

Characteristics of Commercial Vehicle Drivers in Ontario

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Considerable attention has been paid recently to the drivers of commercial vehicles, in light of concerns about the impact of deregulation. In 1988 a major on-highway survey of commercial vehicles was carried out in the province of Ontario. Data in the survey were also collected on the characteristics of truck drivers, including age, the means and terms of employment, driving record, and extent of experience and training. Information from the survey provides useful insight as to the working conditions of drivers and the nature of the drivers themselves.

Drivers of large commercial vehicles have been the focus of public attention for many years. With trucking deregulation in the United States in 1980 and in Canada in 1988, its impact on these drivers has been the subject of concerns, specifically the following:

- In their drive to become more profitable, firms have changed the security, remuneration, and conditions of employment of drivers, resulting in less driver accountability.
- There is suspicion that deregulation will encourage the deferring of vehicle maintenance in order to reduce costs.
- As a result, safety has been compromised with a deterioration in driver and vehicle performance, especially because of increased traffic congestion and the economic need to increase vehicle use.

The correlation between economic regulation and safety performance is unclear, given that the level of truck safety was controversial even before deregulation. Indeed, some have argued that the principal safety problem was not necessarily the degree of economic regulation but the adequacy of enforcement (1).

A review of truck driver-related characteristics was considered appropriate in the context of an overall goods movement study, given this and the fact that truck drivers have one of the highest occupational fatality rates (2,p.431). Concerns have also been raised because of a perceived shortage of qualified drivers that was identified in the 1980s. Considerable goods traffic was diverted from the rail mode to the truck mode; at the same time, working conditions and pay levels in the trucking industry were not sufficient to attract or retain truck drivers (3,4).

The opportunity to research these issues arose during the undertaking of the 1988 Ontario Commercial Vehicle Survey. For that survey, several questions were asked about employment status, length of driving experience, driver remuneration

and training, and union affiliation. An attempt was made to collect driver license numbers in order to analyze driving records.

The intent of this paper is to report on these findings. It should be noted that although driver-related information was but a small part of the information collected during the survey, it is an initial step in building a base of knowledge from which other parts of the ministry can analyze further, develop policies, and refine enforcement procedures.

The literature contains many examples of studies that are more specific in their analysis or application, for example, studies that evaluate driver improvement programs, reasons and exposure rates for truck accidents by driver and vehicle type, and the effects of deregulation. This study does not attempt to draw on or compare itself to all this research.

SURVEY LOGISTICS

The Ontario Ministry of Transport periodically carries out on-highway surveys of intercity truck activity. Its 1988 Ontario Commercial Vehicle Survey was conducted over 23 weeks between March and November 1988 at 57 locations, mainly at vehicle inspection stations and border crossings (Figure 1). At most locations, surveying was done over a full 24-hr period, weather permitting.

A total of 19,225 commercial vehicle drivers were given a 29-question interview that lasted between 8 and 12 min; 8 questions specifically pertained to the driver. The survey total represented an overall sample rate of 18 percent. The survey was conducted by trained university students and contract personnel, not vehicle inspection staff. Vehicle inspection staff directed traffic into the inspection station and weighed the vehicle. There was no threat, implied or actual, for nonresponse; drivers who refused to participate were immediately free to proceed. Enforcement was practiced during the survey with respect to weight or safety violations, but there was little evidence of station avoidance.

Generally, between two and five vehicles were directed into the inspection area, where they were weighed and the drivers interviewed. All other vehicles were allowed to bypass the inspection area until the surveying was completed. The process was then repeated. There was no attempt to bias the survey by class of truck or carrier; the likelihood of being selected was equal.

Drivers responded favorably to the survey. There was a refusal rate of 3.9 percent for the entire survey. For each individual question, there was a further nonresponse rate on

