Comparison of Office of Motor Carriers Accident Data with Independent Truck Accident Data from Washington State

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Detailed in this paper are the results of a comparison of accident data reported by motor carriers via the 50-T Form to the Office of Motor Carriers (OMC) with another independent source of similar accident data. This independent data source contains information from truck crashes that occurred on Interstate highways in Washington State that was collected as part of an independent truck safety study conducted by the Insurance Institute for Highway Safety (IIHS). The trucks in the independent data set were screened to determine which accidents should have been reported to OMC. Many comparisons were conducted to analyze the differences between trucks that reported to OMC versus those that did not and the accuracy of the information reported. This comparison found that only 40 percent of trucks involved in eligible crashes had their accident reported to OMC. Furthermore, many of the most important variables were not reported accurately. For example, of the 47 trucks with serious equipment defect identified in the Washington State Truck Study, only 3 reported defective equipment to OMC. Also, the truck configuration was reported incorrectly for about 20 percent of tractor-trailer trucks. Consequently, many past studies that have used the OMC 50-T form data for detailed analysis of truck safety may be invalid. On the basis of the results of these comparisons, several recommendations are made in this study to revise the 50-T form data and review its potential role in accident analysis.

Detailed in this paper are the results of a comparison of accident data reported by motor carriers via the 50-T Form to the OMC with another independent source of similar accident data. This independent data source contains information from truck crashes that occurred on Interstate highways in Washington State that was collected as part of an independent truck safety study conducted by the IIHS. The results of this Washington State Truck Study have already been reported in several journal articles (*1–3*). In addition to the standard police report form, the Washington State Truck Study also collected data via a supplementary truck form that was similar to the 50-T Form. Furthermore, an equipment inspection was performed for each crash-involved truck by commercial vehicle enforcement officers of the Washington State Patrol.

All the truck and police report data from the Washington State Truck Study were analyzed to determine which trucks should have reported their accidents to OMC. Afterward, an attempt was made to match all eligible crash-involved trucks from the Washington State Truck Study to trucks in the OMC accident files. The information reported by the commercial vehicle enforcement officers in the Washington State Truck Study was then compared with similar data reported to OMC by motor carriers on their 50-T Forms.

Contingency table analyses were conducted to investigate the agreement between the two data sources for truck characteristics (e.g., configuration, weight, and length), hours of service, motor carrier operation (e.g., type of carrier and fleet size), and crash circumstances (e.g., injury and property damage only and action of the truck). From these comparisons, recommendations are made for each data item studied concerning any bias in the OMC accident file that may affect carriers reporting to OMC and the accuracy of their information.

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WORK PLAN

This study was done as part of a OMC contract research project that reviewed the current use of information from the OMC 50-T Accident Form and its future status. OMC defined the scope and types of analyses that were to be conducted. OMC's primary objective was to examine whether there were any consistent patterns in the accuracy and completeness of the data that motor carriers were reporting to OMC via the 50-T Form. Specifically, OMC was concerned about how reporting of information varied by motor carrier characteristics, such as type of operation (i.e., common, contract, or private) and fleet size. This information was essential to OMC because the 50-T Form information was being evaluated to see how it was used by the government and other organizations, and whether reporting procedures or variables should be modified or vary by carrier characteristics.

In meetings with OMC, specific research questions defined by this comparison addressed

1. Are motor carriers accurately reporting vehicle defects?
2. How accurately are motor carriers reporting vehicle characteristics?
3. Are motor carriers accurately reporting hours of service?
4. What was the noncollision action?
5. Are injuries-fatalities accurately reported?

INDEPENDENT DATA SOURCES

Described in this section are the different sources of information that were used as comparison with the OMC accident

data records. An example of each of the data sources is included in the complete report submitted to OMC (*4*). The role of each data source and its key variables used to match the other data files and the OMC accident records are noted in the following paragraphs. Also presented in this section are the variables that were used in the contingency table comparisons.

Washington State Patrol Accident Reports

The official Washington State Patrol accident report records were obtained from the Washington State Patrol on computer tapes. These computer files were processed to identify all truck accidents that occurred on Interstates or divided highways from 1984 to 1986. This process created records for 5,725 crash-involved trucks. This number is very large as it included both intrastate and Interstate carriers, all divided highways (not just Interstates), and the complete years from 1984 to 1986. As noted later, the truck crash data used in this comparison is for Interstate carriers only, crashes that occurred on Interstate system highways, and from June 1984 through June 1986. The key variables that were used to match other data files from the Washington State Truck Study were the date of the crash (year, month, day), time of the crash, Interstate, milepost, and the age of the driver. The information used from these records to compare with 50-T Form data were the injury and property damage estimates (to determine if the motor carrier was required to report to OMC), actions of the truck, and crash circumstances (e.g., contributing factors, driver citations).

Washington State Truck Study Supplementary Truck Forms

These forms indicated the same data used in the Washington State Truck Study, conducted from March 1984 through July 1986, that examined the role of truck, driver, and trucking operation characteristics in contributing to accident causation (*1–3*). They contained similar information to the OMC 50-T Form as well as additional information about the motor carrier fleet and driver characteristics. These supplementary forms were reviewed and all the major variables were entered into a computer file. The key variables used to match the other files were the date of the crash, time, Interstate, milepost, and the age of the driver. The variables used in the evaluation of the 50-T Form data were truck configuration, truck weight and length, truck operations, fleet size, driver experience, and hours of driving. Approximately 500 eligible trucks were identified.

