Motor Transport Statistics and Their Use in Highway Policy

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Fundamental to the rational solution of the general problems of transportation and the more specific problem of highway finance and taxation is the availability of comprehensive, pertinent and reliable statistics on the operation of the entire motor transport industry. Due to the large number of independent operations and their diversity, it is difficult to obtain complete and accurate data on the industry in any country or area of the world. To fill a gap in Canadian transportation statistics, the Dominion Bureau of Statistics undertook in 1954 to determine the use and certain important operational characteristics of the various classes of trucks by sampling the entire truck transport population of the country, annually. For the year 1957 data were complete for the first time for all provinces of Canada. This statistical series will, in future, be published annually. This paper discusses the uses of these data, the methods of obtaining them, and some of the more important findings.

• IN BROAD TERMS the objective of all highway policy should be to produce the most economical, dependable, convenient and safe road and street system possible from the resources and technical knowledge available. These road and street systems are, and should continue to be built for the transportation of goods as well as people. It is elementary that the quality of the highway system affects the economics of motor vehicle transportation. In turn, the use of the highway system for commercial purposes depends on its quality. The volume of goods moved on highways in turn affects competitive modes of transportation, such as rail, water, air and pipeline. Highway policy can thus have long-range effects on the entire transportation industry and the national economy.

In national transportation policy it is essential to strive for an integration of, and balance between, the various modes of transportation to approach the most economical over-all system for the nation as a whole consistent, of course, with its basic political and social needs. In Canada and the United States an attempt is made to do this through highway finance and taxation policies of the provinces or states and the federal government, as well as through the regulation of freight rates by federal authorities such as the Interstate Commerce Commission in the United States and the Board of Transport Commissioners for Canada.

It is impossible for the agencies mentioned to intelligently develop taxation or regulation policies consistent with the objectives of over-all transportation economy unless they have available for analysis accurate statistics on the current operations and historical trends for each of the various modes of transport. In regulating rates it is important to have data on the volumes of freight traffic by commodity classes; freight revenues by commodity classes; by individual hauling units; by transportation companies, together with actual operating costs.

The statistical requirements of those

agencies which formulate highway development, finance and taxation policy are somewhat different but not unrelated to the requirements of the regulatory bodies. In developing highway policy, four questions must be answered, as follows:

1. How much money should be spent on roads and streets?
2. From which revenue sources should these funds be derived?
3. Where should the money be spent?
4. When should the money be spent?

The last two questions are essentially questions of priority. These may be answered through a highway needs study wherein the physical condition and use of each segment of the entire road system is inventoried and the sections are ranked according to their relative adequacy and the economic justification for their improvement.

To formulate answers to the first two questions, more general information on the use of the road systems and their importance is required in addition to the needs study data previously mentioned. Statistical requirements for the development of answers to these questions include data on fuel consumption, average operating gross weights, and average annual miles of travel for various sizes and classes of vehicles. These data are necessary to assess both the incidence and the impact of current and proposed methods of taxation. Without such information it is impossible to carry out a tax allocation according to any one of the current theories such as the incremental, ton mile, or operating cost methods.

In Canada the regulation of interprovincial rail and pipeline transport, and to some extent water transport, is a function of the Board of Transport Commissioners, a federal government agency. However, in contrast to the situation in the United States, the regulation of the motor transport industry in Canada by tradition has been carried out solely by the individual provincial governments. This peculiar situation has come about largely because of the geography of Canada, where most of the ten provinces are extremely large and interprovincial truck transportation has generally been considered to be relatively small in comparison to intraprovincial traffic.

In Canada the provincial highway departments are responsible for the planning, design, construction, maintenance, finance and administration of the highway systems within their boundaries. There is no general policy of federal financial aid for highway construction in Canada. Such aid has been given in the past for specific projects of limited duration only and the amount of such aid has been minor in terms of total highway expenditures. Furthermore, in contrast to the situation in the United States, the road user tax field has been left exclusively to the provinces. Thus, in Canada, all highway policy originates with the provincial governments.