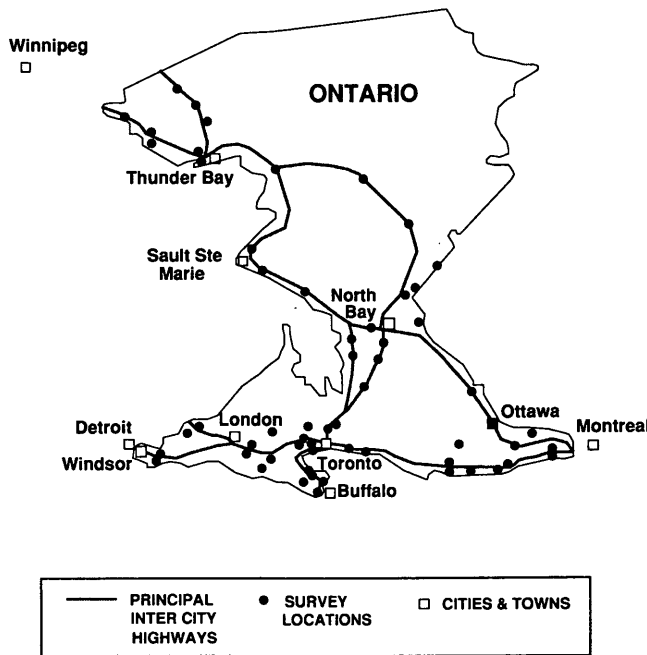


FIGURE 1 Locations of survey stations.

the order of 9 to 15 percent. Ontario drivers, who constituted 81 percent of all drivers surveyed, were also asked if they would voluntarily provide their driver license number as part of the interview. About 8,800, or 64 percent, of the surveyed Ontario drivers provided a valid license number for analysis. This figure roughly approximated a 1 percent sample of all Ontario truck drivers. Their records were later compared with a representative subset of the licensed Ontario driving population.

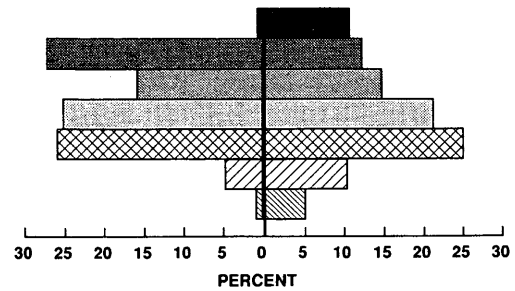
The survey results were controlled at the analysis level so as to not overrepresent the same driver on the same trip but at a different location. Given the expanse of the province, a driver or vehicle could conceivably pass as many as nine inspection stations on a single trip.

OTHER SURVEY FINDINGS

On the order of 76 percent of the vehicles surveyed were tractor and semi-trailer units, 16 percent were straight trucks, 6 percent were tractor and two-trailer units, and 2 percent were other types. The three most prominent body styles of vehicles were van or box (61 percent), flatbed (14 percent), and tanker (8 percent). Fifty-eight percent of the vehicles had five axles, 20 percent had six or more axles, and 22 percent had less than five axles.

Fifty-two percent of the movements surveyed were by private carriers (companies that haul their own goods), in contrast to 48 percent by for-hire carriers (companies who haul goods for other firms). Forty-four percent of all movements and 51 percent of all weight carried crossed the provincial border. The mean trip length of the first truck-trailer unit was 560 km (350 mi).

ONTARIO TRUCK DRIVERS ALL ONTARIO DRIVERS



ONTARIO TRUCK DRIVERS NON-ONTARIO TRUCK DRIVERS

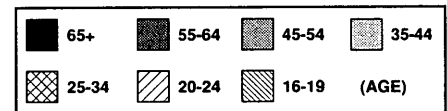
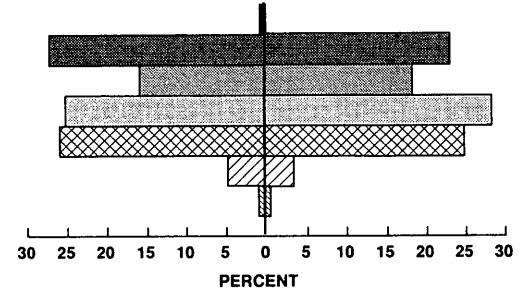


FIGURE 2 Age profile of men drivers.

AGE AND SEX PROFILE

The truck driving profession is dominated by men; fewer than 1 percent of drivers surveyed were women. The demographic profile of drivers is principally occupied by those in the advanced age categories, if the over-65 age category is excluded (Figure 2).

There were only modest differences among the commercial vehicle driver categories (Table 1). The mean age of drivers was 39 years. This was slightly younger than that—41 years—found in a recent (1988) Florida survey of 900 intercity drivers conducted at 16 inspection stations (5,6). About one-third of all drivers were in their thirties. Most differences were found in the under-30 age category, partly because one must be 18 years old in Ontario to drive a truck (American standards restrict truck drivers to 21 years and older).

