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THE SAND AND GRAVEL INDUSTRY, 1942

Commercial production of sand and gravel in Canada during 1942 totalled 26,349,907 short tons valued at $9,005,414 compared with 31,604,806 short tons worth $10,375,723 in 1941. Included in the totals for both years are sands and gravels from all sources, including recoveries by dredges and material used by railroads as ballast and by mines as backfill.

Quebec and Ontario are Canada's largest sand and gravel producing provinces, the output in these provinces in 1942 being, respectively, 11,026,249 short tons and 8,420,358 short tons; in 1942, the quantity of material washed or screened at Canadian sand and gravel plants totalled 3,656,889 short tons compared with 4,458,426 short tons in 1941, while the quantity of bank or pit-run grades amounted to 22,693,018 short tons as against a corresponding tonnage of 27,146,380 in the preceding year.

Of the total sand and gravel output in 1942, there were 16,139,859 short tons used for concrete, roads, etc., and 4,610,323 short tons as railroad ballast. In addition, there were produced 2,535,366 short tons of straight run sand for building, etc., 35,807 short tons for moulding; 2,694 short tons as core sand and 54,029 short tons for other purposes. The quantity of crushed gravel produced during the year under review amounted to 2,135,072 short tons, and 836,757 short tons of sand were employed as mine fill.

Firms (including individuals) reported as active in the Canadian sand and gravel industry numbered 1,419 in 1942; of these, 800 were located in Quebec, 554 in Ontario, 26 in British Columbia and lesser numbers in Nova Scotia, New Brunswick, Manitoba, Saskatchewan and Alberta. Capital employed by the industry totalled $4,477,547; employees were reported at 2,141; salaries and wages paid totalled $2,404,755; fuel, electricity and process supplies used aggregated $677,149, and the total net value of production was estimated at $8,328,265.

The following information has been abstracted from a report prepared by the Bureau of Mines, Ottawa:

Deposits of gravel and sand are numerous throughout Eastern Canada, with the exception of Prince Edward Island, where gravels are scarce. Owing to the widespread occurence of gravels and sands and to their bulk in relation to value, local needs for these materials are usually supplied from the nearest deposits, as their cost to the consumer is governed largely by the length of haul; hence the large number of small pits and the small number of large plants. Some grades of sand particularly suitable for certain industries command a much higher price than does ordinary sand.

Sand and Gravel

Road improvement, concrete works and railway ballast absorb by far the greater part of the gravel and sand used. Gravel in particular has proved a good material for building all-weather roads at low cost and its use has steadily increased with the growth of motor traffic.

A considerable tonnage of sand and gravel is also used in the mines for re-filling underground workings. Some mines used several thousand tons a day.

Most of the gravel used for road work comes from pits worked for that purpose. Usually a portable or semi-portable plant is used to extract enough gravel to supply the immediate need and then a sufficient reserve is built up, in the form of stock piles, for two years' requirements. Road pits may remain idle for two years or more. The amount of gravel produced from year to year thus fluctuates, depending on the program of road construction and improvement. Intermittent operation also applies to railway pits, which may remain idle for several years.

Part of the gravel used is crushed, screened and in some cases even washed, and the proportion thus processed is increasing steadily. Some Provincial Highway Departments have used crushed instead of pit-run gravel on their main highways for a number of years. Most of the large commercial plants are equiped for producing crushed gravel, a product that can compete with crushed stone.

The amount of sand consumed follows the trend of building activity, as most of it is used in the building industry for concrete work, cement and lime mortar, or wall plaster. The sand must be clean, that is, free from dust, loam, organic matter, or clay, and contain but little silt, and is usually obtainable from local deposits.

Prices of sand, gravel and crushed stone in the four largest cities in Canada were as follows, at the end of 1941 and 1942. Prices per ton or cubic yard, as indicated below, are for carlots, f.o.b. cars:

	Montreal per ton		Toronto per ton		Winnipeg per cu.yd.		Vancouver per cu.yd.	
	1941	1942	1941	1942	1941	1942	1941	1942
Sand	1.15	1.15	1.00	1.00	1.00	1.00	1.00	1.00
Gravel	1.10	1.10	1.53	1.56	1.00	1.00	1.00	1.00
Crushed Stone ...	.82	.93	1.61	1.67	-	-	1.13	1.10

Every province except New Brunswick and Prince Edward Island produces natural bonded moulding sand. One deposit in New Brunswick was operated in 1918 and another in 1921 and 1922. A small production also came from Prince Edward Island of a grade suitable only for light-weight castings. By far the greater part of the output has come from the Niagara peninsula, Ontario. Occasionally new deposits have been opened up, mostly in Ontario and in the western provinces.

