	2 991	1 170	1 674	2 844
Alberta	5 478	7 072	12 550	4 696	9 853	14 549	4 402	9 847	14 250
British Columbia, Yukon and Northwest Territories	10 094	3 262	13 356	10 687	4 193	14 880	9 573	4 309	13 881
Total Canada	49 238	26 304	75 542	51 058	30 386	81 444	45 770	30 621	76 391

Sources: Natural Resources Canada; Statistics Canada, catalogue no. 61-223.

Notes: Numbers may not add to totals due to rounding. Expenditures include value of new construction and major renovation work purchased.

TABLE 6. CANADA, VALUE OF CONSTRUCTION BY TYPE, 1993-95

	1993	1994	1995
	(\$ millions)		
BUILDING CONSTRUCTION			
Residential	32 577	34 922	29 186
Industrial	2 219	3 006	3 243
Commercial	8 479	6 251	6 265
Institutional	4 123	4 931	4 982
Other	1 840	1 948	2 095
Total building	49 238	51 058	45 770
ENGINEERING CONSTRUCTION			
Marine	243	492	445
Transportation	5 340	6 032	6 436
Waterworks	793	904	1 140
Sewage, dams, sanitary systems	1 303	1 501	1 585
Electric power	5 347	3 965	3 441
Railway, telephones	1 587	1 446	1 298
Gas and oil facilities	9 503	13 721	13 474
Other	2 188	2 325	2 803
Total engineering	26 304	30 386	30 621
Total construction	75 542	81 444	76 391

Sources: Natural Resources Canada; Statistics Canada, catalogue no. 61-223.

Notes: Numbers may not add to totals due to rounding. Expenditures include value of new construction and major renovation work purchased.

TABLE 7. WORLD PRODUCTION OF CEMENT, 1996 AND 1997

	1996	1997 ^e
	(000 tonnes)	
People's Republic of China	490 000	510 000
Japan	94 492	95 000
United States	80 818	82 500
India	76 220	80 000
Korea, Republic of	57 334	59 000
Germany	40 000	40 000
Italy	34 000 ^e	34 000
Turkey	32 500	33 500
Russia, Republic of	27 800	30 000
Thailand	35 000	30 000
Canada	11 587	12 000
Other countries	505 249 ^e	494 000
Total world	1 485 000	1 500 000

Sources: Natural Resources Canada; U.S. Geological Survey, January 1998.

^e Estimated.