Commercial Vehicle Inspection and Critical Item Inspection Forms

These forms recorded the results of the truck equipment inspections performed by the commercial vehicle enforcement officers on the crash-involved trucks of the Washington State Truck Study. These inspections are similar to the equipment inspections performed in the OMC Motor Carrier Safety Assistance Program (MCSAP). In fact, many of the MCSAP teams were trained by Washington State personnel. These forms indicated the condition of the truck's major component systems such as brakes, steering, and tires. The officers completed a critical item form indicating whether any of these systems were defective and if these defects constituted a violation of operating requirements or, if more serious, required that the truck be placed out of service. For example, one brake out of adjustment would constitute a violation, but having 25 percent of the brakes out of adjustment would require that the truck be immediately placed out of service until repairs are completed.

The driver's log book status was also noted on these inspection forms. A log book violation consists of having an incorrect log that is less than 24 hrs behind. An out-of-service log book violation consists of having a log book violation that is more than 24 hrs behind, violation of the driver hours of service rules, or operating without a log book.

This file contained fewer trucks than the supplementary form file because in some instances the crash-involved truck was severely damaged in the crash or circumstances did not permit inspections to be conducted, such as in a blizzard. The key variables in this file were the same as the supplementary form file. The results of these inspections were compared with the condition of the truck and mechanical defects that should have been noted by motor carriers on 50-T Forms.

All of these files (State Patrol reports, supplementary truck forms, and vehicle inspections) were merged together using the key variables as noted. There was little trouble matching the Washington Truck Study data together, but there were some difficulties in matching this data with the police reports. This occurred primarily because of rounding of key data items, in particular, the time, milepost, and driver age. A straightforward computer match on the key variables resulted in only about 50 percent of the trucks matching. Consequently, each record in the police file was carefully reviewed to determine whether it matched with a truck record from the Washington Truck Study. In almost all cases, the problem was that one of the key variables in the police file was slightly different from the same variable recorded in the Washington Truck Study. For example, the milepost may be recorded as 269 on the police report, but 270 on the Truck Study forms, or the time was listed as 800 on the police report but 755 on the Truck Study forms.

MATCHING WASHINGTON TRUCK STUDY DATA WITH OMC FILES

The next step was to match trucks from the Washington Truck Study with truck accident reports in the OMC 50-T Accident Form files. Computer files of the 50-T Form data were provided by OMC. The OMC files were first screened to identify truck crashes that occurred on Interstates during the period 1984 to 1986 in Washington State. This resulted in 468 OMC truck accident reports. The key variables in this file that were used to match crashes in the Washington State data were the date of the crash, Interstate route, time, and driver age. The limitation in this matching process was the few variables in the OMC data that were available to pin down to location and circumstances of the crash that were not variables that

would be used later as part of our analysis. However, there were only a few instances of two Interstate trucks being involved in a crash together or on the same day on the same Interstate at approximately the same time, mostly during poor weather. Consequently, these "matching" variables almost always defined a unique event. Driver age variables were used to help match up these accident records because it was felt that the driver's age would be reported accurately.

An initial attempt to match the two data sources revealed that there were also problems with the rounding off of key variables. Consequently, the OMC data were reviewed by hand for better matching. This review found that in the OMC file there were many instances in which the time was not given in military time and the age was transposed (i.e., 32 rather than 23). In almost all cases in which a truck was present in the Washington State data, but not in the OMC file, there was no truck accident report in the OMC file for that date, on that Interstate, or within many hours of the appropriate time. None of the other study variables were used for matching as they were to be part of the analysis. This review identified 185 trucks that matched between the Washington State data and the OMC files. The remaining OMC trucks were simply not captured as part of the Washington State study. The truck inspectors in the Washington State Truck Study did attempt to go to most major truck crashes during the study period, but they could not investigate all crashes. For example, in urban areas there may have been more than one crash occurring at a given time, precluding investigation of both crashes. In addition, in the more rural areas there may not have been a truck inspector available to go to the crash site in a timely manner, particularly if the truck could drive away from the crash site.

The remaining eligible trucks in the Washington State data were then screened to eliminate truck crashes that may not have met the OMC reporting criteria of the accident resulting in an injury where treatment was received away from the site or meeting the property damage reporting criteria (at least $2,000 in 1984 and 1985 and $4,200 in 1986). This screen identified 287 trucks that were in the Washington State Truck study that should have been reported to OMC, but were not present in their files. Consequently, the final analysis file contains 472 truck records; 185 matched with OMC reports and 287 that were not matched.

The remaining trucks in accidents from the OMC files were dropped from further analysis. Given the poor accuracy of many of the key variables reported to OMC that is documented later in this paper, performing additional analysis of these trucks would not be valid.

DATA ANALYSIS

The data analysis consisted of generating two-way (two-factor) contingency tables that classified the trucks by various characteristics and computing the Chi-squared statistic to determine whether the factors being compared are independent. (In most comparisons, the cell sample sizes were too small for this statistic to be reliable.) Because more than 100 variables were available for analysis, a specific work plan was submitted to and approved by OMC, as detailed earlier in this paper. The specific research questions identified by OMC addressed aspects of defective truck equipment, vehicle characteristics, hours of service, driver condition, collision events, crash outcome (property damage/injury/fatal) and driver experience. Where appropriate, these comparisons were also performed to include a third factor such as carrier type (private, contract or common) or fleet size. The analysis was conducted using the Statgraphics (Version 2.6) statistical software. For ease of presentation, only summary tables are presented in this paper, as well as several sample comparison contingency tables. All the detailed analyses were included in appendices of the main report submitted to OMC (*4*).

RESULTS OF COMPARING OMC DATA WITH WASHINGTON STATE TRUCK STUDY

Detailed in this section are the results of analyses conducted to address the specific research questions that were identified by OMC, as well as a short description of the importance of the research question and the implication of our findings.

