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**Preliminary Regulatory Evaluation  
Regulatory Flexibility Analysis**

**Longer Combination Vehicle Driver Training**

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## EXECUTIVE SUMMARY

In accordance with a Congressional mandate, the FMCSA recently published an NPRM proposing minimum training requirements for operators of certain multiple trailer vehicles. The NPRM proposes that, with limited exceptions, drivers who do not currently operate these vehicles must complete training before operating double- or triple-trailer commercial motor vehicles. Most drivers who currently operate these vehicles will be exempted from these training requirements. The NPRM also outlines requirements for employers of drivers of these vehicles instructors, and enforcement and administrative personnel. This preliminary regulatory evaluation analyzes the costs and benefits of the NPRM.

Congress directed the FMCSA to publish regulations concerning training of drivers of longer combination vehicles (LCVs), which they defined as a any combination of a truck tractor and 2 or more trailers or semitrailers which operate on the National System of Interstate and Defense Highways with a gross vehicle weight greater than 80,000 pounds.

Approximately 35,000 drivers currently operate LCVs and will be grandfathered. Approximately 1,200 LCV drivers would require training annually. ANPRM docket comments and conversation with industry representatives and analysts suggest that LCV drivers are currently obtaining about half the estimated amount of required training, approximately 50 hours. The net cost of training (including drivers' wages) is \$45.50 an hour. This results in a ten-year cost of approximately \$28 million.

Precisely quantifying the benefits of this rule is difficult. Congress clearly assumed that increased training reduces accident rates, and many analysts agree with this position. However, quantitative data examining the relationship between training and accident rates is not plentiful, and those studies we have located have not found a strong and consistent relationship. Therefore, we performed sensitivity analysis, estimating the benefits from a range of reductions in drivers' accident rates for drivers who have received training. Net benefits ranged from -\$10 million for a 5% reduction in the accident rate to \$144 million for a 50% reduction. Table 1 presents the results for a number of possible deterrence levels.

Table 1  
Benefit Cost Ratio with Different Accident Rate Reductions

Crash Reduction	5%	10%	15%	20%
B/C Ratio	0.6	1.2	1.8	2.5

Table 2 shows costs, benefits, and the number of accidents and drivers that would be affected by these proposals, with an assumed 10% reduction in accidents.

Table 2  
 Summary Results with 10% Accident Rate Reductions  
 millions of dollars

# Trained Annually	10-year Costs	10-year Benefits	Net Benefits	B/C Ratio	Crashes Prevented
1,172	\$28.0	\$34.4	\$6.4	1.2	315

This analysis assumes that the proposal will require that prospective LCV drivers obtain an additional 50 hours of training. This is a conservative estimate, in that it is on the high end of the range of likely training time. Nonetheless, because of uncertainty over how many hours of training will be required, we performed sensitivity analysis for different assumed hours of training. As expected, the sensitivity analysis shows that net benefits move in the opposite direction of the number of hours. We invite comments from reviewers about the amount of training needed to meet the requirements of this proposal.

All costs and benefits are over a ten-year period, and are discounted at a 7% rate.

## INTRODUCTION

The FMCSA recently published in the Federal Register a Notice of Proposed Rulemaking (NPRM) that proposes requiring drivers of Longer Combination Vehicles (LCVs) to obtain special training. The proposal would require certain new drivers of doubles, and all drivers of triples, to pass a training course before operating a LCV. The NPRM outlines the specific requirements for drivers and State enforcement personnel.

This document analyzes the costs and benefits of the NPRM, as required under Executive Order 12866 and Department of Transportation (DOT) Order 2100.5.

## BACKGROUND

Commercial Motor Vehicle (CMV) drivers are not currently required to obtain special training prior to driving a LCV. These drivers must obtain a Commercial Drivers License (CDL) with a double/triple endorsement, which requires that they pass a knowledge test. However, there are no current training requirements for either the CDL or the double/triple training endorsement.

Congress expressed its concern with this matter in 1991, when it passed the Intermodal Surface Transportation Efficiency Act (ISTEA). Title IV of ISTEA, the Motor Carrier Act of 1991 (MCA), directed the Federal Highway Administration to initiate rulemaking action regarding training standards for Longer Combination Vehicle drivers. Specifically, Section 4007(b) of the MCA required the FHWA to promulgate regulations laying out minimum training standards for drivers of LCVs, and mandated that drivers' skills be certified by instructors who meet Federal requirements. The MCA defines LCVs as any combination of a truck tractor and 2 or more trailers of semi-trailers which operate on the National System of Interstate and Defense Highways with a gross vehicle weight (GVW) greater than 80,000 pounds.

In response to this congressional mandate, the FHWA published an Advance Notice of Proposed Rulemaking (ANPRM) in the January 15, 1993 Federal Register (58 FR 4638). The ANPRM asked for comments on a variety of questions related to the scope, administration, and standards of training. The Notice of Proposed Rulemaking accompanying this regulatory evaluation discusses the answers the Federal Motor Carrier Safety Administration (FMCSA, the FHWA's successor Agency) received and the agency's comments on these responses.