From the foregoing it may be seen that a considerable number of agencies in Canada require statistics on the motor transport industry. These include the ten provincial highway departments, the ten provincial boards regulating the trucking and passenger bus industries, and the federal Board of Transport Commissioners. In addition there is a demand for such information from various associations and public groups. The job of compiling statistics of road transport traffic in Canada has been undertaken by the Dominion Bureau of Statistics, thereby avoiding duplication of effort. This also insures the best possible comparability and utilizes the experience gained in similar undertakings by the Dominion Bureau of Statistics.

ROLE OF BUREAU OF STATISTICS

The Dominion Bureau of Statistics is the central statistical agency for Canada. As such, it is the major producer of statistics on the economic, social and cultural aspects of the country. The Transportation and Public Utilities Section collects and publishes statistics on all forms of transportation, including water, air, rail, road and pipeline carriers, as well as communications and

utilities such as electric power and gas distributors.

To find corresponding data in the United States one would have to look to such sources as the Interstate Commerce Commission, the Bureau of the Census, the Civil Aeronautics Administration, the American Transit Association, the Army Corps of Engineers, the Federal Communications Commission, and the Bureau of Public Roads, as well as several other public and private agencies. In the field of road transport alone the Dominion Bureau of Statistics, through its Transportation and Public Utilities Section, compiles statistics on highway mileages, revenues and expenditures; motor vehicle registrations; motor vehicle traffic accidents; gasoline and diesel oil consumption; intercity passenger bus operations; motor carriers of freight; and urban transit.

NEED FOR MOTOR TRANSPORT TRAFFIC STATISTICS

Until recently one serious gap in the field of road statistics was the lack of motor transport traffic data. This has been filled with the establishment of a motor transport traffic survey, on a continuing basis.

The demand for commercial road transport traffic data arises out of the rapid growth of truck transport in Canada, particularly since World War II. Such basic statistics as average yearly mileage, average gross ton-miles, total net ton-miles and revenue per ton-mile were needed to assess the development of road transport and its relative role in the total transportation field. Various investigating commissions established by the federal government on rail traffic were hampered in their studies by the absence of such data. In freight rate cases in particular, the Board of Transport Commissioners for Canada, the railways, and the road transport industry, found themselves handicapped by lack of information. Provincial governments responsible for the planning and maintenance of highways, together with the regulation and taxation of road vehicles, were unable to precisely appraise the nature and amount of commercial motor transport traffic.

Since the first provincial report was published in 1956, various comments and inquiries have been received from provincial governments, the Canadian Trucking Associations and its affiliates, individual trucking firms, truck and tire manufacturers, and fuel companies, as well as research agencies requiring data for numerous problems related to the trucking industry. Answers can now be provided for such questions as: What is the average length of haul by commodity? What is the revenue per mile earned by for-hire trucks? What are the rates of fuel consumption and average yearly mileage by type of vehicle? How many trucks use diesel fuel?

DEVELOPMENT OF THE MOTOR TRANSPORT TRAFFIC SURVEY

Until 1958, when motor transport traffic data for all ten provinces for 1957 were published, statistics were limited to company reports of motor carriers' activities which provided information on common freight and passenger carriers. Contract carriers were omitted, together with other classes of truck transport such as urban, farm and intercity trucks operated by firms for the transportation of their own goods. Traffic data for various classes of trucks and areas of operation were not available. Even the basic measurement unit of freight transport, the ton-mile, was lacking. Among other reasons, it was difficult to secure traffic data because of the multitude of small trucking operators who, although comprising a significant portion of the industry, do not keep detailed traffic records.

Because of the heterogeneous nature of the trucking industry, it was decided to attempt a mail survey of motor transport traffic based on a random sample of vehicles selected from provincial registrations records. A pilot survey was conducted in the province of Manitoba in 1954 to determine the feasibility of this method. Upon obtaining a satisfac-

tory response, similar arrangements were made with the other provinces.

SAMPLING METHODS

The technique of sampling vehicles is generally the same in each province. Samples of commercial vehicles are selected quarterly from motor vehicle registration records. The vehicle sample is stratified by six gross vehicle weight groups: 0-2½ tons, 2½-5 tons, 5-7½ tons, 7½-10 tons, 10-15 tons, and over 15 tons. Where possible, samples are selected from distinct license categories corresponding to four functional classes: for-hire, private intercity, farm, and urban. In some provinces where the licensing system does not provide a satisfactory breakdown of vehicle groups, trucks are classified according to replies received in survey questionnaires.

