

# **DETERMINING MOTOR CARRIER ACCOUNTABILITY FOR CRASHES IN THE UNITED STATES**

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## **Introduction**

In the United States of America (USA) all States are required to report to the Federal Motor Carrier Safety Administration (FMCSA) of the Department of Transportation all commercial large truck and bus crashes which result in a fatality, injury, or property-damage-only crash where at least one vehicle (not necessarily the truck or bus) must be towed from the scene due to disabling damage. A large truck is defined as the commercial motor vehicle with the gross combination weight rating of over 10,000 pounds. A bus must have seat for more than nine people, including the driver. FMCSA receives data on over 100,000 large truck and buses involved in crashes each year.

The trucks and buses involved in all the crashes received by FMCSA are entered into the records of motor carriers responsible for the operation of the vehicles. Currently all crashes count equally against motor carriers in safety scores that FMCSA assigns to carriers under its Compliance, Safety, Accountability (CSA) program. The motor carrier industry in the USA maintains that carriers should not be assigned safety scores based partially on crashes for which they are not at fault.

FMCSA has conducted tests to see if “accountability” could be determined for all crashes based on only the coding of police accident reports (PARs). If successful, FMCSA would be able weight crashes so motor carriers with accountable crashes would receive higher

unsafe scores without incurring the enormous costs of conducting detail reconstructions of thousands of crashes. The first test involved comparing coding truck crashes taken from the Large Truck Crash Causation Study (LTCCS) and the National Highway Safety Administration's (NHTSA) General Estimates System (GES) files. The results of this test will be covered in the paper. Currently the results from a second test focusing on crashes from NHTSA's Fatality Analysis Reporting System (FARS) are being analyzed before release scheduled for later this month.

### **Test Methodology**

The methodology used for the first test was developed for the Large Truck Crash Causation Study (LTCCS), a joint FMCSA-NHTSA effort conducted in 2001-2003 and reported to Congress in 2006. The references attached to this paper cover the methodology of the LTCCS, the potential uses of the study data, the report to Congress on the study results, and a paper presented at the 2008 meeting of the CTRF. The same methodology was used by NHTSA in their 2005-2007 National Motor Vehicle Crash Causation Study (NMVCCS), which examined 5,470 fatal, injury, and property-damage-only crashes involving passenger vehicles.

Data for LTCCS cases were collected by trained crash researchers and State truck and bus inspectors at the crash scene (interviews, crash diagrams, photographs, truck inspections); follow-up interviews with crash participants and motor carriers; and the examination of other documents such as police accident reports (PARs), emergency medical system transportation runs, hospital records and autopsy reports. The result was an enormous amount of data from each crash.

All data from each crash were sent to one of the two NHTSA zone centers to coding – Zone Center 1 in Buffalo, New York, and Zone Center 2 in San Antonio, Texas. At the zone centers two major variables coded for the LTCCS crash cases:

- Critical Event – The action or event that put the vehicle or vehicles on a course that made the collision unavoidable.

The critical event was assigned to the vehicle that took the action that made the crash inevitable.

- Critical Reason – The immediate reason for the critical event (i.e., the failure leading to the critical event. The critical reason was assigned to the vehicle coded with the critical event, and could be coded as a driver error, vehicle failure, or environmental condition (roadway or weather).

For the test accountability would be assigned to the motor carrier if the truck was coded with the critical event for the crash, and the truck driver or the truck vehicle was coded with the critical reason. Critical reasons coded as being roadway problems or weather conditions would not result in accountability being assigned to the motor carrier.

This test for coding critical reasons for crashes from just the PARs included 1,221 police reported crashes. There were five groups of crashes coded:

- 221 fatal crashes from the Large Truck Crash Causation Study (LTCCS),
- 200 A injury (incapacitating injury) crashes from the LTCCS,
- 200 B injury (non-incapacitating injury) crashes from the LTCCS,
- 200 C injury (possible injury) crashes involving at least one large truck from NHTSA's General Estimates System (GES) database of crashes, and
- 400 property-damage-only (PDO) crashes from the GES database that involved at least one large truck and one vehicle (not necessarily the large truck or commercial bus) being towed from the crash scene.