## THE PROPOSAL

The NPRM divides the training program into modules. In order to drive LCV doubles, drivers must have a class A CDL, and 6 or more months experience driving a group A or B CMV. A group A CMV is a vehicle with a gross vehicle weight rating (GVWR) of 26,000 pounds or more, and a group B CMV is one with a GVWR over 10,000 pounds. Drivers with a minimum of 6 months experience operating doubles and a Class A CDL may take triple training.

For one year after the effective date of the rule, drivers who meet certain criteria are exempted from

having to take the training classes. Drivers wishing to operate LCVs may be grandfathered if they certify that, in the previous two years, they:

- have had a valid CDL with a double/triple trailer endorsement, and
- have not had more than one license, and
- have not had their CDL suspended, revoked, or canceled, and
- have not been convicted for a disqualifying offense while operating a CMV, and
- have had no more than one conviction for a serious traffic violation while operating a CMV, and
- have not been convicted of a violation of State or local laws relating to motor vehicle traffic control, other than parking violations, and
- have no record of an accident for which they were at fault while operating a CMV.

In addition to the above requirements, drivers seeking an exemption from training must certify and provide evidence that they are regularly employed in a job involving the operation of a CMV requiring a CDL with a double/triple endorsement, and that they have operated, for at least 2 years immediately prior to application, a vehicle representative of the LCV endorsement category for which application is being made.

The FMCSA anticipates that most current LCV drivers will be grandfathered, and the bulk of driving class attendees will be drivers new to LCVs.

Not all aspects of the proposed rule are discussed in this document. Furthermore, this is an analytical report, not a regulatory one; statements in this document do not have the force of regulatory authority or interpretation. Readers wishing the complete regulatory language, including definitions, are encouraged to review the NPRM itself.

EO 12866 requires the Federal government to "assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating." This regulatory analysis was conducted in accordance with these requirements. This regulatory evaluation identifies, and, to the extent possible, quantifies all the likely costs and benefits of the proposed regulation. This evaluation also discusses the distribution of costs and benefits. This regulatory evaluation employs a standard cost-benefit approach, which is explained in detail in Gramlich.

## COSTS

This rule will impose both direct and indirect costs. The direct costs include the cost of providing operators of LCVs specialized training. The largest component of direct costs is the training cost, which includes both general training costs (such as the cost of providing an instructor, materials, fuel used in the range and street components of training, etc.) and the costs of drivers' time.

### COST OF TRAINING

The primary cost of this regulation will be the cost of training LCV drivers. The key factors in estimating the cost are the number of drivers who will need training and the amount of extra training they will have to undergo.

#### *Number of Drivers Requiring Training*

As noted above, this proposal contains liberal grandfathering provisions. Drivers may forgo training if they currently operate a LCV and have had no serious traffic violations in a CMV in the two years prior to application. Other conditions are listed in the previous section. Therefore, the vast majority of current LCV drivers will not need training classes.

The number of drivers who will take each type of training class is unknown. Currently, drivers with a CDL and a double/triple endorsement may drive any of the vehicles covered by this proposal. This will not be the case if this proposal is adopted, as drivers will need vehicle-specific training. The FMCSA believes drivers who are currently applying for LCV double/triple endorsement would receive LCV training and certification if this proposal is adopted.

Current and complete data on double/triple endorsements and LCV operators are not available. We used data from the Bureau of Labor Statistics (BLS) and the Federal Highway Administration to estimate the number of drivers who would need LCV training. In the article *Occupational Employment Projections to 2010* (Hecker), the BLS presented their estimate of the current number of truck drivers, as well as the number needed in 2010. BLS estimates that there are currently 1.75 million heavy truck drivers, and another 1.12 million light or delivery truck drivers. BLS definitions do not match the regulatory categories used by the FMCSA.

Not all heavy truck drivers operate LCVs. Data from the FHWA's Office of Policy shows that LCVs account for about 0.75 percent of all double and triple vehicle miles of travel (VMT). Triples account for six percent of LCV VMT. VMT does not translate directly to drivers, and the Agency believes that the true number of LCV drivers is greater than 1 percent. Accordingly, we adjusted the VMT measure upwards, and assumed that 2 percent of all heavy truck drivers operate LCVs. This translates into 35,000 current LCV drivers (0.02 x 1.75 million heavy truck drivers).

BLS forecasts that there will be 586,000 new heavy truck drivers in 2010. 240,000 of these drivers will be needed because of industry growth, while 346,000 will be required to replace current drivers.

An average of 58,600 new drivers will be needed for each of the ten years in the BLS forecast period. Given our previous assumption that 2 percent of these drivers will be needed for LCVs, this translates into an average of 1,172 new LCV drivers needed per year. 1,102 of these drivers will need double LCV certification, and 70 (6 percent of LCV drivers) will need triple certification. The overall number of LCV drivers will increase by about 700 annually, as the new drivers will be somewhat offset by 480 drivers who will stop driving every year (based on the replacement percent for all heavy truck drivers from the BLS).