Vehicles which do not normally engage in the transportation of commodities are excluded. Examples are: tow trucks, hearses, ambulances, snowmobiles, farm tractors, cranes, bulldozers, diggers, graders, other road building equipment, and military and government-owned vehicles.

An over-all sample of 12 percent of trucks registered in Canada was selected during 1957 on the basis of approximately 3 percent chosen each quarter to ensure that the sample vehicles represented current registrations in force. A larger sample was concentrated in the heavier weight groups. This resulted, for example, in 25.8 percent of for-hire trucks being included in the survey. The operator of each vehicle selected is asked to provide information on the vehicle's operations for a specified 7-day period, Sunday through Saturday. The questionnaire (*1*) is an 18-page booklet in attractive layout and format to invite cooperation in its completion by the respondent.

The results obtained from completed questionnaires are expanded to represent total truck traffic for each quarterly period by multiplying sample data by the inverse ratio of the sample to the estimated population and by the ratio of three months (13 weeks) to one week. Annual provincial data are compiled by combining quarterly results; annual totals, therefore, incorporate or give effect to seasonal fluctuations in traffic.

PROBLEMS OF COMPILATION

In compiling national estimates from provincial data several problems arise. One major difficulty is the elimination of duplication occurring when vehicles are registered in more than one province and travel across provincial boundaries. It was not possible to obtain Canada totals simply by adding the total traffic performed by vehicles registered in each province. Instead, national estimates are compiled by totaling "within-the-province" traffic as published in provincial reports. "Traffic within a province" is defined as that performed entirely inside the province by trucks registered in that province. The "outside-the-province" portion of interprovincial and international traffic, as well as a small amount of traffic performed entirely outside provincial boundaries, is thus excluded. By using "within-the-province" data, no duplication should occur, as no vehicle has more than one registration in each province. Removing duplication from national estimates of interprovincial traffic presented a particular problem. This was overcome by using a correction factor based on "net" registrations.

Another problem in the preparation of useful national estimates is the lack of comparability in vehicle weight classifications. Although most provinces license by gross vehicle weight, Quebec and British Columbia use a tare weight system, and gross vehicle weights must be estimated. In Ontario, tractors only are licensed by gross vehicle weight, so that the combined weight must be calculated by using an estimated tare weight of the attached trailer and the weight of the heaviest load carried during the week. It thus becomes difficult to assign tractor-trailers to specific weight groups.

Another serious difficulty in the compilation of worthwhile national estimates

is the lack of comparable vehicle license classifications among the ten provinces. The existing provincial licensing systems are used, where possible, to classify vehicles into the four functional categories. Unfortunately, this method does not provide closely comparable vehicle classes because of the different meanings placed on similar-appearing license types. For example, in Ontario a common or contract carrier license is required for the transportation of any commodity for compensation on a highway. By comparison, in Manitoba it need be obtained only for common or contract carrier operations beyond a 15-mile radius of the place of registration. In Saskatchewan the transportation of general merchandise or specified commodities for compensation requires a carrier license, although this is not required for the transportation of certain other commodities for revenue. Numerous additional variations occur among other provincial vehicle classes.

If the provinces were to adopt a uniform standard of vehicle classification, this problem would disappear. A method of providing strict uniformity, however, would be to classify vehicles on the basis of replies to the questionnaires using standard definitions established for that purpose. Unfortunately, the results so obtained could not be related to the licensing systems of some provinces and this would limit their value in the administration of provincial motor vehicle and highway policies. In future reports, however, it is planned to provide supplementary estimates of for-hire operations based on standard criteria, in addition to the data compiled in accordance with the licensing systems.

RESPONSE

A satisfactory response to the survey has been achieved by means of an intensive mail tracing procedure combined with a further follow-up by D.B.S. regional officials where required. During 1957, of a total of 100,846 trucks selected, non-response amounted to only 10 percent. However, 15 percent of the questionnaires were returned incomplete and unusable. Completed questionnaires equaled 45 percent. Questionnaires reporting vehicles not operated amounted to 30 percent. These latter, however, are considered usable questionnaires, because allowances for vehicles not in operation must be made when expanding the survey results. Thus, satisfactory returns are considered to be 75 percent of the total questionnaires mailed. The rates of response, of course, vary among vehicle classes and provinces and indications are that there is a tendency for larger firms to be more co-operative.