A more profound difference was discovered when comparing company drivers to brokers and owner operators, individuals who own a truck and operate it themselves, usually under contract with a carrier. Sixteen percent of brokers and owner operators were under 30 years old compared with 20 percent of company drivers.

EMPLOYMENT STATUS

One of the most visible outcomes of deregulation has been that firms more often contract work out to driver services, particularly to owner operators. Greater use of such drivers

TABLE 1 Percentage of Commercial Vehicle Drivers by Age Category

AGE GROUP (years)	BROKERS & OWNER OPERATORS	COMPANY DRIVERS	FOR-HIRE DRIVERS	PRIVATE DRIVERS	ONTARIO DRIVERS	NON-ONTARIO DRIVERS	TOTAL
16-19	1.0	1.0	1.0	1.0	1.0	1.0	1.0
20-29	15.4	20.4	20.1	18.8	20.1	18.1	19.7
30-39	36.9	34.6	35.3	34.8	34.9	34.3	34.8
40-49	29.7	25.8	26.1	26.8	25.7	30.1	26.5
50-59	14.6	15.2	14.7	15.7	15.3	14.6	15.1
60-64	2.0	2.3	2.2	2.2	2.3	1.8	2.2
65 +	0.4	0.7	0.6	0.7	0.8	0.3	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean Age (yrs)	39.3	38.9	38.8	39.0	38.9	39.1	39.0

TABLE 2 Driver Employment by Type of Carrier

EMPLOYMENT CATEGORY	FOR-HIRE CARRIER	PRIVATE CARRIER	COMBINED
Company Driver	61.8%	83.7%	73.1%
Broker/Owner Operator	28.5%	8.6%	18.3%
Agency Driver	7.5%	5.7%	6.5%
Self Employed	2.2%	2.0%	2.1%
TOTAL	100.0%	100.0%	100.0%

is a function of

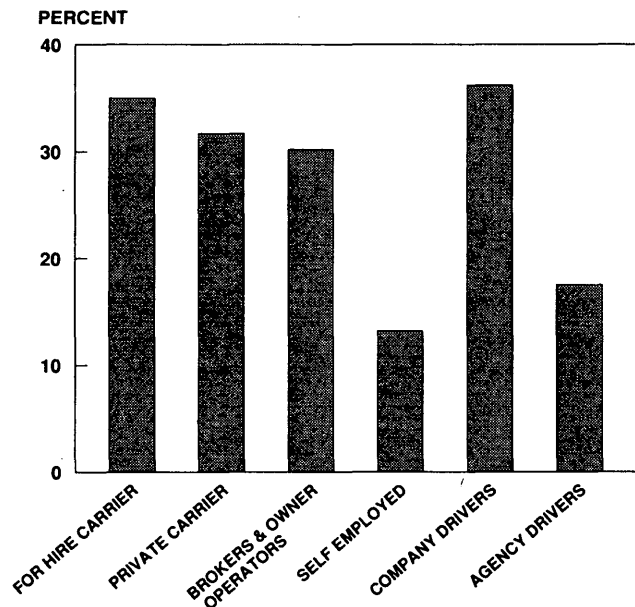
- Attempts by firms to reduce both fleet size, direct driver employment levels, and associated benefits; and
- Opportunities for individual drivers to attain higher pay by operating independently rather than as part of a larger firm.

The 1988 survey established that a quarter of all drivers operated outside of a traditional firm. The largest proportion, 18 percent, was made up of brokers or owner operators, almost three times that for agency drivers (Table 2). The aforementioned Florida survey found greater evidence of owner operator use—27 percent. For-hire carriers relied on agency drivers and brokers to a far greater extent (36 percent) than private carriers (14 percent).

In contrast, the 1983 Ontario Commercial Vehicle Survey identified that 79 percent were company drivers, 9 percent were brokers or owner operators, 8 percent were self-employed, and 4 percent were agency drivers. For-hire carriers were also found to be three times as likely to contract work out to brokers or owner operators (7,p.141). Undoubtedly, pressures to become more competitive induced greater use of owner operators during the period 1983–1988.