As noted above, current LCV drivers who had certain violations or convictions will be not be grandfathered, and will have to take a training course. A recent survey of CDL holders found that 0.7 percent of CDL holders with a double/triple endorsement had one or more disqualifying convictions in the previous 2 years. 4.2 percent of these drivers had 2 or more serious convictions. Both CMV and personal vehicle convictions are included in this total. We were unable to examine how many drivers could not be grandfathered because they met any of the other prohibitions (such as being involved in an accident in which they were determined to be at fault). As explained in Appendix C, we estimate that 5 percent of current LCV drivers would not be grandfathered and therefore need retraining. This translates into 1,750 current LCV drivers needing training in the first year. No current LCV drivers would need retraining in later years. Current drivers account for over 80 percent of first year training costs, because they outnumber new trainees and they are assumed to have twice as much training as new LCV drivers, as explained below.

By raising the cost of obtaining permission to drive LCVs, the new training requirement could reduce demand for endorsements somewhat. Some drivers who otherwise would have applied for an endorsement will be deterred by the cost, both monetary and temporal, of obtaining the requisite training. We anticipate that the reduction in applicants will be relatively small, for the following reasons. First, as will be discussed below, it is anticipated that many drivers will have their training at least partly paid for by their employers. By reducing their (relative) cost of training, this cost-sharing will deter fewer would-be LCV drivers than would be the case if drivers paid the entire cost themselves. Second, while this regulation will increase the cost to drivers of obtaining an LCV endorsement, it will also raise their benefits. By slowing down the increase in the number of eligible drivers, this proposal would increase the value of existing drivers (since they would become harder to replace). This is discussed in somewhat more detail in the section titled "other." This could result in a slight increase in driver's wages, which would offset some of the disincentive of the increase in training costs. Because of these countervailing pressures, we assumed there will be no change in the number of drivers applying to operate LCVs.

### *Hours of Training*

As explained above, this proposal would establish a training course for LCV doubles and a course for triples. For purposes of this evaluation, we assumed that each course would take approximately 100 hours. The proposal does not mandate any specific number of hours of training. We believe 100 hours is probably high, and that many drivers will need less than that amount of training. However, in order to be conservative and not underestimate the burden, we chose to use 100 hours for this evaluation. Specific course topics and requirements can be found in the regulatory text

accompanying this regulatory evaluation. Drivers applying for a triple certification must have taken the double training class.

We estimated in the previous section that 1,172 LCV drivers would obtain the initial basic training annually. This adds up to a total of 117 thousand hours of training annually.

Not all of these hours represent a new burden imposed by the Federal government. Many companies that currently operate LCVs provide their drivers with some training. Some States also require that operators of LCVs establish safety programs, which presumably includes some training time (see ATA, Colorado's comments to the ANPRM docket). This poses something of a problem in estimating the cost of this rule. Costs that would be incurred without the rule are not properly assigned to the Federal proposal. If drivers for UPS would receive the same amount of training whether this proposal were implemented or not, then this proposal would not impose new costs on UPS. In calculating the cost of this proposal, only *new* burdens should be measured.

The amount of training provided varies by company. Comments to the ANPRM docket and anecdotal information suggest that training ranges from nothing to more than 100 hours. The FMCSA believes that large companies provide the greatest amount of training. Given that large companies also employ the largest number drivers, we have assumed that, on average, LCV drivers are already receiving about half the amount of training this proposal might require, about 50 hours per driver. Given the uncertainty surrounding this estimate, we also calculated the costs of varying the number of hours by plus and minus 50 percent, 25 hours and 75 hours. At 50 hours of extra training, the proposal would result in LCV drivers receiving 58,600 hours of training annually (0.5 times the 117 thousand hours calculated above). Calculations of costs for different hours of training are presented in Chapter 5.

Two costs are imposed by requiring drivers to undergo training: the cost of providing the training, and the opportunity cost of the drivers' time. The cost of providing training is fairly straightforward: it consists of the costs of hiring an instructor, producing training materials, equipment used for instruction, fuel, wear and tear on vehicles, etc. The concept of opportunity cost is somewhat less familiar, but no more oblique. The opportunity cost of an action is the value of the best alternative that must be foregone when an action is taken. In this case, the opportunity cost of training is the foregone value of the work that the driver would otherwise be performing. The value of this work is pegged, as is standard, at the driver's wage.

The Department of Labor's Bureau of Labor Statistics conducts a number of surveys of employment and wages. Appendix A provides some detail on these surveys, and shows estimated truck driver wages for the various surveys in 2001. We use an average from these surveys of \$14.75 per hour, which is slightly higher than the wage reported by the Current Population Survey but close to that of the other 2 surveys. We added 31% to cover the cost of fringe benefits. This estimate was developed in the Hours of Service regulatory evaluation. It is a weighted average of the fringe benefits for private and for-hire carriers, based on data from the ATA and the BLS. 31 percent of \$14.75 is \$4.57; this increases total compensation to \$19.32. Appendix B contains more detail on how this estimate was generated.

Drivers and prospective drivers of LCVs are likely to have somewhat higher wages than average drivers. Docket comments suggest that carriers use their most experienced drivers to operate LCVs, and more experienced drivers are paid more than their newer counterparts. (Signpost Survey; Belzer et. al.; ICF). In the Hours of Service regulatory evaluation, FMCSA's contractor, ICF, used Current Population Survey (CPS) data to analyze driver pay based on a variety of factors, including driver experience. Their equation shows that, at the mean, adding three years of experience increases drivers wage by just under a dollar an hour. We therefore adjusted compensation up by \$1.18, to \$20.50.