SOURCES OF ERROR IN SURVEY

The present method of collecting road transport traffic data is susceptible to deficiencies common to sample survey techniques using a mail questionnaire. Apart from sampling error, the estimates are subject to certain weaknesses in the actual reporting of traffic data. Because many truck operators do not keep detailed operating records, replies to certain questions (such as total weight of goods loaded during the survey week) may be based on rough estimates or opinions. This is particularly true for farm and urban trucks.

A serious bias could be expected in the matter of reporting the vehicle as "not used" during the survey week. Respondents were asked to state reasons for the non-use of the vehicle. Among the more common replies were "being repaired," "no business," "laid up for the season," and "bad road conditions." Vehicles are treated as not used only if the specific reason given indicates that they did not operate. If there is any doubt, the questionnaire is returned to the owner for more detail. Where no reason is forthcoming, the questionnaire is considered as "not completed." To date there has been no direct evidence indicating that owners report vehicles as not used to avoid the effort of completing the questionnaire in detail.

Another bias might result from the assumption that the vehicles for which questionnaires were not completed or not

returned, were operated or not operated in the same proportion as those vehicles providing completed questionnaires.

Tests of reliability have still to be carried out. However, the general estimates obtained to date have shown stability in successive surveys and seem to conform with the results expected by major users of the data. Reliability of these estimates will tend to vary with the type of data collected and according to whether the statistics are based on a relatively large number of returns. In other words, in any stratified sample more reliable results are expected for the whole sample than for any segment. This has imposed a limit on the degree of breakdown possible. Generally speaking, however, vehicle operations averages are probably more reliable than total estimates.

REQUIREMENTS FOR ADDITIONAL TRAFFIC DATA

Typical of the provincial reports released is "Motor Transport Traffic Statistics, Province of Ontario, 1957" (*2*). This report gives some background history regarding the methods followed in the survey, how the survey results were expanded, the response to the survey, and a brief description of the various report sections. The following tables are included:

Sec. I. Traffic of Ontario registered trucks inside and outside the province.
- Table 1. All trucks by type of operation.
- Table 2. All trucks by gross vehicle weight groups.
- Table 3. For-hire trucks by gross vehicle weight groups.
- Table 4. Private intercity trucks by gross vehicle weight groups.

Sec. II. Traffic of Ontario registered trucks within the province.
- Table 1. All trucks by type of operation.
- Table 2. All trucks by gross vehicle weight groups.
- Table 3. For-hire trucks by gross vehicle weight groups.
- Table 4. Private intercity trucks by gross vehicle weight groups.
- Table 5. Private urban trucks by gross vehicle weight groups.
- Table 6. Private farm trucks by gross vehicle weight groups.
- Table 7. Selected statistics of intercity traffic by gross vehicle weight groups.

Sec. III. Intraprovincial traffic by Ontario registered trucks.
- Table 1. Selected statistics by gross vehicle weight groups.
- Table 2. Selected statistics by commodity groups.

Sec. IV. Interprovincial and international traffic by Ontario registered trucks.
- Table 1. Tons of goods carried.
- Table 2. Selected statistics by gross vehicle weight groups.
- Table 3. Selected statistics by commodity groups.

Sec. V. Traffic by Ontario registered buses inside and outside the province.
- Table 1. By passenger seating capacity.

Sec. VI. Traffic by Ontario registered buses within the province.
- Table 1. By passenger seating capacity.

Appendix. Sampling results.

As demand warrants, further analyses may be provided. Because of previous requests, information on model and axle was collected during 1958 and some tabulations may be published in 1958 reports. Several requests have been received for statistics of private vehicle operations by industry classes (such as mining, manufacturing, forestry, wholesale and retail trade). These data, as well as more detailed commodity statistics, may be compiled in the future.

Less interest has been displayed in farm and urban traffic statistics and a reduction in the coverage of such classes

is under consideration. This would allow for an expanded survey of the heavier gross vehicle weight groups, most of which comprise those for-hire or private intercity vehicles which are more competitive with rail and water carriers. A larger sample should facilitate a finer breakdown of data, including extra tabulations such as traffic flow patterns by selected major trucking routes.