Completeness of the OMC File

Other studies have reported that only 40 percent of trucks in accidents eligible for the OMC files are actually reported, but there has been little documentation of this or what characteristics affect this bias (*5,6*). This study found that 39 percent of the trucks involved in OMC-eligible crashes that occurred on Interstate highways in Washington State during the study period reported to OMC (185 out of 472). There is little reason to believe that this finding is peculiar to Washington State because all of these trucks were Interstate carriers that operate throughout the United States. If anything, this finding might be considered conservative. It could be argued that because these truck drivers knew they were becoming part of a Washington State Patrol "study," carriers might have an incentive to report their accidents because of the special attention and possible follow up that might occur.

The issue of reporting (or matching) was also investigated by several other factors. Classified by type of carrier operation, common carriers reported more frequently (46 percent) compared with contract (31 percent) or private (24 percent) carriers (see Figure 1). Large fleets, containing more than 50 trucks, reported better (58 percent) than medium-size fleets containing 11 to 50 trucks (36 percent) or small fleets with 10 or fewer trucks (24 percent) (see Figure 2). Both of these trends were statistically significant. Trucks without defective equipment reported more frequently (42 percent) than trucks with out-of-service defects (34 percent). Our analysis also found that crashes involving younger drivers (30 years old or younger) tended to report less (33 percent) compared with older drivers (41 percent). Finally, little difference was found in reporting for tractor trailer trucks versus doubles (both about 40 percent), but crashes involving single-unit trucks were reported (24 percent) less frequently.

Are Motor Carriers Accurately Reporting Equipment Defects?

The issue of reporting defective equipment is of critical concern to OMC because defective equipment is key to assigning

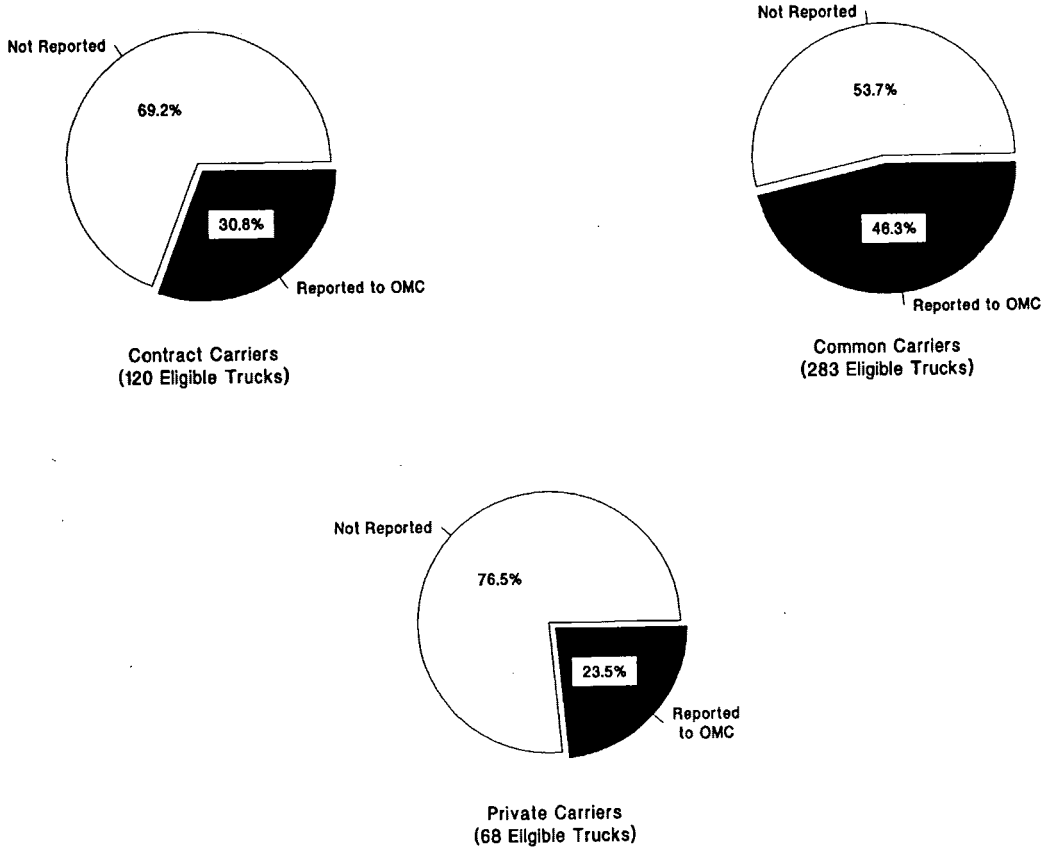

FIGURE 1 Reporting of crashes to OMC by carrier type.