FMCSA spoke to a number of training schools and associations. While the price of training varies considerably, most private training school respondents replied that a cost of \$4,000 for a 4-week course was typical. Many schools also offer longer courses that are more expensive. The executive Vice President of Stevens Transport, a refrigerated carrier based in Dallas, stated that it costs them \$3,500 to train new drivers (Transport Topics, 12/9/02). Publicly funded truck driver training schools are less expensive, with quoted prices of closer to \$2,000. These programs include both classroom training and behind the wheel training. To be conservative, we used a figure of \$25 per hour of training (\$4,000 divided by 4 weeks divided by 40 hours per week). This translates into \$2,750 of direct training cost for a 110-hour course.

On-road training is obviously more expensive than classroom training, because the ratio of instructors to trainees is one to one, rather than the 15 to one (or greater) that is possible for classroom training. In addition, programs must have trucks available for driving, and face additional variable costs such as fuel and insurance. The training programs FMCSA contacted all include both classroom training and behind the wheel training as part of their curriculum. These programs did not disaggregate their training costs, so the FMCSA likewise used the combined cost figure cited above.

Some carriers will get work out of their trainees. At least one person said that carriers sometime have their trainee haul freight, generally under the supervision of an instructor, while in class. This lowers the opportunity cost of training, since the trainees are engaging in the second best use of their time and producing revenue for their employer. The frequency of this practice is unknown. Members of the MTCV curriculum technical advisory panel have noted that their trainees haul freight during training, generally with an instructor in the cab. Because we do not know how prevalent this practice is, we did not reduce the training cost to account for this work.

The combined cost of training for new LCV drivers is therefore \$45.50 an hour (\$20.50 of foregone driver wages plus \$25 in actual training costs). Multiplying the 58,600 hours by \$45.50 an hour yields a training cost of \$2.67 million a year for new drivers basic training costs.

The first year cost for training current LCV drivers who are not grandfathered is much higher, since there are more of them and they need a full 100 hours of training. The cost for training these drivers is \$8 million. There are no out-year training costs for these drivers, since they must take the class initially in order to continue driving.

The total training cost is \$10.6 million in the first year, and approximately \$2.7 million in later years. Ten-year costs discounted training costs are approximately \$28 million.

## CARRIER COSTS

This evaluation has focused on the cost of this regulation to drivers and the public. Carriers will face minimal costs. They will be required to confirm their driver qualifications, and to keep copies of the relevant paperwork in the driver qualification (DQ) file. Carriers must also not allow a driver to operate a LCV for which he lacks the required training. This will impose some minimal costs on carriers. For purposes of this evaluation, we assumed that it would cost carriers \$5 per driver to comply with this proposal. This adds \$5,900 per year, which does not effect the ten-year discounted costs described above.

## OTHER

While this analysis has discussed gains and losses to carriers as a whole, the distribution of benefits will likely vary within these groups. This section discusses these issues.

The motor carrier industry is composed of many different segments, with different operating characteristics, vehicle usage patterns, pay rates, and so on. Of particular importance is the split between large and small carriers. While there are a significant number of medium sized carriers, deregulation has resulted in an increase in the percentage of both large and small carriers (Corsi, pages 3-7). This is particularly true in the less than truckload (LTL) sector, which is a major user of LCVs (TRB, chapter 3). Extractive industries, primarily in the West, also tend to use LCVs.

Evidence suggests that large LTL companies have thorough training programs. Comments to the ANPRM docket and anecdotal information support the widespread belief that large LTL carriers already provide their drivers with extensive training before allowing them to operate LCVs (see the discussion on costs). For carriers which are already meeting (or surpassing) the hours of training requirements of this proposal, there will be no extra costs (or only minor costs) as a result of this proposal.

Carriers with less extensive training programs, on the other hand, will face relatively larger costs to comply with this proposal. Again, anecdotal evidence indicates that small, often private carriers are the least likely to have extensive training programs.

If this description of the users of LCVs is accurate, the costs of this proposal would be borne unevenly. Small carriers would be faced with new expenses, raising their overall costs. Large carriers, on the other hand, would face smaller cost increases. By raising small carriers' relative prices, large carriers would receive a competitive advantage. The result could be some shifting of traffic from small to large carriers.

This effect may be reinforced by that fact that many smaller operators employ a low-cost competitive strategy. A low-cost strategy involves competing almost entirely on price. The risk of this strategy is

its extreme sensitivity to small price changes. Some evidence suggests that small LTL carriers are more likely to employ a low-cost strategy than are other (medium or large) carriers (Corsi et al). Larger carriers, by contrast, embrace a variety of strategies (Corsi et al; Boyle, page 5). To the extent that smaller carriers, LTL and otherwise, disproportionately follow a low-cost strategy, they would suffer higher than expected losses of traffic from this proposal (or any proposal that raises their costs). Carriers employing different strategies (differentiation, product focused, etc.) are much less sensitive to slight cost increases.

The costs of this proposal would differ by type of carrier. Costs may also vary by type of driver. The basic division will be between drivers who currently operate LCVs (most of whom will be grandfathered in) and those who want to operate LCVs in the future. Two factors are at work. First, by raising the cost of becoming accredited to drive an LCV, this proposal serves as a barrier to entry. Some drivers who, absent this proposal, would enter the LCV driving market will be deterred by the increased cost (in dollars and time). The supply of LCV drivers will fall, or not grow as quickly as it otherwise would. Drivers already in the market (i.e., those who have been grandfathered in) will face less competition.