Although the reports on motor transport traffic to date have succeeded in filling a statistical gap in the field of road transport, no information on automobile traffic has been collected in regard to fuel consumption rates and average yearly mileage. This could be based on a special sample of automobile registrations and a separate mail survey.

RESULTS OF 1957 SURVEY

Among the more interesting results of the 1957 motor transport traffic survey are those pertaining to for-hire trucks. Although such vehicles amounted to only 5.6 percent of total registrations, they accounted for 48.3 percent of the total net ton-miles performed by all commercial trucks in Canada. This follows not only from the comparatively high average yearly mileage of for-hire trucks (18,200 as opposed to 6,800 for all trucks) but also from the heavier average load carried (8.2 tons as compared with an average of 3.5 tons for all trucks). These results may be attributed to the fact that nearly 32 percent of for-hire vehicles have a gross vehicle weight of over 15 tons, whereas only 2.5 percent of all other classes fall in this weight group. The predominance of heavier for-hire vehicles also explains the low mileage (5.5) per gallon (U.S.) of gasoline as compared with a ratio of 8.6 for all vehicles.

Private intercity vehicles in Canada have an average yearly mileage of 9,700 and obtain 8.7 miles per gallon (U.S.). The amount of traffic performed by these trucks averages 15,200 net ton-miles and is considerably less than the for-hire vehicle 100,700 net ton-mile average. Capacity utilized by private intercity trucks in Canada averages 38 percent compared with 48 percent for for-hire trucks.

Of considerable interest to the transport economist are statistics of the average length of haul by for-hire vehicles. This was estimated to be 42 miles in intraprovincial trips and 406 miles in interprovincial and international operations. Further data are presented by commodity and gross vehicle weight groups in the Appendix.

APPLICATIONS OF MOTOR TRANSPORT TRAFFIC DATA

Various applications of these data can be made in studies of road use and highway tax policy. To formulate realistic administrative and fiscal policies for roads and streets it is useful to examine the function of the motor vehicle in the national transportation system. These Canadian motor transport traffic statistics now make possible comparisons between rail, water, air, pipeline and road transport. Table 3 (Appendix) shows that in 1957 rail transport accounted for 59 percent of the total intercity net ton-miles performed in Canada and trucks accounted for 7 percent. Considering weight of goods carried, however, truck transport accounted for 52 percent of the total. The large percentage of ton-miles performed by railways in Canada partly reflects the influence of the country's geography where several bulk commodities are hauled long distances between Western Canada, the Central Provinces of Ontario and Quebec, and the Atlantic Provinces. On the other hand, a large part of Canadian truck transport is centered around comparatively few large cities and in the relatively compact industrial region of the Niagara Peninsula and the St. Lawrence Lowlands. Another significant factor is the growing use of "piggy-back" operations for intercity traffic.

Further illustrating the use of motor transport traffic statistics in highway taxation problems, a special compilation (Table 5, Appendix) shows gasoline and diesel oil consumption rates based on

actual vehicle operations in five provinces. This information has been used to derive the fuel consumption curves shown in Figure 1, which is based on registered and not actual operating gross vehicle weights. Furthermore, the curve is a freehand sketch and not a mathematically computed trend-line. However, data are available from the survey for the production of more refined and reliable fuel consumption curves.

Such data may be used to assess the incidence of total motor vehicle taxes on private intercity and for-hire trucks supplementing specific license fee data and motor fuel tax statistics. Through a more precise measurement of road user imposts for specific classes of vehicles, a better evaluation of the various vehicle taxation plans in Canada should result.

CONCLUSIONS

Reliable statistical information on the composition of the highway system, revenues and expenditures for roads and streets, the uses of the highway system, and the operational characteristics of highway vehicles and the motor transport industry are essential for the formulation and implementation of highway policy. Such data are difficult to obtain and compile. This is particularly true with regard to motor transport traffic statistics. It is believed that the approach to this problem developed and employed by the Dominion Bureau of Statistics is unique. Results seem to indicate that the technique is sound and that the data obtained are reasonably reliable. There are obviously certain weaknesses in the program, but these are gradually being overcome.