About one-third of all drivers surveyed belonged to a work-related association, mainly a union, and mainly the Teamsters union. Even among brokers and owner operators there was considerable union membership (Figure 3).

Unionization levels are generally attributed to be higher in Canada than in the United States. This was borne out in an

**FIGURE 3** Levels of membership in work-related associations.

examination of international trips: 30.7 percent of Ontario drivers involved in international (cross-border) trips reported being members of a union, compared with only 21.6 percent of U.S.-based drivers on similar trips. The Florida study found only 10 percent union membership among drivers but identified that another 27 percent formerly belonged to a union.

TABLE 3 Years of Commercial Driving Experience

DRIVER TYPE	YEARS OF EXPERIENCE					TOTAL	MEAN
	UNDER 9	10-19	20-29	30 & OVER			
Owner Operator	27.3%	37.2%	22.9%	12.6%	100.0%	16.2	
Company Driver	30.7%	34.4%	21.4%	13.5%	100.0%	15.4	
For-Hire Carrier	30.6%	34.7%	21.7%	13.0%	100.0%	15.8	
Private Carrier	29.2%	36.2%	21.2%	13.4%	100.0%	16.0	
Ontario Carrier	30.1%	35.0%	21.5%	13.5%	100.0%	15.9	
Other Carrier	29.8%	37.1%	21.4%	11.7%	100.0%	15.6	
Straight Trucks	47.1%	29.7%	14.9%	8.3%	100.0%	12.2	
Tractor & Semis	27.0%	36.3%	22.5%	14.2%	100.0%	16.6	
Work Assoc'n	20.0%	35.6%	25.4%	19.0%	100.0%	18.6	
Non Work Assoc'n	35.0%	35.3%	19.4%	10.3%	100.0%	14.5	
Average	30.0%	35.4%	21.5%	13.1%	100.0%	15.9	

DRIVING EXPERIENCE

The survey found that the typical driver had spent 16 years driving a commercial vehicle, comparable to the Florida study (15.7 years), and that some 35 percent of drivers had at least 20 years of experience. There were modest differences in experience among the different classes of drivers:

- Brokers and owner operators and those hauling for private carriers had slightly more years of experience than did company drivers and those hauling for private carriers (Table 3).
- Those hauling for Ontario and non-Ontario carriers had comparable levels of experience.
- There was a more profound difference in years of experience (19 years) between drivers who belonged to a work-related association (e.g., union) and drivers that did not (15 years), particularly among drivers with more than 30 years of experience.
- There was an equally notable difference in experience between drivers of smaller straight trucks and drivers of larger tractor and semi-trailer units. A significantly higher proportion of straight truck drivers had less than 9 years of experience than did any other category of driver.

When experience in years is compared to age, a significant pattern is revealed. There is a considerable drop-off in the

number of drivers with few years of experience in the 40-plus age groups. This tends to support the perception that truck driving is an attractive occupation only to younger people; relatively few enter the profession in their later working years. This has implications for the future supply of drivers, given the high mean age of drivers and the general aging of the North American population.

DRIVING REMUNERATION

About 33 percent of drivers surveyed indicated that they were paid on the basis of time, and 31 percent noted that they were paid on the basis of distance traveled (Table 4). Payment based exclusively on weight transported was unusual, although many drivers were paid by a combination of methods, including weight transported.

For-hire carriers generally paid their drivers on the basis of distance traveled; private carriers, on the basis of time. Drivers of particular truck body styles were compensated in different fashions for their services. For example, drivers of dump trucks, concrete mixers, and flatbed units were most often paid on the basis of time; for drivers of float units and car carriers, pay was based on distance; for drivers of hopper units and tankers, pay was based on a combination of methods.

By contrast, the 1987 Florida survey ascertained that 60 percent of the drivers were paid on the basis of distance trav-

TABLE 4 Method of Driver Payment

PAYMENT TYPE	FOR-HIRE	PRIVATE	COMBINED
Time (Hourly/Salaried)	20.7%	44.2%	32.9%
Distance travelled	39.0%	23.7%	31.0%
Weight/Volume/Commodity type	8.3%	4.5%	6.3%
Combination of methods	32.0%	27.6%	29.8%
Total	100.0%	100.0%	100.0%

eled, 33 percent were paid on the basis of characteristics of the load, and only 7 percent on the basis of a salary or hourly wage (8). Private carriers had a higher proportion of drivers paid on the basis of time—13 percent, versus 5 percent for for-hire carriers—but it was nowhere near that of the Ontario experience. (This question was not repeated for the 1988 version of the Florida survey.)