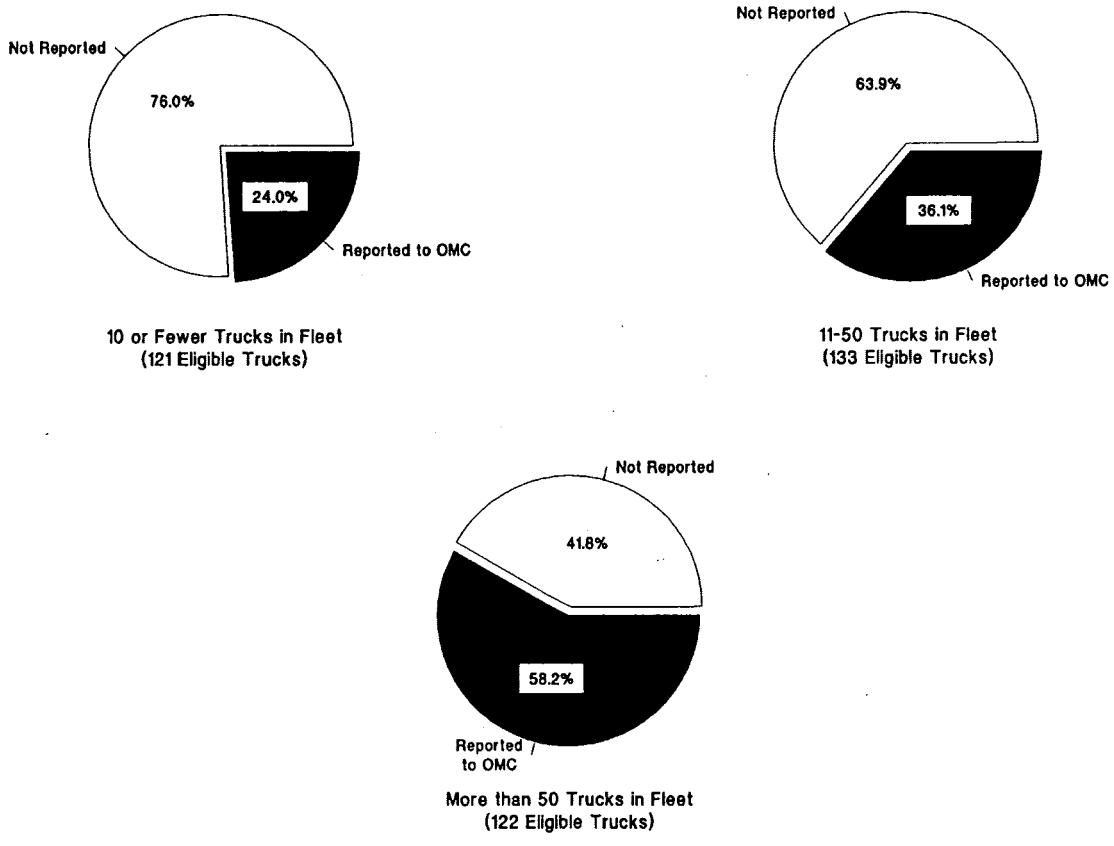

FIGURE 2 Reporting of crashes to OMC by fleet size.

preventability to truck crashes. In the past, OMC data has indicated that only 5 percent of trucks in crashes have defective equipment. At the same time, random roadside inspections of trucks indicate that as many as 50 percent of trucks have defective equipment (*5,6*). Although all the equipment defects may not be related to specific crash circumstances simply based on random occurrence, it would be expected that the proportion of trucks in the OMC data should be significantly higher than 5 percent.

Comparisons of the equipment defect variable in the OMC 50-T Form data with the results of the equipment inspections performed by the Washington State Patrol indicated that truck equipment defects are rarely reported to OMC. As indicated in Table 1, of the 47 trucks identified by the Washington State Patrol as having out-of-service defects, only 3 (6 percent) reported having defective equipment to OMC. As mentioned previously, having defective equipment may not be the most critical factor in all these accidents, but most of these defects involved brakes or steering and it would be difficult to determine crashes in which braking and steering are not relevant. Of the 47 trucks with out-of service defects, 66 percent (31 of 47) had out-of-service brake adjustment defects. In addition, 10 percent (5 of 47) had (separately or in combination) out-of-service steering defects; typically, too much play in the steering wheel without any response.

Also noted in our analyses, trucks with out-of-service defects tended to report less frequently (31 percent) to OMC than trucks with no defects or where an inspection could not be completed (41 percent). This poor reporting of trucks with serious defects to OMC may reflect the reluctance of carriers to submit 50-T Forms for an accident where they may be at fault.

One problem with this comparison is the actual question asked on the OMC form: Were mechanical defects or failures apparent on your vehicle at the time of the accident? This question is not specific and can be misinterpreted. For example, how is apparent defined? Although the OMC instructions go into this issue in detail (requiring that each defect known to exist before the accident, brought to light by the accident, or discovered by investigation of the accident should be recorded), few carriers probably review these additional instructions. A more direct question would be: Were any equipment defects present on your vehicle at the time of the accident? On the other hand, it would be difficult to believe that a substantial portion of the drivers with trucks having out-of-service brake and steering defects are not aware of the problems.

Despite the problem described, of the 185 matched trucks, private carriers reported defects to OMC more accurately (75 percent) compared with either common or contract carriers (both about 45 percent). Medium-size fleets (11 to 50 trucks) reported defects less accurately (35 percent) to OMC than either of the other two fleet categories (both more than 50 percent).

Additional analyses were conducted to determine how defective equipment varied among the motor carrier operation variables for all 472 trucks involved in the Washington State study. Contract carriers had the highest proportion (37 percent) of trucks with out-of-service defects compared with private (33 percent) or common carriers (27 percent) (Figure 3). Smaller fleets (10 trucks or less) had a higher proportion of trucks with out-of-service defects (38 percent) compared with larger fleets (28 percent) (Figure 4). Finally, it was found that tractor trailer trucks (33 percent) had out-of-service defects more frequently than doubles (20 percent) or single unit trucks (23 percent).

Are Motor Carriers Accurately Reporting Hours of Service?

Truck drivers are required to maintain an accurate log of their activities, specifically the number of hours of driving and rest they have had while on and off duty. There is significant

TABLE 1 Reporting of Defective Equipment to OMC

DEFECTIVE EQUIPMENT NOTED IN WASHINGTON STATE TRUCK STUDY:	CONDITION OF TRUCK EQUIPMENT REPORTED TO OMC: No Defects	Defects	Row Total
No Defects	79 (96.3)*	3 (3.7)	82 (45.8)
Equipment Violations	49 (98.0)	1 (2.0)	50 (27.9)
Out-of-Service Violations	44 (93.6)	3 (6.4)	47 (26.3)
Column Total	172 (96.1)	7 (3.9)	179** (100.0)

* Numbers in () are percents. Cell percents are by row.

** Table does not total to 185 because truck inspections were not performed by Washington State Patrol for 6 trucks due to adverse conditions.