The second factor is the added cost to companies that hire untrained workers. The total cost of getting an LCV driver on the road is the wage plus the training cost for drivers who need to take the training class(es), while it is only the wage for drivers who have already met FMCSA standards. Obviously, companies will prefer the lower cost grandfathered drivers. If the cost of training is \$2,000 per driver, and a company pays that cost, then it can afford to pay a grandfathered driver \$1,000 more than a non-grandfathered driver and still come out ahead. Obviously, if a company pays only a portion of the training cost, the calculation is somewhat different, but the same principle applies.

These two factors could result in a slight increase in the wage of drivers who are exempted from the requirements of this proposal, and a slight decrease in the wage of new LCV drivers who must obtain training. These are changes from wages that would prevail without this proposal, not net changes from existing wages. It is possible that new drivers' wages would increase, but not by as much as they otherwise (absent this proposal) would. No estimate was made the magnitude of these effects. In any case, most of these changes would be transfers, not real resource costs.

## BENEFITS

The FMCSA anticipates that the extra training required by this regulation will result in a slight decrease in accidents. Generally, regulatory analyses include an estimate of the specific number of accidents prevented by the regulation under consideration. These estimates are usually based on statistical studies of the relationship between an intervention (in this case, training) and an outcome (accidents).

Because of the paucity of data, that approach was not taken in this evaluation. As was discussed above, the Agency was unable to locate any reliable, quantitative studies of the impact of truck driver training on safety. There are a number of reasons for the absence of studies of the (hypothesized) connection between driver training and accident reduction. The statistical problems involved are daunting, involving difficulty measuring both the inputs (training) and outputs (accidents rate), problems specifying a relationship (because of the relatively small number of accidents), and poor quality data.

Nonetheless, most people who submitted comments to the ANPRM docket argued that driver training reduces accidents. This is consistent with the widespread belief in the motor carrier industry that those carriers with the best training programs have the lowest accident rates. Congress also clearly believes that such a relationship exists, a belief embodied in the Motor Carrier Act's training mandate.

## ACCIDENT REDUCTION

Because of the concerns expressed above, the FMCSA did not come up with a "best" estimate of the number of accidents this proposal would prevent. Instead, the Agency estimated the benefits that would accrue from various levels of accident reduction. We then determined the break-even level of reduction, that is, the number of accidents prevented that would be required for this rule to show a positive net benefit.

### *Safety Record of LCVs*

Analysts do not agree on the relative safety of LCVs, for several reasons. Analysis has been conducted using different yardsticks (absolute accidents vs. accidents per million vehicle miles of travel (VMT)), years of data, States or areas of analysis, and data sources. In addition, because of the lack of a clear definition of LCVs, studies have analyzed and compared different vehicles configurations. Most of the data bearing on this issue was not collected with this type of analysis in mind, and is therefore ill-suited for comparative accident analysis.

A particular weak link is information regarding the number of miles traveled by different types of vehicles. This data is needed as a denominator in order to calculate accident rates. Many studies use the FHWA's estimates of vehicle travel. However, because of the (relatively) small number of miles travelled by LCVs (particularly triples), any estimate would be very unreliable (subject to a very large

standard error).

The Insurance Institute for Highway Safety (IIHS) recently commented on a pilot program proposed by the Truckload Carriers Association to allow younger drivers to obtain a CDL (IIHS). In their comment, IIHS noted that “extensive research has shown the limited efficacy of driver training programs in reducing crash risk”. IIHS then cites a number of studies which reviewed scientific literature on driver training. One study cited by IIHS (Vernick et al.) found “...there is no convincing evidence that high school age students who complete a driver education course have fewer motor vehicle crashes or violations than those who do not...If anything, it appears that the greater likelihood of licensure for those receiving driver education increased their risk for a violation or crash.” Another literature review mentioned by IIHS (Mayhew and Simpson) reached similar conclusions: “The overwhelming preponderance of evidence fails to show that formally trained students have a lower frequency of crashes than those who do not receive such training. Even worse, a few studies have shown a safety disbenefit of driver education/training.”

The U.S. General Accounting Office (GAO) has also studied the safety of LCVs, and its report included a review of a number of the most frequently cited reports. The results of this analysis were summarized by the title of the report, *The Safety of Longer Combination Vehicles is Unknown*. (The GAO report covers longer doubles and triples, rather than LCVs as defined by Congress). The results of eight studies reviewed by the GAO ranged from showing that LCVs were 20 percent less likely to be involved in accidents than single-trailer trucks to indicating that they were 58 percent more likely to be involved.

#### *Number of LCV Accidents*

The National Highway Transportation Safety Administration (NHTSA) collects information on crashes by type of vehicle. The NHTSA obtains information on all fatal accidents, which are maintained on their Fatality Analysis Reporting System (FARS). The University of Michigan Transportation Research Institute (UMTRI) uses FARS as a baseline for their Trucks Involved in Fatal Accidents (TIFA) database. TIFA supplements FARS, and uses follow-up interviews and contacts to gather additional, more detailed information on vehicle variables (configuration, intended trip distance, etc.). Because of the extra work, TIFA generally includes more truck accidents than does FARS. More significant for this analysis, TIFA also includes truck GVWR.