The results of a general investigation of moulding sands in Canada were published in 1936 by the Bureau of Mines, Ottawa, in the form of report No. 767, "Natural Bonded Moulding Sands of Canada." This report directs attention to the large number of deposits from which supplies have been obtained for local foundries and the probability of replacing imported material with Canadian sands.

Small quantities of moulding sands not tabulated in official records are produced in nearly all the provinces by foundrymen for their own use from nearby deposits; or by part time operators such as farmers for local foundries.

The industry is seasonal in nature as foundrymen usually obtain their supplies in the summer and autumn.

Table 1 - PRODUCTION IN CANADA OF SAND AND GRAVEL, 1942 and 1941

	Washed or screened Tons	Bank or pit run Tons	TOTAL VALUE $
1942			
PRODUCTION (x) -			
SAND -			
Moulding sand	25,753	10,054	41,825
Building sand and sand for concrete, roadwork, etc.	1,617,886	917,480	934,777
Core sand	2,454	240	3,670
Mine filling	-	836,757	147,602
Other sand (including blast sands, engine sands, etc.)	2,727	51,302	12,534
SAND AND GRAVEL -			
Sand and gravel for railway ballast	275,814	4,334,509	957,781
Sand and gravel for concrete, road-building, etc.	1,342,011	14,797,848	6,010,412
Crushed gravel	390,244	1,744,828	896,813
TOTAL	3,656,889	22,693,018	9,005,414
Cost of fuel, electricity and process supplies used	-	-	677,149
TOTAL NET VALUE	-	-	8,328,265
1941			
PRODUCTION (x) -			
SAND -			
Moulding sand	25,624	12,685	40,066
Building sand and sand for concrete, roadwork, etc.	1,305,256	887,149	729,901
Core sand	37,468	73	17,680
Mine filling	-	1,363,317	190,504
Other sand (including blast sands, engine sands, etc.)	7,485	84,533	26,054
SAND AND GRAVEL -			
Sand and gravel for railway ballast	340,005	4,496,903	916,979
Sand and gravel for concrete, road-building, etc.	2,194,901	17,574,897	7,135,258
Crushed gravel	547,687	2,726,823	1,319,281
TOTAL	4,458,426	27,146,380	10,375,723
Cost of fuel, electricity and process supplies used	-	-	474,647
TOTAL NET VALUE	-	-	9,901,076

(x) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz in the bulletin--The Feldspar and Quartz Mining Industry.

Table 2 - PRODUCTION (x) OF SAND AND GRAVEL IN CANADA, 1933-1942

Year	Tons	$	Year	Tons	$
1933	11,738,823	4,464,285	1938	32,223,882	12,002,554
1934	14,854,159	4,035,477	1939	31,294,341	11,241,102
1935	21,213,489	6,389,440	1940	31,375,415	11,759,245
1936	22,124,160	6,921,399	1941	31,604,806	10,375,723
1937	27,001,301	10,492,696	1942	26,349,907	9,005,414

(x) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz. Also does not include sand used for back filling at mines prior to 1936.

Table 3 - PRODUCTION OF SAND AND GRAVEL, BY PROVINCES, 1939-1942

Province		1939	1940	1941	1942
Prince Edward Island	Tons	(a)	(a)	(a)	(a)
	$	(a)	(a)	(a)	(a)
Nova Scotia	Tons	2,139,427	1,440,140	749,441	775,795
	$	1,225,827	867,490	332,531	371,970
New Brunswick	Tons	3,373,303	944,033	962,483	923,020
	$	1,363,051	278,710	425,772	540,541
Quebec	Tons	10,050,985	12,177,624	11,681,390	11,026,249
	$	2,703,032	3,127,931	2,673,300	2,485,853
Ontario	Tons	9,350,875	9,678,745	11,569,382	8,420,358
	$	3,537,216	4,025,026	4,524,463	3,433,986
Manitoba	Tons	1,363,593	1,851,645	1,503,901	1,443,001
	$	514,404	839,993	429,996	427,150
Saskatchewan	Tons	1,913,995	1,472,385	1,220,801	679,979
	$	408,199	741,353	406,835	435,798
Alberta	Tons	817,168	1,722,465	956,484	481,644
	$	619,105	1,069,677	433,504	218,914
British Columbia	Tons	2,284,995	2,087,878	2,960,924	2,599,861
	$	870,268	809,075	1,151,322	1,091,202

(a) No commercial production reported.