It is hoped that the experience gained by D.B.S. may be of some value to agencies responsible for compiling similar information in other countries. In this regard, it is believed that some of the data produced by D.B.S. may be of current value to American highway engineers and economists. The vehicle fuel consumption data, for example, may be useful in the United States inasmuch as the vehicle types and operating conditions in the two countries are almost identical.

In closing, it may be of interest to indicate the effort involved in compiling these data. At present there are 26 clerks and two professional people working exclusively on these surveys. In addition

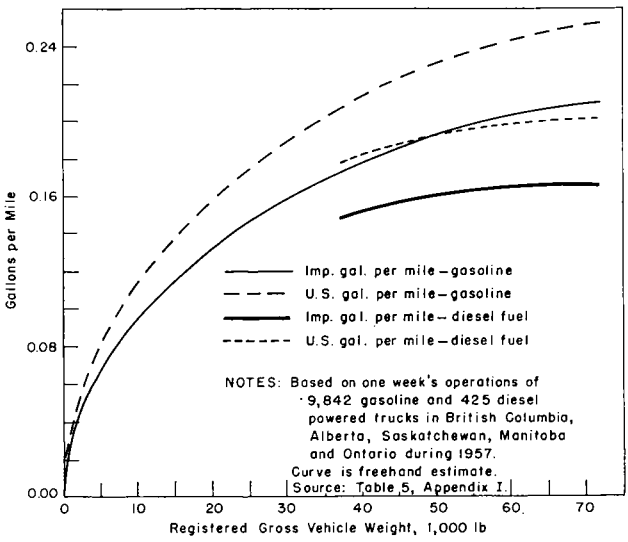

Figure 1. Fuel consumption curves of for-hire and private intercity trucks, 1957.

the project requires general supervision and some part-time assistance from the D.B.S. field officials located in each province. There are approximately 10 times as many vehicles and people in the United States as there are in Canada. However, the relationship of 10 to 1 might be an inappropriate factor for estimating the requirements to undertake a similar project in the United States in view of the economies of scale associated with a larger project.

REFERENCES

1. "Trucking Survey Questionnaire." Transportation and Public Utilities Section, Dominion Bureau of Statistics, Ottawa, Canada (1957).
2. "Motor Transport Traffic Statistics, Province of Ontario, 1957." Transportation and Public Utilities Section, Dominion Bureau of Statistics, Ottawa, Canada (1958).

APPENDIX

TABLE 1

TRUCK TRAFFIC IN CANADA BY TYPE OF OPERATION AND GROSS WEIGHT GROUPS, 1957 [a]

Category	Annual Mileage per Truck [b]	Miles Per Gallon [b]				Cargo Use [c]				Revenue per Ton-Mile [b] ($)
		Gasoline		Diesel Oil		Goods Carried (tons) [b]	Net Ton-Miles [b]	Gross Ton-Miles [b]	% of Cap. Util. [b]	
		U.S.	Imp.	U.S.	Imp.					
(a) Total, by Type of Operation										
For-hire	18,200	5.5	6.6	5.0	6.0	8.2	100,700	213,900	47.8	0.082
Private:										
Intercity	9,700	8.7	10.5	4.9	5.9	3.6	15,200	44,900	38.2	—
Urban	6,200	9.3	11.2	4.9	5.9	1.4	4,800	20,400	31.1	—
Farm	3,400	11.0	13.2	—	—	1.2	1,300	8,600	23.1	—
Total	6,800	8.6	10.3	5.0	6.0	3.5	11,600	33,300	39.8	—
(b) Total For-Hire, by Registered Gross Vehicle Weight										
0- 5,000 lb	5,000	11.6	13.9	—	—	0.6	1,600	9,600	33.9	0.44
5,001-10,000 lb	11,200	9.7	11.6	—	—	1.1	8,200	33,700	40.4	0.339
10,001-15,000 lb	10,700	7.8	9.4	—	—	2.4	18,200	54,000	45.8	0.227
15,001-20,000 lb	11,800	6.7	8.1	7.2	8.7	3.6	28,800	76,500	43.5	0.143
20,001-30,000 lb	16,300	5.9	7.1	5.2	6.2	6.2	59,300	136,300	43.9	0.093
30,001-50,000 lb	23,300	4.7	5.6	5.1	6.1	10.0	157,800	321,100	47.0	0.076
50,001-over	38,300	4.3	5.2	5.0	6.0	13.2	378,200	750,100	51.2	0.063
Total	18,200	5.5	6.6	5.0	6.0	8.2	100,700	213,900	47.8	0.082
(c) Total Private Intercity, by Registered Gross Vehicle Weight										
0- 5,000 lb	8,000	13.0	15.6	—	—	0.4	1,000	13,200	14.3	—
5,001-10,000 lb	8,600	11.2	13.4	—	—	0.7	2,500	20,300	21.7	—
10,001-15,000 lb	9,600	8.2	9.8	7.7	9.2	2.3	13,200	45,700	38.3	—
15,001-20,000 lb	10,600	7.0	8.4	8.0	10.0	3.7	22,700	65,100	38.6	—
20,001-30,000 lb	14,000	6.0	7.2	4.9	5.9	5.5	44,400	109,800	40.0	—
30,001-50,000 lb	19,000	5.0	6.0	4.7	5.7	9.9	107,700	225,300	42.4	—
50,001-over	30,800	4.2	5.1	5.0	6.0	13.3	272,200	570,500	45.8	—
Total	9,700	8.7	10.5	4.9	5.9	3.6	15,200	44,900	38.2	—