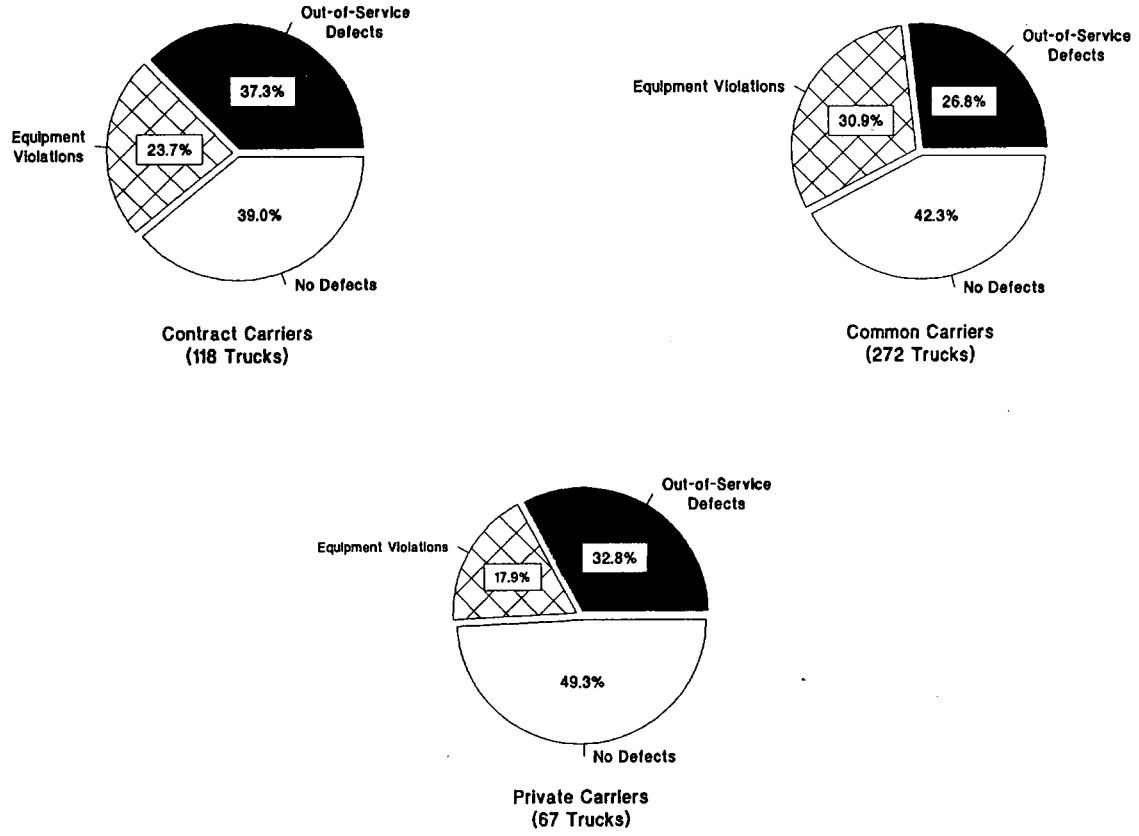

FIGURE 3 Incidence of defective equipment for crash-involved trucks in the Washington State Truck Study by carrier type.

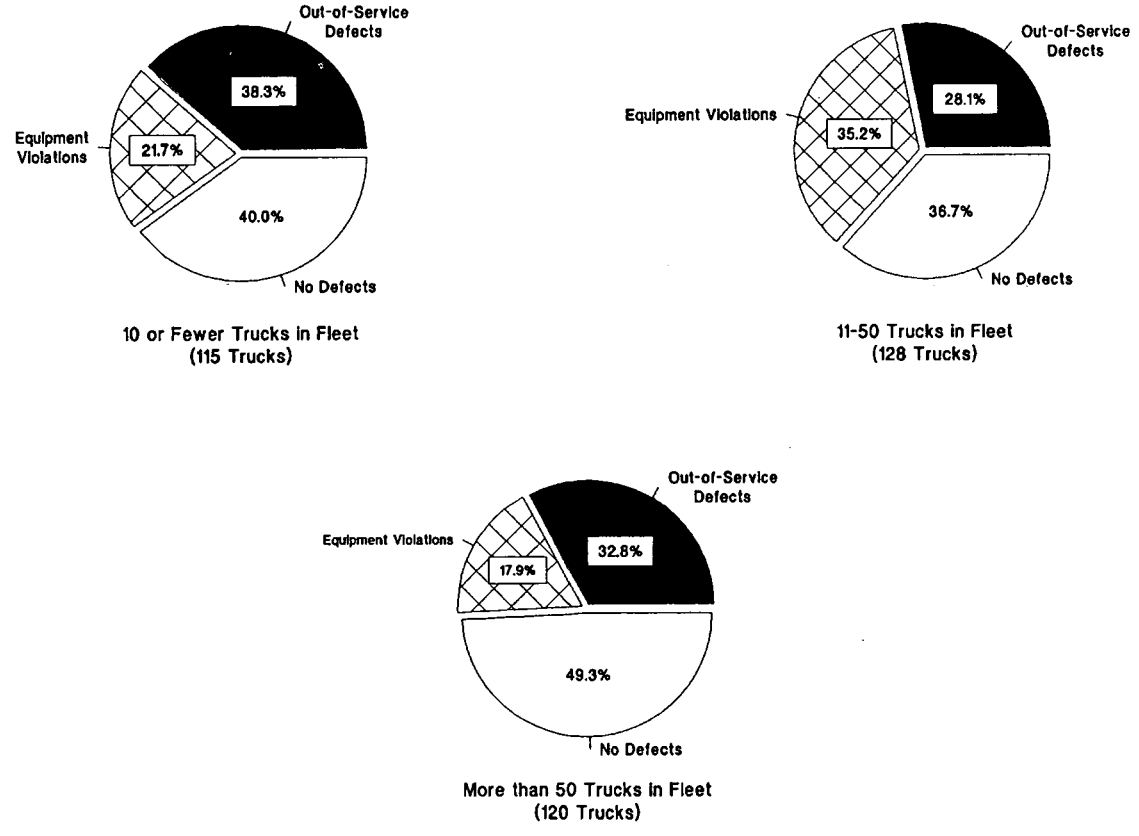

FIGURE 4 Incidence of defective equipment for crash-involved trucks in the Washington State Truck Study by fleet size.