Table 4 - PRODUCTION OF WASHED AND SCREENED AND PIT RUN GRADES, 1942

Province	Washed or screened	Bank or pit run	TOTAL VALUE
	Tons	Tons	$
Nova Scotia	-	775,795	371,970
New Brunswick	59,324	863,696	540,541
Quebec	647,812	10,378,437	2,485,853
Ontario	1,887,761	6,532,597	3,433,986
Manitoba	226,770	1,216,231	427,150
Saskatchewan	-	679,979	435,798
Alberta	43,702	437,942	218,914
British Columbia	791,520	1,808,341	1,091,202
TOTAL	3,656,889	22,693,018	9,005,414

Table 5 - PRODUCTION OF SAND FOR BUILDING AND CONCRETE, ROADS, ETC., AND SAND AND GRAVEL FOR RAILWAY BALLAST AND FOR CONCRETE, ROADS, ETC., 1933-1942.

Year	SAND For building, concrete, roads, etc.		SAND AND GRAVEL For railway ballast		SAND AND GRAVEL For concrete, roads, etc.	
	Tons	$	Tons	$	Tons	$
1933	775,412	218,559	561,538	110,449	9,957,832	3,907,911
1934	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751
1935	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331
1936	956,502	362,542	6,318,681	1,054,703	14,336,640	5,216,942
1937	1,356,269	476,824	2,764,639	533,876	19,453,188	8,340,764
1938	1,750,187	685,976	2,359,703	443,936	22,513,256	9,101,882
1939	1,169,899	364,829	3,223,718	603,288	22,899,751	8,988,114
1940	1,961,604	537,957	3,834,904	699,518	21,465,961	9,100,612
1941	2,192,405	729,901	4,836,908	916,979	19,769,798	7,135,258
1942 -						
Nova Scotia	-	-	186,646	33,898	496,067	274,393
New Brunswick	40	18	241,411	74,656	681,569	465,867
Quebec	1,351,372	371,870	1,136,286	210,841	6,942,225	1,310,935
Ontario	1,040,482	492,108	1,673,027	391,239	4,541,580	2,217,155
Manitoba	19,508	8,489	614,913	119,735	707,418	251,134
Saskatchewan	135	15	163,903	25,698	481,235	403,512
Alberta	23,781	25,023	194,852	29,575	261,990	164,079
British Columbia	100,048	37,254	399,285	72,139	2,027,775	923,337
CANADA	2,535,366	934,777	4,610,323	957,781	16,139,859	6,010,412

Table 6 - PRODUCTION OF MOULDING AND CORE SAND AND CRUSHED GRAVEL, 1942

	Moulding Sand		Core Sand		Crushed Gravel	
	Tons	$	Tons	$	Tons	$
Nova Scotia	1,118	3,275	-	-	91,964	60,404
New Brunswick	-	-	-	-	-	-
Quebec	-	-	-	-	1,595,286	591,937
Ontario	33,349	37,147	2,454	3,492	277,054	141,169
Manitoba	1,295	1,337	240	178	99,627	46,277
Saskatchewan	18	36	-	-	1,628	844
Alberta	27	30	-	-	-	-
British Columbia	-	-	-	-	69,513	56,182
CANADA, 1942	35,807	41,825	2,694	3,670	2,135,072	896,813
CANADA, 1941	29,602	30,538	2,115	3,119	2,998,843	1,216,917

Table 7 - PRINCIPAL STATISTICS OF THE SAND AND GRAVEL INDUSTRY IN CANADA(x), 1940-1942

		1940	1941	1942
Number of firms		1,458	1,399	1,419
Capital employed	$	3,456,502	4,287,789	4,477,547
Number of employees - On salary		103	109	113
On wages		4,140	3,143	2,028
Total		4,243	3,252	2,141
Salaries and wages - Salaries	$	192,696	214,840	224,868
Wages	$	3,551,889	2,780,686	2,179,887
Total	$	3,744,585	2,995,526	2,404,755
Selling value of sand and gravel produced by railway companies (Gross)	$	660,627	821,789	844,829
Selling value of sand and gravel produced by other operators (Gross)	$	11,098,618	9,553,934	8,160,585
Total Selling Value of Sand and Gravel Produced (Gross)	$	11,759,245	10,375,723	9,005,414
Cost of fuel and electricity	$	244,631	389,643	509,190
Cost of process supplies used	$	46,377	85,004	167,959
TOTAL NET VALUE OF PRODUCTION	$	11,468,237	9,901,076	8,328,265

(x) Includes data relating to sand production by dredgers and railways.