The concern about method of driver payment is that it almost represents a direct economic incentive to drive longer hours and violate hours-of-service regulations designed and instituted to enhance safety. The lack of rest that results from such situations has been found to translate into a greater risk of truck driver-related crashes (9,p.30).

DRIVER TRAINING

Driving a commercial vehicle is a demanding occupation. To continue to meet those demands it is advantageous to upgrade one's skills through additional training. It was asked whether, during the past few years, the drivers had taken a course that either taught or enhanced their knowledge of first aid, provided superior defensive driving skills, or trained and upgraded them in using dangerous goods and mitigating spills.

It should be noted that just taking such courses does not necessarily mean that one is a safer driver. There are variations in program length, depth of coverage, and year last taken. Indeed, some researchers have concluded that support for "common sense notions" in the traffic safety literature with respect to driver improvement activity programs is far from unequivocal (10).

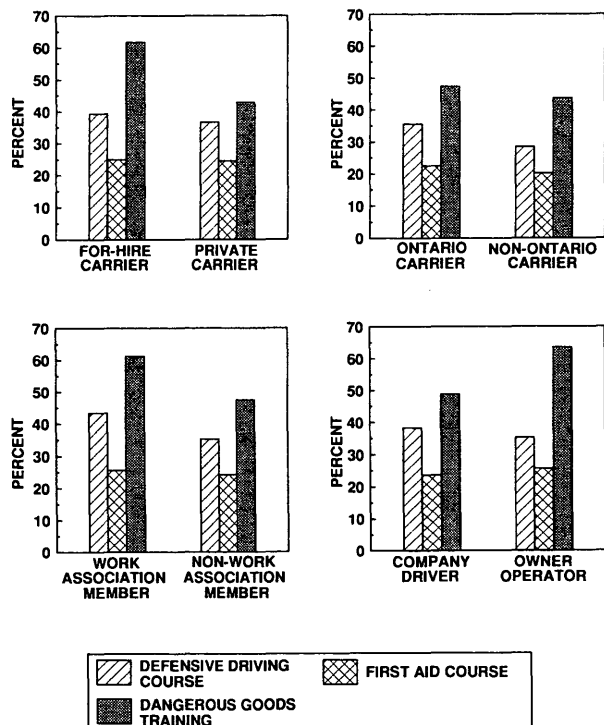


FIGURE 4 Extent of driver training.

Sixty-two percent of the drivers indicated that they undertook some form of enhanced training. The dangerous goods training course, a requirement by law for the transport of such goods, had a 47 percent attendance level; 34 percent attended a defensive driving course and 22 percent took a first aid course. About 11 percent of the drivers had taken all three course types. Drivers belonging to a work related-association or employed by a for-hire firm or Ontario-registered carrier were more likely to have taken such courses (Figure 4).

DRIVING RECORD

The public has a negative image of the commercial truck driver that is reinforced with every accident or incident involving trucks. It was thus considered opportune to investigate the driving records of commercial vehicle drivers to ascertain whether the public perception of those drivers was justified.

It was not possible to access the records of non-Ontario drivers, hence the request for driver license numbers was asked only of Ontario drivers. About 8,000 valid Ontario driver license numbers were obtained, a response rate of 64 percent. Because the overwhelming majority of drivers were male, the comparative analysis concentrated only on male driving records.

The driving records of these individuals were contrasted with the male proportion of a subset of 2.1 million drivers in the entire file of 6.5 million Ontario drivers. It should be noted that the comparison constitutes the total driving record of truck drivers, not just that obtained while driving a truck.

The following results were not formally checked for bias; it is acknowledged that the data may be biased insofar as poor drivers or those driving under suspension may have declined to provide their license numbers, although it was stated that the information would be kept in confidence and would not be used against them. Further analysis is intended to identify and correct those biases. Therefore, these results should be viewed with caution. Driving records are updated each year. Driver violations remain on the driver's record for 3 years after the offense.

