

Published in *Global Truck and Commercial Vehicle Technology*.
London: World Markets Research Centre's Business Briefing Series, 1999, 86-90

SAFETY REGULATION

a report by

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The trucking industry has an unfortunate poor public image for safety. Much of this is undeserved. Yet it is easy to see why truck safety is a subject for public debate. Of the almost 5,000 annual fatalities in truck-involved crashes in the United States, 87% are pedestrians or drivers and passengers in other motor-vehicle. A mere 13% are truck company employees. While one can argue about the share of causality and blame, one thing is clear: the pure physics mean that the other road user comes off worse in any crash. The fear is exacerbated by the increased volume of truck traffic. The success of the truck industry since deregulation in 1980 has meant that truck miles have more than doubled. It is not surprising that the driving, and voting, public lobby politicians to impose truck safety regulations.

Also one of the virtues of the trucking industry is also its safety Achilles heel. That is the ease of entry to and exit from the industry. There is concern, which has been verified by academic study, that new entrants to the industry pose larger risks than more established firms. In addition there is a concern that certain firms may act myopically, cutting corners on safety expenditures now, and knowing that they can declare bankruptcy to avoid liability from lawsuits arising from crashes in the future.

That said, there is evidence that the crash rate for trucks has been improving faster than that for other types of motor vehicles. The figure shows that the rate of fatal crashes per million miles for combination (tractor-trailer) trucks has more than halved since 1977. The absolute number of crashes has declined somewhat, while truck miles have doubled. Much of this improvement has occurred because roads are safer in general, a fact that is reflected in the fatal crash rate for other vehicle types. Improved automotive technology, better vehicle-occupant protection and changing social attitudes towards the use of seat belts and drinking and driving have all contributed to safer highways.

It is noticeable that the fatal crash rate for trucks appears to have declined faster than that for other vehicle types since the mid-1980s. This is contrary to the dire predictions of the opponents of economic deregulation which occurred for interstate commerce in 1980. These people feared an influx of inexperienced firms, and financial pressures on existing carriers. It is certainly true that there was a massive influx of new firms, and a whole segment of long-standing middle-sized firms was forced into bankruptcy.