evidence that drivers routinely exceed these hours of service rules and that these log books are not properly maintained. There also appears to be growing support for automatic on-board recording devices to monitor driver hours rather than continuing to use manual log books. On the other hand, some accident studies have found that the majority of truck crashes occur during the first several hours of the trip and, thus, excess hours of service may not be as large a factor in accident causation as believed.

Our analyses of the OMC hours-driven variable versus the hours of service recorded in the Washington State Truck Study indicated that the hours of service category reported to OMC is generally accurate. Almost 50 percent of the "matched" truck drivers had been on the road 3 hrs or less, but 5 percent had been on the road for 10 hrs or more. However, these results are biased by the fact that they do not include many of the drivers who had deficiencies in their log books. Comparison is made in Figure 5 of the log book status of those drivers that matched versus those that did not, and indicates that 60 percent of the drivers with log book violations (including out-of service) were not found in the OMC data. In addition, our analysis found that contract carriers reported their hours of driving (within 2 hrs of the Truck Study data) less accurately (73 percent) compared with the other carriers (both about 85 percent). Drivers in smaller fleets tended to report their hours of driving more accurately (89 percent) than drivers in larger fleets (both about 80 percent).

The frequency of log book violations among all trucks in the Washington State Truck Study was also examined by other motor carrier operation variables. Driver out-of-service log book violations were about twice as frequent among contract carriers (16 percent) than for either common or private carriers. Log book out-of-service violations were slightly more frequent among small fleets (14 percent) than medium size or large fleets (9 percent). Finally, 13 percent of tractor trailer drivers in crashes had out-of-service violations compared with only 5 percent of drivers of double trailer trucks.

What Was the Noncollision Event?

For single-vehicle truck accidents, the OMC 50-T Form asks carriers to report what other one noncollision event occurred, including ran-off-road, jackknife, overturn, and fire. The implication is that some action of the driver caused the crash and that it could have been avoided perhaps by going slower, the driver paying more attention to the roadway, or having the driver adjust his behavior for adverse driving conditions. The same data were also collected as part of the Washington State Truck Study except that more than one event could be reported.

Sixty-four of the 185 matched trucks reported their crashes as noncollision crashes, 81 were reported as collisions involving another moving vehicle, and 39 were coded as collisions

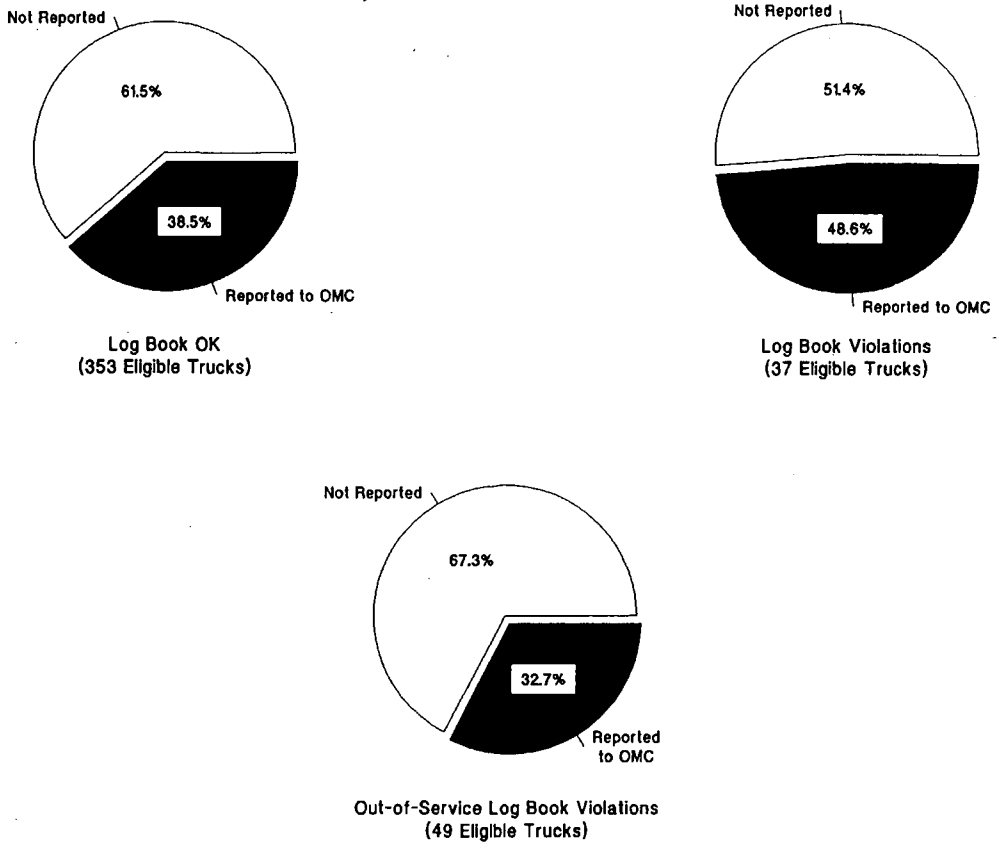

FIGURE 5 Reporting of crashes to OMC by status of log book.

with fixed objects. These types of collisions varied by carrier type, but were similar among the fleet size categories. Private carriers had proportionally fewer noncollision crashes and more multivehicle crashes than the other carrier types.