It was found that the overall driving records of Ontario's truck drivers were superior to those of the general driving population (Table 5) in all categories except one—collisions. The data are to be analyzed further to ascertain whether geographical or other considerations (e.g., at-fault information) were associated with this statistic.

The driving records have not been adjusted to reflect distance traveled; given the vehicle kilometers traveled by truck drivers, their record would appear even more favorable than illustrated here. Alternatively, some enforcement staff believe that the court system tends to be more lenient with truckers than with other drivers because driving is a trucker's livelihood.

A review of the driving records of commercial vehicle drivers revealed that the proportion of offenses declines as age increases (Figure 5), similar to the experience of all younger drivers. This relationship appears to be consistent with other information. A U.S. analysis of fatal accident involvement rates by driver age for large trucks also illustrated that younger drivers tended to be over involved not only in fatal truck accidents but in nearly all other conditions (11).

TABLE 5 Comparison of Driving Records

CATEGORY	TRUCK DRIVERS	ALL MALE DRIVERS
Demerit Point Incidence	27.8%	35.7%
Convictions	31.1%	35.9%
Speeding Violations	19.9%	25.4%
Collisions	9.0%	6.8%
Alcoholic Collisions	0.1%	0.3%
Suspensions	2.8%	5.7%
Warning Letters	5.0%	7.5%
Interviews	1.2%	1.4%



FIGURE 5 Total traffic convictions for Ontario commercial vehicle drivers (men only), 1988 (Source: 1988 Ontario Commercial Vehicle Survey).

HOURS OF SERVICE

In response to concerns about safety, legislation has been passed that regulates the number of hours that commercial vehicle drivers can work daily, weekly, or biweekly. The 1988 Commercial Vehicle Survey requested that drivers provide information on how many hours they would work that day and how much of their time would actually be spent driving.

An examination of the mean hours worked and driven revealed only modest differences between subpopulations of drivers (i.e., for-hire versus private). Generally, on average, intercity drivers worked 10 hr that day, of which 7 hr were actually spent in transit.

Not surprisingly, intracity goods movement studies in Toronto and Ottawa established that far less time was spent in transit for urban goods movement trips; because of shorter distances and smaller shipment sizes, more time was spent loading and unloading. In the Toronto study, it was found

that 4 hr each was spent driving, loading, and unloading; in the Ottawa study, 3.8 hr was spent driving (42 percent) and 5.3 hr (58 percent) was spent loading and unloading (12,13).

Sixty-three percent of intercity drivers worked between 9 and 13 hr that day; 9 percent of drivers surveyed worked more than 13 hr that day. Contracted drivers and firms tended to work longer hours than their counterparts (Figure 6).

Of interest is the number of truck drivers who work more than 13 hr and those who drive for a large proportion of that time. Several studies have identified that truck driver performance tends to deteriorate as hours of driving increase (14,p.vi) and that elevated levels of accident risk have been associated with driving after more than 12 hr on duty and driving during early morning hours (9,p.29).

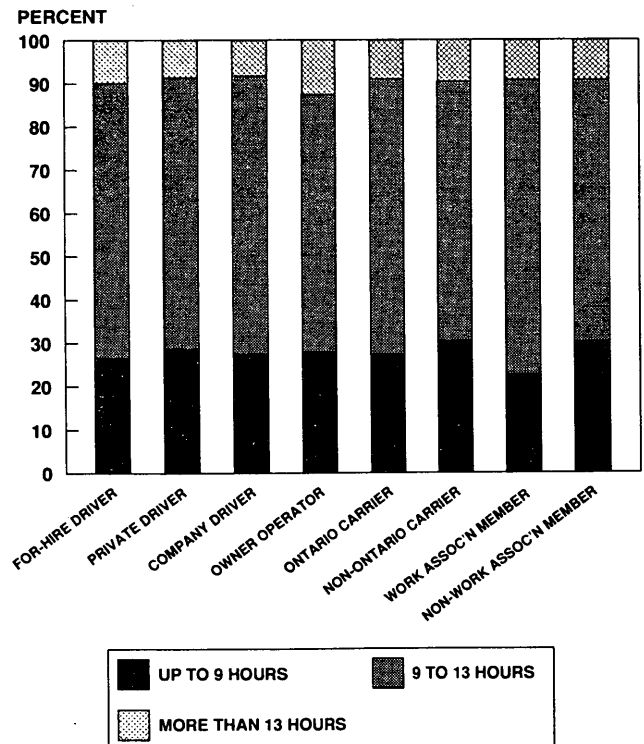


FIGURE 6 Hours of service.