Table 8 - CAPITAL EMPLOYED, NUMBER OF EMPLOYEES, SALARIES AND WAGES PAID, AND FUEL AND ELECTRICITY CONSUMED, BY PROVINCES, 1942 and 1941

Province	Number of operators	Capital employed (x)	Number of employees	Salaries and wages	Cost of fuel and electricity used	Cost of process supplies used	Net value of production
		$		$	$	$	$
1942							
Nova Scotia	5	(x)	228	121,791	(x)	(x)	371,970
New Brunswick	6	40,000	146	77,277	3,651	8,591	528,299
Quebec	800	220,814	885	988,687	208,176	125,608	2,152,069
Ontario	554	1,920,726	369	493,162	228,037	4,872	3,201,077
Manitoba	11	810,064	266	343,009	19,384	24,113	383,653
Saskatchewan	10	5,000	28	46,464	872	964	433,962
Alberta	7	62,759	64	107,334	12,895	1,398	204,621
British Columbia	26	1,418,184	155	227,031	36,175	2,413	1,052,614
1941							
Nova Scotia	6	(x)10,320	579	257,045	(x)	(x) 175	332,356
New Brunswick	6	(x) 5,000	393	202,926	(x)	(x)	423,772
Quebec	902	265,447	928	965,638	58,304	5,115	2,609,381
Ontario	422	2,269,369	455	532,019	246,334	26,794	4,251,335
Manitoba	11	839,174	319	393,951	19,400	24,692	385,904
Saskatchewan	15	287,772	129	149,312	16,255	18,605	371,975
Alberta	9	50,484	265	276,159	8,587	1,744	423,173
British Columbia	28	560,223	184	218,476	40,763	7,879	1,102,680

(x) Complete data not available.

Table 9 - FUEL AND ELECTRICITY USED, 1941 and 1942

Kind	Unit of measure	1942 Quantity	1942 Value	1941 Quantity	1941 Value
			$		$
Bituminous coal - Canadian	short ton	4,882	40,602	2,874	23,174
Foreign.	short ton	12,767	93,818	5,427	44,464
Anthracite coal	short ton	5	75	2,223	15,040
Coke	short ton	22	373	-	-
Gasoline	Imp. gal.	746,874	265,603	718,630	205,817
Kerosene	Imp. gal.	3,394	840	3,641	883
Fuel oil	Imp. gal.	201,426	39,367	276,667	32,381
Wood	cord	303	1,840	3	37
Natural gas	M cu. ft.	49	23	135	77
Other fuel	-	-	-	-	5
Electricity purchased	K. W. H.	6,587,012	66,649	5,657,545	67,765
TOTAL	-	-	509,190	-	389,643

Table 10 - AVERAGE NUMBER OF WAGE-EARNERS, BY MONTHS, 1938-1942

	1938	1939	1940	1941	1942
January	458	203	274	450	369
February	476	245	268	440	434
March	466	340	346	517	524
April	935	821	629	815	782
May	12,762	11,054	3,275	4,400	3,796
June	14,195	13,444	8,182	8,493	5,352
July	13,889	13,591	11,504	8,023	4,787
August	13,872	12,451	11,526	7,225	3,183
September	12,905	10,253	8,644	3,421	1,835
October	9,559	5,199	3,372	2,570	1,142
November	1,259	1,032	886	764	954
December	574	382	628	412	528

Table 11 - NUMBER OF WAGE-EARNERS WHO WORKED THE NUMBER OF HOURS SPECIFIED, DURING ONE WEEK IN MONTH OF HIGHEST EMPLOYMENT, 1942.

Hours	Number	Hours	Number
30 hours or less.....	16	51-54 hours	93
31-43 hours	37	55 hours	16
44 hours	24	56-64 hours	453
45-47 hours	19	65 hours and over	241
48 hours	5,630	GRAND TOTAL	6,546
49-50 hours	17	Total wages paid in that week .....$	115,548

TABLE 12 - POWER EQUIPMENT INSTALLATION, 1942

	Number of units (x)	Horse power
Steam engines and steam turbines	18	701
Diesel engines	15	890
Gasoline, gas and oil engines	55	2,257
Hydraulic turbines or water wheels	7	240
Electric motors operated by purchased power	229	7,834
Electric motors operated by establishments' power	8	53
Stationary boilers	10	670

(x) Includes reserve equipment.