Comparing the noncollision events reported to OMC with similar events recorded in the Washington State Truck Study indicated that there is good agreement between the two data sources. When an event was reported to OMC, it was also recorded by the Truck Study. However, the problem is that during a single vehicle noncollision accident, several of these events could occur. For example, a truck can jackknife, run off the road, and then overturn down the side of the road. The OMC data records only one event. Consequently, this OMC variable may not tell the complete story of single-vehicle crash events. For example, of the 64 matched trucks coded as noncollision in the OMC file, the Washington State Truck Study recorded that 42 of them overturned (see Table 2). However, only 25 of these trucks were reported to OMC as overturning, whereas 12 were reported as simply run off the road, and 4 were reported as jackknife crashes. If this OMC variable is to be useful, all applicable events need to be recorded. In addition, these crash events can also occur as part of either multivehicle or fixed object crashes, and, consequently, there is no reason that crash events are not reported for these crash types.

How Accurately Are Vehicle Characteristics Reported?

Comparing truck length between the two data sources indicated that almost 75 percent of the truck lengths reported to OMC were within 5 ft of those recorded in the Washington State Truck Study. These results did not differ significantly by truck type or fleet size. However, the accuracy of reported truck length did differ by carrier type with common (78 percent) and contract (69 percent) carriers being more accurate than private carriers (57 percent).

The differences between the truck weight reported to OMC and recorded in the Washington Truck Study were not in as close agreement as truck length. Overall, only 55 percent of the matched trucks reported their weight within 5,000 lbs of the weight recorded in the Washington State Truck Study. In contrast to the truck length results, the differences in reported weight did not differ significantly by carrier type, but smaller fleets (10 or fewer trucks) reported their weight more accurately (67 percent within 5,000 lbs) than larger fleets (52 percent within 5,000 lbs).

Perhaps the most controversial truck variable that has been examined by many truck studies is truck configuration (*1,5,6*). In particular, most truck safety studies have compared the accident record of tractor trailer trucks with double-trailer configuration trucks (tractor with two trailers). Unfortunately, the results of this data comparison study indicate that many of these past accident studies may contain serious errors. Reconciling the truck configuration variables between the two data sources analyzed in this study indicate that only 75 percent of the matched trucks were classified as the same configuration in both the OMC and Washington State Truck Study data (see Table 3). Only 82 percent of tractor trailers were classified as this configuration in the OMC data; 16 percent were classified as doubles. Similarly, only 77 percent of doubles were classified as this configuration in the OMC

TABLE 2 Comparison of Crash Events Between Washington State Truck Study and OMC 50-T Form

Sole Crash Event Reported to OMC on the 50-T Form:	Truck Overturn was **One of the Crash Events** Reported By Washington State Patrol: NO	YES	Row Total
Ran-Off-Road	5 (22.7)*	12 (28.6)	17 (26.6)
Jackknife	16 (72.7)	4 (9.5)	20 (31.3)
Truck Overturn	0 (0.0)	25 (59.5)	25 (39.1)
Truck Units Separated	1 (4.5)	0 (0.0)	1 (1.6)
Other	0 (0.0)	1 (2.4)	1 (1.6)
Column Total	22 (34.4)	42 (65.6)	64 (100.0)

Note: Only one crash event is recorded on the OMC 50-T form. In contrast, the Truck Study recorded as many events as apply to the crash.

* Numbers in () are percents. Cell percents are by column.

TABLE 3 Comparison of Truck Configuration Between Washington State Truck Study and OMC 50-T Form

	Truck Configuration Recorded by Washington State Truck Inspector					
Truck Configuration Reported on 50-T Form to OMC	Tractor	Tractor Trailer	Tractor 2 Trailers	Single Unit Truck	Truck-Trailer	Row Total
Truck (A)*	1 (20.0)*	0	1 (20.0)	1 (9.1)	0	3
Truck Trailer (AD)	0	1 (0.7)	0	4 (36.4)	4 (36.4)	9
Truck-Other (AF)	0	0	0	0	1 (14.3)	1
Tractor (B)	2 (40.0)	1 (0.7)	1 (3.8)	0	0	4
Tractor Trailer (BC)	1 (20.0)	111 (82.2)	3 (11.5)	4 (36.4)	2 (28.6)	121
Tractor 2 Trailers (BCD)	1 (20.0)	22 (16.3)	20 (76.9)	1 (9.1)	0	44
Triple (BCDF)	0	0	1 (3.8)	0	0	1
Tractor-Other (BF)	0	0	0	1 (9.1)	0	1
Column Total	5 (100.0)	135 (100.0)	26 (100.0)	11 (100.0)	7 (100.0)	

* Truck Unit codes from OMC 50-T Form.
* Numbers in () are percents. Cell percents are by column

data; 12 percent were classified as regular tractor trailer trucks. Furthermore, more than half the doubles (24 of 44) reported to OMC were actually some other configuration. Consequently, these analyses indicate that not only were there underreporting differences to OMC by truck type, but at least 1 out of 4 trucks had their configuration reported incorrectly. Contract carriers reported their truck configurations more accurately (84 percent) than either common (71 percent) or private (75 percent) carriers. Also, larger fleets reported their truck configurations more accurately (78 percent) than smaller fleets (69 percent).

As a general observation, the analyses discussed reveal that for some data, such as truck length, there seems to be general agreement among the two data sources, but for the other data, such as truck weight and configuration, there were serious differences between these two data sources.

Are Injuries and Fatalities Accurately Reported?