TABLE 6 Ontario Accident Levels, 1985-1989 (24)

YEAR	ALL ACCIDENTS	ALL FATAL ACCIDENTS	TRUCK ACCIDENTS	FATAL ACCIDENTS
1985	189,750	1,036	60,386	417
1986	187,286	951	62,895	416
1987	203,431	1,085	71,172	483
1988	228,398	1,076	67,653	471
1989	247,038	1,106	70,510	466

DISCUSSION OF RESULTS

The purpose of the 1988 Ontario Commercial Vehicle Survey was to provide information on the characteristics of intercity truck movements in the province. Driver characteristics collected and reported here represent an initial step toward the provision of time series statistics on commercial vehicle drivers for policy development and analysis purposes. It is of great use insofar as it provides background information on several issues and concerns.

For example, hours-of-service regulations in the United States are more restrictive than those in Ontario. Recent enforcement blitzes have caught many Canadian truckers on cross-border trips in violation of those regulations (15).

The data collected on hours of service can be useful for evaluating whether current regulations are appropriate. They can be measured against reported driving practices, American regulatory experiences, and concerns about overworked drivers (16, p.1; 17, p.22), as well as whether they can be adequately articulated by drivers. For instance, a study of drivers of heavy freight trucks in the Netherlands found that hours-of-work regulations were frequently contravened, probably because they were poorly understood (14).

In addition, data on methods of driver payment, hours-of-service restrictions, and work-related association membership provide insight into issues affecting owner operators and unions (18), overall employment levels in the industry, and tax levels, affording the ability to better understand and deal with confrontational situations such as recent highway and border blockades held by independent Canadian truckers (19). These data also confirm that if current trends continue, there could be an employment deficiency in the industry that will be exacerbated by projected growth in the trucking sector in the 1990s. One study estimated that 34,000 new tractor-trailer drivers will be required in the Canadian trucking industry during this period (20). This deficiency is occurring when it is becoming increasingly difficult to attract new drivers from its traditional blue-collar sources and at the same time retain existing drivers because of associated working conditions and income levels.

It is hoped that these situations can be corrected with a redirection of educational resources and recruitment-related actions by other government agencies, and that drivers, carriers, shippers, and government can work together to alleviate other concerns.

Since driver-related violations as opposed to vehicle deficiencies are more often cited as causes of truck accidents (21), tying accident statistics to this information allows the findings of other studies to be confirmed or refuted. For example, one

such study states that younger drivers and longer hours of driving were associated with the higher crash involvement of large trucks (22).

Overall, truck-related accidents have been increasing at a slower rate than all accidents (by 17 to 30 percent, respectively) in Ontario over the past 5 years (Table 6); however, fatal truck accidents have increased more (12 percent) than all fatal accidents (7 percent).

Further analysis of the information collected enables a comparison of driver and vehicle statistics from the survey with accident information and the development of vehicle kilometer exposure rates by vehicle style with a view to updating policy and enforcement practices.

The data also provide a starting point to evaluate the success of driver training programs, given that the level of driver training is one of the most commonly cited factors associated with heavy-vehicle accidents (23). It was noted in another study that drivers with formal training were more likely to have accidents than those without (6).

It is reasonable to expect that when the next major provincial on-highway survey is undertaken in 1993, the list of questions asked of drivers themselves would be continued and perhaps augmented. The commercial vehicle surveys were not developed to evaluate the impact of deregulation, but a 1993 survey would represent a useful postderegulation view of some of the effects of that action, one to be compared with the 1988 information that approximates a view of deregulation in transition. Unfortunately, there is little substantive information to approximate the prederegulation view in Ontario.

ACKNOWLEDGEMENTS

The author greatly appreciated the efforts of all involved in the undertaking of the 1988 Ontario Commercial Vehicle Survey, particularly the work of R. Tardif, G. Ripley, E. Cheung, A. Banik, M. McLeod, J. Tao, A. Gerlewych, and P. Dimitrou.

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Publication of this paper sponsored by Committee on Vehicle User Characteristics.