[a] From "Motor Transport Traffic Statistics," Dominion Bureau of Statistics, Ottawa, Canada.
[b] Average.
[c] Per truck.

TABLE 2

TRAFFIC IN CANADA BY COMMODITY AND GROSS VEHICLE WEIGHT GROUPS, 1957 [a]

Category	For-Hire			Private Intercity	
	Avg. Weight Carried (tons)	Avg. Distance per Ton (mi)	Revenue per Ton-Mile ($)	Avg. Weight Carried (tons)	Avg. Distance per Ton (mi)
(*a*) INTRAPROVINCIAL,[b] BY COMMODITY GROUP					
Agric. products	9.1	64.3	0.061	4.7	40.7
Animals and animal products	4.7	66.9	0.088	2.6	59.2
Mine products	9.4	10.6	0.071	8.3	8.8
Forest products	8.8	35.3	0.080	6.7	25.8
Manufactures and misc.	9.9	89.8	0.072	2.9	42.3
General freight	7.3	94.8	0.103	2.4	35.6
Total	8.4	42.5	0.079	3.7	23.0
(*b*) INTERPROVINCIAL, BY COMMODITY GROUP					
Agric. products	14.2	598.1	0.039	9.8	274.7
Animals and animal products	11.7	684.7	0.043	9.0	369.6
Mine products	14.6	295.4	0.041	10.8	171.0
Forest products	13.8	195.1	0.042	9.4	52.1
Manufactures and misc.	11.6	371.1	0.056	7.1	226.0
General freight	12.7	414.1	0.064	12.4	875.5
Total	12.1	406.4	0.055	8.5	191.9
(*c*) INTERPROVINCIAL, BY GROSS VEHICLE WEIGHT					
0-10,000 lb	0.5	41.0	0.988	0.5	73.8
10,001-20,000 lb	3.6	193.6	0.165	3.3	85.3
20,001-30,000 lb	9.0	446.2	0.058	6.0	66.8
30,001-50,000 lb	11.1	374.9	0.060	11.4	185.9
50,001-over	14.1	436.6	0.049	14.2	443.4
Total	12.1	406.4	0.055	8.5	191.9

[a] From "Motor Transport Traffic Statistics," Dominion Bureau of Statistics, Ottawa, Canada.
[b] Excludes interprovincial and international trips.

TABLE 3

INTERCITY FREIGHT IN CANADA, 1957, BY MAJOR MODES OF TRANSPORT [a]

Transport Mode	Millions of Freight Ton-Miles	% of Total	Thousands of Tons	% of Total
Rail	71,047	58.93	197,010	34.52
Water, inland [b]	24,656	20.45	37,869	6.64
Highway	8,330	6.91	293,925	51.50
Pipeline, petroleum	16,507	13.69	41,751	7.32
Air	24	0.02	133	0.02
Total	120,564	100.00	570,688	100.00

[a] From publications of the Transportation and Public Utilities Section, Dominion Bureau of Statistics, Ottawa, Canada.
[b] Estimated.