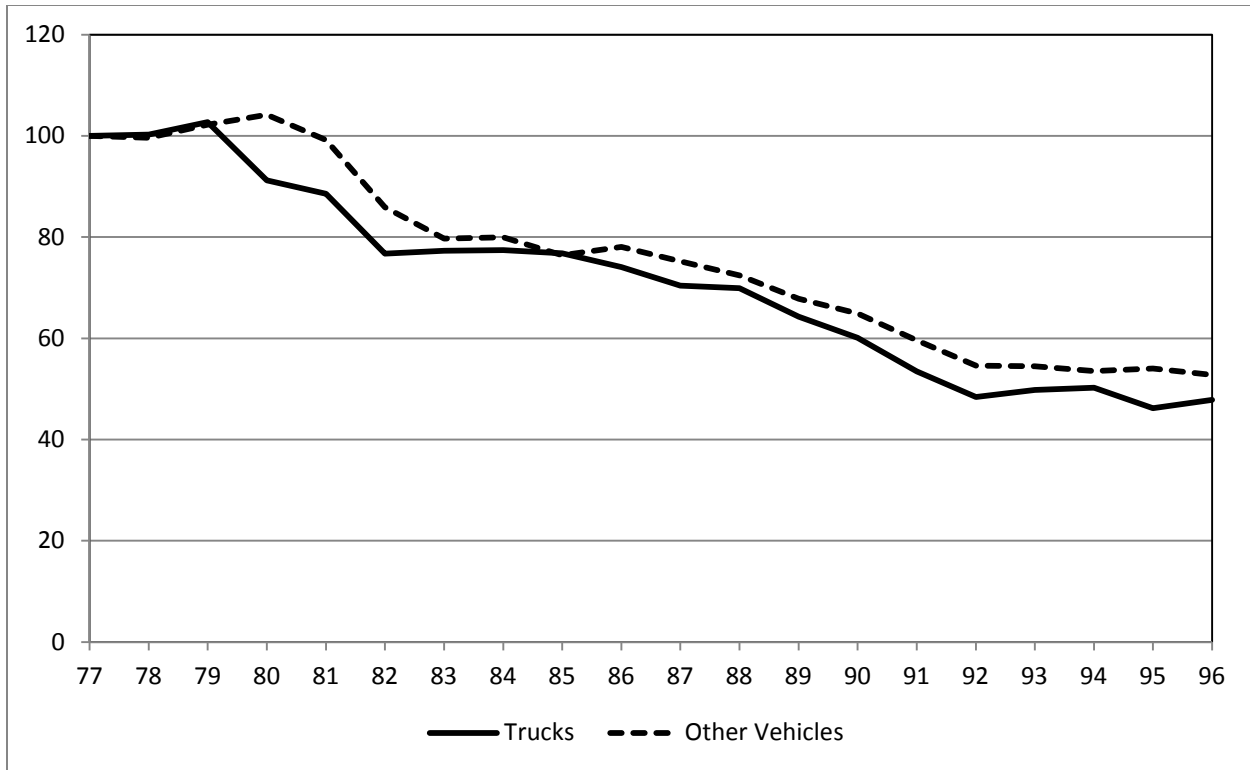


Figure 1: Index of Fatal Crash Rates

What averted a real safety problem was the move from implicit to explicit safety regulation in the early 1980s. While it is true that there had been federal safety regulations dating back to 1940, much of the implementation of the regulations was conducted by the very strict entry controls that existed prior to economic deregulation. Subsequent to deregulation, legislation was introduced in the early 1980s that tightened vehicle standards, introduced new rules for transporting hazardous materials and implemented a coordinated national “commercial drivers’ license.” The new license requirements imposed uniform testing across the various states and prevented drivers from holding multiple licenses as a way to avoid the consequences of revocation in one jurisdiction. Many states had to raise driver-testing standards considerably.

In addition, considerable federal funds were made available to increase enforcement of regulations. This was primarily through two programs. The first was an expansion of an existing program where inspectors visit a firm’s home base and conduct a *Compliance Review* of its safety managements programs. Based on a standard check-list of questions, a rating system is used to determine whether remedial action, return visits or legal action are necessary. Myself and a co-author, Leon N. Moses, used data from these audits in the early 1990s to see which management safety practices were strongly related to safety performance.

We found that the firms with the best safety records are those firms who keep careful records of crashes and investigate crashes to determine if disciplinary or educational action is necessary for the drivers involved. We found that the 11% of firms who are deficient in recording and reporting to the government crashes had a crash rate that is nine times worse than firms who do report. This is not to claim that good paperwork prevents crashes. Rather, the safest trucking firms are those

that make clear to their drivers that they are concerned about crashes and will take steps to investigate them to determine “preventability” and will follow up with disciplinary or educational action.

There is also strong evidence that compliance with hours-of-service regulations is related to safety performance. The 30% of firms that are unfamiliar with the drivers' hours-of-service rules, and do not keep records of duty status of individual drivers have crash rates 30% above firms who do comply. The firms with the best safety performance not only keep records of hour-of-service but also have systems to monitor duty status and make this information available to dispatchers. These results give indirect support to the concept that driver fatigue plays a major role in truck crashes.

In contrast, we found that the questions relating to driver hiring and qualifications, driving rules, and maintenance practices were not strong predictors of safety performance. The overwhelming conclusion is that corporate culture is a very strong determinant of safety performance. A safe firm is one in a dedicated safety manager lets employees know that compliance with hours-of-service regulations is important, and that investigations will be made into crashes.

Table 1: Crash Rate by Firm Size

Annual Fleet Miles Range (thousands)	Reportable Crashes per Million Miles
<35	1.17
35-73	0.91
73-140	0.80
140-370	0.72
370+	0.63

We also discovered that certain firm characteristics were leading indicators of safety performance. We found considerable evidence that crash rates decline as firm size increases. As shown in the table, the largest firms have crash rates about half those of the smallest firms. Even after correction is made for the types of operations undertaken, larger firms have superior safety performance. The most significant improvement in crash rates occurs when firms grow from small to medium sized. We also found that private carriers, those carriers primarily moving the products of their parent company, have crash rates 20% lower than for-hire carriers. Presumably, these firms have a strong incentive for safe operation because it is the company's own cargo that would be damaged in a crash. Private carriers also have the advantage of relatively repetitious operations, which means that drivers are more familiar with specific routes and local hazards.