This level of comprehensiveness is not possible for non-fatal accidents, because of their tremendous number. The NHTSA collects a stratified sample of non-fatal accidents, and estimates the total number of crashes by assorted characteristics (such as vehicle type, road type, etc). This information is maintained on the General Estimates System (GES).

The table below presents information on the number of fatality and injury involved crashes, and the number of Property Damage Only (PDO) accidents, from 1995 through 2000 (the most recent years for which data exists). The figures include accidents involving vehicles with two or more trailers only. Fatal crashes with a double are only included if the truck had a GVWR of more than 80,000 pounds. All fatal crashes where a triple was involved are included, regardless of the GVWR. Weight data is not available for non-fatal crashes. Therefore, we adjusted the non-fatal crashes to account for

the percentage of doubles which are LCVs. From 1995 to 1999, doubles were involved in an average of 167 fatal crashes per year, 46 of which (27.6%) involved trucks with a GVWR above 80,000. We assumed that 27.6 percent of all non-fatal double crashes involved LCVs. The numbers of non-fatal crashes involving doubles is 3.6 times larger than reported in the following table (1/0.276).

Table 3  
Fatalities and Injuries, and Property Damage Only Crashes  
in Longer Combination Vehicles  
(1995-2001)

	1995	1996	1997	1998	1999	2000	2001	Average
Double Fatal	40	27	62	50	52	--	--	46
Triple Fatal	1	5	3	0	2	--	--	2
All Fatals	41	32	65	50	54	--	--	48
Double Injury	--	--	343	423	424	407	518	423
Triple Injury	--	--	68	0	0	3	23	19
All Injury	--	--	411	423	424	410	541	442
Double PDO	--	--	1291	1064	1076	1279	770	1096
Triple PDO	--	--	7	259	164	274	269	195
All PDO	--	--	1298	1323	1240	1553	1039	1291
All Crashes	41	32	1774	1796	1718	1963	1580	1781

An average of almost 1,800 LCV crashes occur annually, 48 of which involved fatalities. The remainder consisted of injuries and PDO accidents. These numbers are probably low, due to underreporting of injury and PDO crashes, and the unusual ratios involved. Fatal crashes make up just over 1 percent of all truck crashes, whereas the table above shows that they constitute about 2.5 percent of LCV crashes. Because we lack any reliable basis to adjust these figures, this analysis uses the numbers presented in the previous table.

Because the number of non-fatality accidents is an estimate, it is subject to estimation error. (Fatality numbers, which are derived from a complete census of all motor vehicle fatalities, are not subject to these same errors.) Because of the relative infrequency of LCV crashes, the estimates are bounded

by fairly large confidence interval.

In *The Cost of Large Truck and Bus Involved Crashes*, Zaloshnja et al. estimate the cost of crashes for different vehicle types and of different severities. Data for LCVs are presented in the following table.

Table 4  
Average Crash Cost for LCVs  
by vehicle type and severity

Vehicle Type and Severity	Cost
Fatal Crash, Double	\$3,367,873
Fatal Crash, Triple	\$3,542,774
Injury Crash, Double	\$245,472
Injury Crash, Triple	\$328,008
PDO Crash, Double	\$11,025
PDO Crash, Triple	\$9,940

We then weighted these average costs by the distribution of crashes from Table 3, to arrive at an average LCV crash cost of \$161,376 per crash. Multiplying this figure by 1,781 accidents yields a average annual LCV crash cost of approximately \$287 million.

#### UNQUANTIFIABLE BENEFITS

The likely reduction in accidents may also result in carriers having lower insurance bills. The extent to which their premiums would fall is unknown, as the reduction in accidents is unknown. Because of the level of uncertainty, no attempt was made to estimate this benefit. While a reduction in insurance rates may be a benefit to a carrier, it is not a social benefit. The lower rates primarily reflect a monetized value of the reduction in accident costs. In other words, premiums go down by the amount insurance claims have fallen, so including this as a benefit would be double counting. A reduction in the real cost of administering insurance would constitute a real net benefit. However, it is unlikely that any such reductions would be substantial (Office of Management and Budget, Appendix 5, pages 733-735).

Some of the freight diverted from LCVs will probably be moved by railroads instead. Railroads use less energy, and cause less pollution, than do trucks (Davis and Strang, pages 2-26, 2-27). Because no formal estimate was made of possible diversion to rail, no estimate was made of these benefits. The FMCSA does not believe that these benefits would be large.

## COMPARISON OF COSTS AND BENEFITS

### BASELINE SCENARIO

The baseline scenario reflects what will happen if this rule is not promulgated. The estimated 35,000 current LCV drivers have approximately 1,780 accidents a year, averaging one accident every 20 drivers (or .05 accidents per driver). As was explained above, absent the LCV option there would be approximately 700 additional LCV drivers a year. The total number of LCV drivers would gradually increase, as replacements would more than offset retirees (with 1,172 new drivers and 480 retiring drivers annually). These new drivers would presumably have the same rate of accidents as existing drivers, as they undergo the same training.