Overall, 38 percent of all matched crashes involved property damage only, 59 percent had someone injured, and 3 percent involved a fatal injury. All the crashes in the matched data file that resulted in someone being fatally injured involved common carriers. The distribution of crashes that were reported to OMC tended to be more severe than the general sample of crashes, particularly for contract and private carriers and medium-size fleets (11 to 50 trucks). This reinforces the theory that carriers would tend to better report crashes that might be investigated further or in depth. There was some discrepancy about the number of persons injured that may have arisen because of minor injuries and how they are categorized. Also, truck drivers typically leave the crash scene once basic information has been collected and the police have everything under control. Consequently, truck drivers would not follow up on the actual total number of people injured or receiving treatment afterwards.

DISCUSSION AND CONCLUSIONS

Compared in this study have been truck accident data collected as part of an independent safety study with similar data that was self-reported to OMC by motor carriers via their 50-T Form. Overall, it was found that only about 40 percent of eligible crash-involved trucks reported their accidents to OMC. This finding is consistent with the results of other studies. The lack of reporting varied by several factors, such as truck type and fleet size, that could have significantly affected the results of previous safety studies that used the OMC 50-T Form data as their basis for compiling accident frequencies, rates, or their characteristics.

As a general trend, of the data items compared between the two data sources, there was good agreement among the

same data items such as truck length. However, there were some serious deficiencies in the agreement of the other data such as defective equipment and truck configuration. By far the biggest deficiency was that defective truck equipment was rarely reported to OMC, even though more than 25 percent of trucks had out-of-service equipment defects.

Summarized by carrier type and fleet size in Tables 4 and 5 are the major results of this study. Contract and private carriers reported their crashes to OMC less frequently than common carriers. Of the data reported to OMC, there was no clear pattern of reporting bias among the carrier types. However, many of the poor accident reporting and crash factor characteristics were associated with contract carriers, such as having a high percent of noncollision crashes, and worse reporting of hours of service and defective equipment. Considering fleet size, there was a clear pattern; the larger the fleet, the more frequently the crash was reported to OMC. Of the data reported to OMC, many of the more serious data deficiencies were associated with medium-size fleets (11 to 50 trucks), such as inaccurate reporting of defective equipment and truck weight, and having a high percentage of crashes involving injuries.

The implications of these findings depend on what is expected of the OMC data file and the accuracy desired for the various data elements. If the OMC file is simply to document the numbers of crashes that occur and some basic characteristics of truck crashes, the 50-T Form and reporting procedures might be adjusted for the deficiencies noted in this study. Given this scenario, OMC should consider dropping the more controversial data items, specifically defective equipment. A follow-up study should then be conducted to determine if more carriers were reporting their accidents, thereby enhancing the completeness of the OMC file without requiring significant efforts to monitor carrier compliance with the 50-T Form requirements.

TABLE 4 Summary of Findings from OMC–Washington State Truck Study Comparisons by Type of Carrier

	Type of Carrier		
	Common	Contract	Private
Percent of Eligible Crashes in Washington State Truck Study that were Matched with 50-T Form File	46	31	24
Compared to Washington State Truck Study:			
Percent Accurately Reporting Truck Equipment Defects on 50-T Form (see Text)	43	45	75
Percent Reporting Hours Driving on 50-T Form (within 2 Hours)	84	73	86
Percent Reporting Non-Collision Crashes on 50-T Form	30	38	19
Percent Reporting Truck Length on 50-T Form (within 5 Feet)	78	69	57
Percent Reporting Truck Weight on 50-T Form (within 5000 lbs)	56	53	53
Percent Reporting Same Truck Configuration on 50-T Form	71	84	75

TABLE 5 Summary of Findings from OMC–Washington State Truck Study Comparisons by Fleet Size

	Fleet Size:		
	1-10	11-50	More than 50
Percent of Eligible Crashes in Washington State Truck Study that were Matched with 50-T Form File	24	36	58
Compared to Washington State Truck Study:			
Percent Accurately Reporting Truck Equipment Defects on 50-T Form (see Text)	54	35	51
Percent Reporting Hours Driving on 50-T Form (within 2 Hours)	89	79	82
Percent Reporting Non-Collision Crashes on 50-T Form	31	25	37
Percent Reporting Truck Length on 50-T Form (within 5 Feet)	71	72	78
Percent Reporting Truck Weight on 50-T Form (within 5000 lbs)	67	47	57
Percent Reporting Same Truck Configuration on 50-T Form	69	78	79

If the OMC file is to be used for more in-depth comparisons of truck safety (as it has been done in many past studies), its current deficiencies constitute significant biases that may cause these types of studies to be invalid. Specifically, key deficiencies include mechanical defects, truck configuration, and crash events. Few mechanical defects were reported to OMC, although they were commonly found in more than half the trucks inspected in the Washington State Truck Study. There were also significant discrepancies in the reporting of the truck's configuration that may affect the results of the many studies that used the OMC file to compare the accident rates of tractor trailers versus doubles. In addition, studies that used this OMC data to estimate the frequency of crash characteristics such as truck overturn or jackknife have significantly underestimated the occurrence of these events.

As an alternative, OMC could develop a system in which their current data reporting is supplemented by crash investigations using MCSAP truck inspectors similar to the ones conducted in the Washington State Truck Study. Given that a staff of trained truck inspectors already existed in Washington State (and does nationally as part of the MCSAP program), the average cost was less than $200 for each in-depth truck inspection conducted by the Commercial Vehicle Enforcement officers of the Washington State Patrol. To reduce costs to OMC, the crashes they would investigate could be limited to the more serious crashes or of special interest (such as the one in which the truck overturned), which would probably merit special investigation by the local police authorities anyway.

In either case, better enforcement and auditing of the 50-T Form requirements and carrier compliance are needed. In addition, to assist OMC in auditing of carriers and conducting analyses such as was performed in this project, the 50-T Form information should be directly linked to other accident documents by including proper identification information that

would directly link the 50-T Form to local police reports or other similar information.

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