Among the for-hire carriers, the general commodity class of carriers have crash rates about 10% higher than those firms who specialize in specific cargoes. Presumably specialist firms thrive by building up a good reputation with a relatively small number of shippers and those shippers become well acquainted with the business characteristics of the trucking firms they use.

The second enforcement program is inspections of individual trucks and drivers at the roadside. Vehicles and/or their drivers found to be in violation of federal regulations are placed “out of service” until the problem is rectified. In a laudatory effort between the United States federal government, state governments and officials in Canada and Mexico, standardized inspection

methodologies have been devised, and decals issued to satisfactory vehicles to avoid repetitive inspections by different jurisdiction of the same vehicle for a period of three months.

Despite the good intentions, my coauthor and I found that the roadside inspection program, as practiced in the early 1990s, was of dubious desirability. This was for two reasons. The first is that the forty-minute inspections were very costly to firms who were delayed, and companies with many trucks were given an excessive number of inspections because inspectors could not coordinate with each other. The other reason was a lack of evidence that the inspections changed the behavior of firms. The inspections were focused on the mechanical condition of the truck, despite that fact that mechanical problems cause a small fraction of crashes. Driver violations, especially those concerned with driving more than permitted hours, are frequently not reported to the driver's home state limiting their potential effectiveness.

Fortunately, information technology has come to the rescue of the inspections. Increasingly, inspectors enter the results of inspections directly into handheld terminals. An algorithm is used to inform other inspectors of the priority they should give to inspecting a particular company's vehicles. Companies with few and/or poor inspections are recommended for inspection, and it is possible to avoid additional inspections of firms with many satisfactory inspections. While not every inspector has been equipped with these devices, they go a long way to solving the problem of excessive delays incurred by good firms.

The authorities face an unenviable task in monitoring the trucking industry. The interstate commerce industry is estimated to have over 400,000 carriers, and there are many more that operate only within state boundaries. Most of these firms are very small. It is estimated that 70% of the firms operate 3 or fewer trucks. It is almost impossible for the government to find, let alone, conduct Compliance Reviews at the home base of these small firms, and roadside inspectors rarely encounter the trucks of any individual firm. Because most firms are small, and crashes are rare, information on crash rates is difficult to obtain and an unreliable indicator of the worst firms. Therefore the federal government has come up with an ingenious system to identify the worst firms using a variety of data sources and indicators.

The Motor Carrier Safety Status Measurement System, or SafeStat, is a computer algorithm that draws on information from a variety of federal databases including crash records, information on traffic tickets issued by police officers, violations found in roadside inspections, and ratings obtained in Compliance Reviews. A weighted score in the range of 0 to 500 is obtained for each firm. The 5% of firms who score more than 150 on this scale are issued with warning letters, and those scoring more than 225 are scheduled for an immediate Compliance Review, during which information can be collected to pursue legal sanctions.

My opinion is that the SafeStat approach is very beneficial and has worldwide application. There is a need to draw together information obtained from the variety of enforcement programs available to the government. Research that we have done has shown that these programs are complementary rather than direct substitutes. We found that firms that perform poorly in both Compliance Reviews and roadside inspections have a crash rate twice that of the average for all other firms. Initial testing of the SafeStat system found that carriers obtaining a score of over 225 had a crash risk two and a half times that of firms given a clean bill of health.

This is not to say that everything is rosy. There is still limited feedback on driving violations to state licensing authorities. While we have a national system for issuing commercial drivers' licenses, we do not have a national system for providing information on which to decide whether we should take someone's license away. The regulations concerning maximum hours of service are in need of updating. The current regulations date from the 1930s, and these are based on those adopted for the railroads in 1907. Since that time we have become much more aware of circadian rhythms, the benefits of short periods of rest, and the effects of having a varied work schedule from day to day. During the coming year the federal government will be issuing a notice of proposed revisions to the rules to incorporate modern biological and medical knowledge. This is eagerly awaited.

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