At that rate, the number of accidents would slowly climb to almost 2,100 a year, a net increase of approximately 300 over the present level. At \$161,000 per accident, LCV accidents cost an average of \$287 million per year.

### Proposal Scenario

Under this proposal, newly trained drivers would gradually replace existing drivers, who are largely self-trained. As was noted above, we estimate there are currently 35,000 LCV drivers, and 480 of these drivers will discontinue driving every year. 1,172 new drivers, who are subject to training, will enter the LCV workforce every year. Therefore, in the first year of this proposal, newly-trained drivers will account for only 3.3 percent of all LCV drivers. They will grow by about 3 percent per year, so that by the tenth year of this proposal they would constitute 27 percent of LCV drivers. Because newly-trained drivers would only account for a modest percent of all LCV drivers, their overall safety impact will be relatively small.

The Agency assumes that this proposal would reduce accidents by ensuring that new drivers are safer than those currently driving LCVs. How much safer these drivers will be is unknown, and can only be determined in retrospect. Therefore, as explained previously, we tested a number of different scenarios.

Table 5 shows the benefit cost ratio for various years assuming that driver training reduces crash rates by 10 percent, and that drivers will receive an additional 50 hours of training. The table shows that this proposal is cost beneficial, with a benefit cost ratio of 1.2. The table also shows that the rule becomes more beneficial in the later years. There are 2 reasons for the gradually increasing ratio of this proposal. First, the first analysis year includes the cost of training current drivers who are not grandfathered. Second, drivers trained in year 1 have reduced accident rates in years 1 through 10. One year of training deters crashes for 10 years. Therefore, costs in year 10 are the same as in previous years, but benefits include all crashes deterred by drivers trained in the 9 earlier years. The same pattern holds regardless of the assumed crash rate and the number of hours of training.

Table 5  
Benefit Cost Ratio, 10 Percent Accident Reduction  
Different Years

Year	1	3	5	7	9	Total
B/C Ratio	0.1	1.1	1.7	2.4	3.1	1.2

Table 6 shows the benefit-cost ratio for a variety of hypothetical crash reduction rates and hours of training. The pattern shows, not surprisingly, that the benefit cost ratio improves as the crash reduction rate increases and the number of hours of training decreases.

Table 6  
Benefit Cost Ratio, Different Assumed Crash Reduction Rates and Hours of Training

Hours of Training	Crash Reduction Rate			
	5%	10%	15%	20%
25	0.96	1.9	2.9	3.8
50	0.6	1.2	1.8	2.5
75	0.5	0.9	1.4	1.8

Finally, Table 7 shows the breakeven point, the percent of crashes deterred that makes the cost benefit ratio equal to 1. The deterrence rate for all hours is in the range that a well-designed training program could yield.

Table 7  
Breakeven Rate

Hours of Training	Breakeven Deterrence Rate
25	5.3%
50	8.2%
75	11.0%

## INITIAL REGULATORY FLEXIBILITY ANALYSIS

### INTRODUCTION

The Regulatory Flexibility Act of 1980 requires Federal agencies to "...endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation." Accordingly, DOT policy requires an analysis of the impact of all regulations (or proposals) on small entities, and mandates that agencies shall strive to lessen any adverse effects on these businesses. The Initial Regulatory Flexibility Analysis must cover the following topics.

- 1) A description of the reasons why the action by the Agency is being considered.
- 2) A succinct statement of the objectives of, and legal basis for, the proposed rule.
- 3) A description-and, where feasible, and estimate of the number- of small entities to which the proposed rule will apply.
- 4) A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the types of professional skills necessary for preparation of the report or record.
5. An identification, to the extent practicable, of all relevant federal rules that may duplicate, overlap, or conflict with the proposed rule.

This section fulfills that function.

#### Reason the action is being considered

This action is being considered in response to Congressional direction. Specifically, section 4007 of the Intermodal Surface Transportation Efficiency Act of 1991 directed the Secretary of Transportation to promulgate regulations requiring training for LCV drivers.

#### Objective and legal basis for this action

The objective for this action is to reduce the number of crashes caused by drivers of LCVs. Congress was specifically concerned about the number of LCV crashes caused by inadequate driver training, and believes that better training will reduce these types of crashes. As noted above, the legal basis for this rule is section 4007 of the Intermodal Surface Transportation Efficiency Act of 1991.

#### Number of small entities to which the action will apply.

This action would apply to all small entities regulated by the FMCSA which own or operate LCVs. The FMCSA is currently conducting research to specify the size of the small motor carrier population. Using the number of drivers as a proxy for size, the majority of carriers can reasonably be described as small. As of April of 2002, there were 610,000 motor carriers on the FMCSA's Motor Carrier Management Information System (MCMIS) census file. Of the 500,000 of these carriers for which we have driver data, 435,000 (87%) have 6 or fewer drivers. Assuming that 87%

of the 110,000 carriers with no driver information are also small, the total number of carriers with six or fewer drivers would exceed half a million.