Coding for the accountability test was also completed by the staff at the two zone centers. For the 621 LTCCS fatal, A injury, and B injury crashes the coders at NHTSA's zone center in Buffalo coded only crashes where the original LTCCS case coded at the San Antonio zone center using only the crash PAR that was part of the LTCCS crash case file. Similarly the San Antonio Zone Center staff coded accountability from just the PAR for all the LTCCS crashes that were

originally coded at the Buffalo zone center. This system allowed a comparison between coding the crashes from all the LTCCS study data with coding the crashes from just the PARs.

The 600 C injury and PDO crashes were coded by both NASS zone centers for critical event and critical reason based solely on data from the PARs and the results were compared. The zone centers together developed a coding form to cover data collection from the PARs for all cases. In addition an interview form was developed for 600 GES crashes, in case the coders believed they needed additional data to help determine the crash critical event and critical reason.

The methodology for coding a PAR for crash critical reason is not a cookbook exercise. Two members of the CSA2010 team and the author watched a NASS Zone Center 1 coder open several GES crash case PARs and code the crashes for critical reason. The coder had experience coding LTCCS and NMVCCS cases over a seven-year period. After a quick perusal of the PARs the coder carefully read the crash narratives, studied the crash diagrams, and reviewed every data element collected. After considering all the data, she used a crash reconstructive approach to put together a summary of the crashes in her mind, and made decisions on the assignment of critical events and critical reasons. Critical reason was the only variable coded for each case, but a quick explanation of the reasons behind the coding was often provided in a one or two sentence narrative for some of the crashes.

## **Results**

Table 1 shows the degree of agreement and disagreement between the zone centers coding of all the 1,221 crashes.

For the 621 LTCCS crash cases agreement means that the critical reason assignment for a particular crash by the zone center staff who coded the reason from just the PAR in the LTCCS database in 2008 matched the critical reason coded by the other zone center staff several years earlier using all the data from the LTCCS database including the PAR. For the 600 crash cases taken from the GES

database agreement means that for the crash case in question the staffs of the two zone centers coded the same critical reason using only the PARs. (Note: All data in GES are coded just from PARs.)

Agreement was also credited where the determination of the critical event was given the truck, but the critical reason in one case was assigned to the driver at one zone center but to the truck vehicle by the other zone center. For accountability purposes when a critical reason is coded for a truck to either a driver error or a vehicle problem, FMCSA intends to count the crash as accountable to the motor carrier and weigh the crash more heavily in the carrier safety scores.

**Table 1. Intercoder Reliability Test**  
 Agreement in Coding Critical Reasons from PARs  
 Did PAR Coders Agree with LTCCS Coder?

Crash Severity	Database	Reports	Agreement		Trucks
			Trucks	Percent	
Fatal	LTCCS	221	241	92.3%	261
A Injury	LTCCS	200	214	94.3%	227
B Injury	LTCCS	200	228	91.2%	250
C Injury	GES	200	189	91.3%	207
PDO					
Towaway	GES	400	411	95.1%	432
Totals		1,221	1,283	<b>93.2%</b>	1,377

Explanatory notes on the table:

- Number of crash reports refers only to the PARs, even though the LTCCS files had much more data than just PARs.
- While there were 1,221 crash cases, the number of trucks and buses involved in the cases was 1,377. A number of crashes involved more than one truck or bus, and accountability was coded for every one of these vehicles. For simplicity sake the “trucks” is used instead of “vehicles” in three columns, since

there were 24 total buses involved in the crashes and only two were motorcoaches.

- Tractors pulling a single semi-trailer made up 67.6% of the trucks involved in the crashes. Single unit trucks were 21.9% of the trucks.

The 93.2% agreement between zone centers on coding accountability seems very good. Discussion between zone centers concluded that the degree of agreement would increase with the development of a coding manual specifically for coding crashes from just PARs. There was no formal manual developed for the Large Truck Crash Causation Study or NHTSA's National Motor Vehicle Crash Causation Study.

One major concern at the beginning of the test was that for more minor crashes the PARs would not contain enough information for coding crash accountability. That did not prove to be the case. The percentage of agreement in the study does not go down as the crash consequences become less serious, as can be seen the GES crashes coded. Coders were surprised to see the high quality of the data in PARs for minor injury and property-damage-only crashes. One possible explanation is that when officers are confronted with crashes involving large vehicles, such as 18-wheelers, they may take more care in completing PARs.