TABLE 4

MOTOR FUEL TAX RATES IN CANADA, 1957 [a]

Province	Tax per Gallon of Motor Fuel ¢	
	Imp. Gal.	U.S. Gal.
Newfoundland	17	14
Pr. Edward Island	16	13
Nova Scotia	17	14
New Brunswick	15	12
Quebec	13	11
Ontario [b]	13	11
Manitoba	11	9
Saskatchewan	12	10
Alberta	10	8
British Columbia	10	8
Canada average	13.4	11.2

[a] From "The Motor Vehicle," Dominion Bureau of Statistics, Ottawa, Canada.
[b] Diesel fuel $0.185 per Imp. gallon and $0.154 per U.S. gallon.

TABLE 5

FUEL CONSUMPTION RATES OF FOR-HIRE AND PRIVATE INTERCITY TRUCKS BY REGISTERED GROSS VEHICLE WEIGHT, 1957 (IN ONTARIO, MANITOBA, SASKATCHEWAN, ALBERTA, BRITISH COLUMBIA)[a]

Gross Vehicle Weight	Gasoline			Diesel Fuel		
	No. of Trucks	Gal per Mile		No. of Trucks	Gal per Mile	
		Imp.	U.S.		Imp.	U.S.
2,001- 4,000	407	0.06316	0.07585	—	—	—
4,001- 6,000	1,809	0.06752	0.08108	—	—	—
6,001- 8,000	561	0.08170	0.09811	—	—	—
8,001-10,000	183	0.08989	0.10795	—	—	—
10,001-12,000	212	0.10194	0.12242	—	—	—
12,001-14,000	224	0.10438	0.12535	—	—	—
14,001-16,000	489	0.11632	0.13969	—	—	—
16,001-18,000	254	0.12323	0.14799	—	—	—
18,001-20,000	508	0.12563	0.15087	—	—	—
20,001-22,000	815	0.13325	0.16002	2	0.23492	0.28212
22,001-24,000	1,156	0.14032	0.16851	10	0.13307	0.15980
24,001-26,000	201	0.15167	0.18214	1	0.25000	0.30023
26,001-28,000	428	0.14561	0.17486	9	0.16788	0.20161
28,001-30,000	56	0.16338	0.19620	1	0.16327	0.19607
30,001-32,000	60	0.16368	0.19656	2	0.18846	0.22632
32,001-34,000	81	0.16479	0.19790	—	—	—
34,001-36,000	128	0.16849	0.20234	1	0.14916	0.17913
36,001-38,000	275	0.17730	0.21292	9	0.18992	0.22807
38,001-40,000	259	0.17788	0.21362	8	0.17197	0.20652
40,001-42,000	419	0.17497	0.21012	16	0.16811	0.20188
42,001-44,000	34	0.19203	0.23061	1	0.14300	0.17173
44,001-46,000	53	0.19644	0.23590	5	0.17576	0.21107
46,001-48,000	21	0.17771	0.21341	2	0.14865	0.17851
48,001-50,000	57	0.17851	0.21437	2	0.14039	0.16859
50,001-52,000	131	0.19017	0.22838	12	0.14074	0.16901
52,001-54,000	152	0.18932	0.22735	20	0.17065	0.20493
54,001-56,000	700	0.19120	0.22961	218	0.16043	0.19266
56,001-58,000	15	0.21895	0.26294	11	0.13035	0.15654
58,001-60,000	3	0.19689	0.23645	3	0.19173	0.23025
60,001-62,000	15	0.23990	0.28810	9	0.17671	0.21221
62,001-64,000	18	0.21211	0.25472	11	0.16446	0.19743
64,001-66,000	113	0.21618	0.25961	52	0.16365	0.19653
66,001-68,000	2	0.24973	0.29990	2	0.20124	0.24167
68,001-70,000	1	0.15909	0.19105	5	0.17214	0.20672
70,001-72,000	2	0.24154	0.29007	13	0.20575	0.24709
All groups	9,842	0.14824	0.17802	425	0.16258	0.19524

[a] From "Motor Transport Traffic Statistics," Dominion Bureau of Statistics, Ottawa, Canada.