### **Second Crash Accountability (Weighting) Test**

FMCSA planned to begin coding crashes for accountability in July 2012. The project was delayed, however, over increased concern about coding crashes solely from PARs. The agency decided that a second test of the methodology was needed. The first step was to draft a guide for coding accountability. This user manual, listed in the paper bibliography, was completed in December 2012.

The second step was to rename the project from crash accountability to "crash weighting". FMCSA has always intended to continue to list all crashes by all interstate truck and bus companies on the motor carrier records the agency maintains. These records are available to

the public. Each crash where it was determined that the carrier was accountable would be given a weight that would negatively impact the carrier's safety score which is also available to the public. Thus, the term weighting is a more accurate indication of FMCSA's proposed use of the data.

The second test involved coding all fatal large truck crashes for the years 2008 through 2010 from just the PARs. The more than 11,000 cases were coded by Zone Center 2 in San Antonio using only the PARs from the NHTSA's Fatality Analysis Reporting System. Most of the coders had previously worked on the LTCCS and the NMVCCS. All were given a one-day training course on using the new coding manual.

FMCSA realizes that not all PARs contain enough data to code accountability. Coders for the second test were instructed that they had three choices for the coding of critical reason: accountable to the motor carrier (driver or vehicle), not accountable to the motor carrier, or not enough data to determine accountability.

Results from the second test are not available at this time. All crashes were coded in January and February 2013. A report on the results is due for internal FMCSA review this June. The final report for public consumption will be released later this year.

### **Discussion and Conclusion**

The Federal Motor Carrier Safety Administration faces an enormous regulatory task. There are as estimated 500,000 active interstate truck and bus companies—and intrastate hazardous materials carriers—that fall within regulatory purview of the agency. FMCSA can afford to devote attention to only a minority of these carriers in any given year. Under the new Compliance, Safety, Accountability (CSA) program the agency takes all the data it has to determine a safety score for each motor carrier. These data include annual results from over three million roadside driver and vehicle inspections; 100,000 crashes; 40,000 safety audits of new motor carriers; hazardous materials inspections; insurance filings; and other activities. Enforcement and

outreach efforts are then targeted on those carriers with the worse scores. One of the seven key scores for each motor carrier is the crash score.

Crash accountability (weighting) is viewed as the potential next step in the CSA program. If approximately 90% of the crashes FMCSA receives and puts on the record of a motor carrier can be coded as accountable, not accountable, or cannot determine accountability, FMCSA could calculate a crash score more indicative of the true safety performance of the motor carrier.

What about the other 10%? There are two major reasons why accountability cannot be determined from a PAR.

- There are not enough data.
- The crash is so complex that accountability cannot be determined from a fully complete PAR.

FMCSA will not have the resources to collect additional data on these 10% or so crashes each year. In addition where the data does not clearly point to accountability or non-accountability, opposing parties in the crash could legitimately challenge a determination made by crash coders before the agency or in a court of law. FMCSA will not have the resources to deal with disputed crash coding for these crashes. Coding 90% of crashes would be a huge step forward, while fighting over the other 10% would not be worth the effort.

Weighting crashes for motor carrier safety scores would benefit FMCSA in helping to focus on unsafe motor carriers. Safe motor carriers will benefit from the program, because they can take determinations or non-accountability to insurance companies and shippers. At the same time insurance companies and shippers may also benefit, if they decide to access the data and make decisions based in part on crash accountability.



## **Bibliography**

Blower, Daniel and Campbell, Kenneth, *Methodology of the Large Truck Crash Causation Study*, Federal Motor Carrier Safety Administration, February 2005, Publication #: FMCSA-RI-05-035.

Craft, Ralph, *The Large Truck Crash Causation Study*, Proceedings of the 43<sup>rd</sup> Annual Conference, Canadian Transportation Research Forum, June 2008.

Hedlund, James and Blower, Daniel, *Using LTCCS Data for Statistical Analyses of Crash Risk*, Federal Motor Carrier Safety Administration, January 2006, Publication #FMCSA-RI-05-037.

*Report to Congress on the Large Truck Crash Causation Study*, Federal Motor Carrier Safety Administration, March 2006.

*User Manual: PAR Review and Crash Weighting Data Collection Tool*, FMCSA Crash Weighting Study, December 2012.