#### Reporting, recordkeeping, and other compliance requirements of the proposed rule

This action would impose a very modest burden on small entities, since it largely regulates the actions of drivers rather than motor carriers. Nonetheless, this action does impose some reporting and recordkeeping requirements on motor carriers. The primary carrier requirement would be to verify drivers' eligibility before allowing them to operate an LCV. In addition, carriers must maintain a copy of the required driver training certificate in each driver qualification (DQ) file. Carriers are currently required to maintain a DQ file for each driver, as outlined in Part 391 of the FMCSRs. No special skills are required to verify eligibility to operate an LCV or to place a driver training certificate in a DQ file.

#### Duplicative, overlapping, or conflicting Federal rules

The FMCSA is not aware of any other rules which duplicate, overlap, or conflict with the proposed action

**APPENDIX A**  
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**Appendix B**  
*Truck Driver Wages and Fringe Benefits*

Current Population Survey (CPS)

The CPS is a monthly survey of households of approximately 50,000 households. It includes anyone who says they are a truck driver, so it should have both employees and owner-operators. The table below is for full time drivers.

CPS, 2001

Full Time Drivers	2,530,000
Median Weekly Earnings	\$593
Implied Hourly Earnings (@ 40 hrs/week)	\$14.83

National Compensation Survey (NCS)

The NCS is a survey of establishments with 50 or more employees. It excludes agriculture, fishing and forestry industries, private household workers, and the federal government. The NCS obtains actual work schedules from employers, rather than typical or assumed schedules. The survey lists about 450 occupations. The survey is conducted by personal visit, and it gets significant occupational detail.

NCS, 2001

Mean Hourly Earnings	\$13.11
Mean Weekly Hours	39.7
Mean Hourly Earnings, Full Time	\$13.13
Mean Weekly Hours, Full Time	41.4
Mean Hourly Earnings, Part Time	\$12.83
Mean Weekly Hours, Part Time	22.8

Occupational Employment Statistics (OES)

The OES is a survey of establishments with 5 or more employees. It excludes agriculture, fishing and forestry industries, private household workers, and some national security agencies. The OES assumes standardized work schedules (unlike the NCS, which obtains actual work schedules from employers). The survey includes about 700 occupations. The OES is conducted by mail, so it gets less detail about occupations than NCS. The OSE surveys 1.2 million establishments over 3-year cycle.

OES, 2001, All Establishments

	Heavy and Tractor Trailer Drivers	Light or Delivery Services Drivers	Total (Weighted Average Wages)
Mean Wage	\$16.20	\$12.32	\$14.66
Median Wage	\$15.66	\$11.22	--
Annual Wage	\$33,690	\$25,630	\$30,480
# Drivers	1,548,480	996,000	2,544,480

The OES survey also collects data on occupations by industrial sector. The following table shows data on truck drivers in SIC 421, Trucking and Carrier Services, Except Air. It shows that truck drivers in this industry are paid more than truck drivers overall. Back of the envelope calculations indicate that the 783,710 heavy and tractor trailer truck drivers not in SIC 421 have a mean hourly wage of \$15. The table also shows that SIC 421 drivers comprise 49 percent of all heavy and tractor-trailer drivers, and 12 percent of all light truck drivers. Heavy and tractor-trailer drivers make up 48 percent of all employees in SIC 421, while light and delivery drivers are 7.6 percent of employees.

OES, 2001, SIC 421 Only

	Heavy and Tractor Trailer Drivers	Light or Delivery Services Drivers	Total (Weighted Average Wages)
Mean Wage	\$17.11	\$13.88	\$16.65
Median Wage	\$16.76	\$13.23	-----
Annual Wage	\$35,580	\$28,870	\$34,639
# Drivers	765,130	120,680	885,810

We would expect the CPS to have the lowest wage, because it includes owner-operators, who often have low wages. NCS should be highest, since they only collect wages from large (50+ employee) establishments. However, NCS is lowest, while CPS and OES are similar. One explanation may be the NCS gets actual hours worked data; given the often high number of hours truckers work, this may push the hourly wage down in the NCS.

For purposes of this analysis, FMCSA uses an average wage of \$14.75 per hour.

#### Fringe Benefits

Fringe benefits includes medical coverage, retirement programs, vacations, and assorted other benefits. These add to the cost of drivers. Data from the BTS's Office of Motor Carrier

Information's Financial and Operating Statistics for 2000 indicates that drivers are paid a fringe rate of approximately 20 percent of their salary. This survey only includes large for-hire carriers. The BLS NCS also includes a series on compensation cost trends, which includes both wages and benefits. For the Transportation and Material Moving occupation, fringe benefits equals about 43 percent of wages.

In the 2002 regulatory evaluation of the hours of service rules, the contractor estimated that the weighted average fringe benefit cost would be 31 percent. We use that cost in this evaluation. Therefore, the total compensation for truck drivers is \$19.32 ( $14.75 \times 1.31$ ).

**Appendix C**  
*CDC Study Methodology and Data Description*

In order to not overburden the states' driver records systems, a stratified random sampling scheme was used for this initial study. The target was to obtain approximately 75,000 driver records from all sizes of carriers nationwide.

Based on census data in MCMIS, carriers were assigned to one of seven size categories and to one of 10 different regions of the country as follows:

*Carrier Size Categories*

Missing, 0, or 1 driver  
2 to 5 drivers  
6 to 15 drivers  
16 to 71 drivers  
72 to 200 drivers  
201 to 1,000 drivers  
1,001 or more drivers

*Carrier Regions*

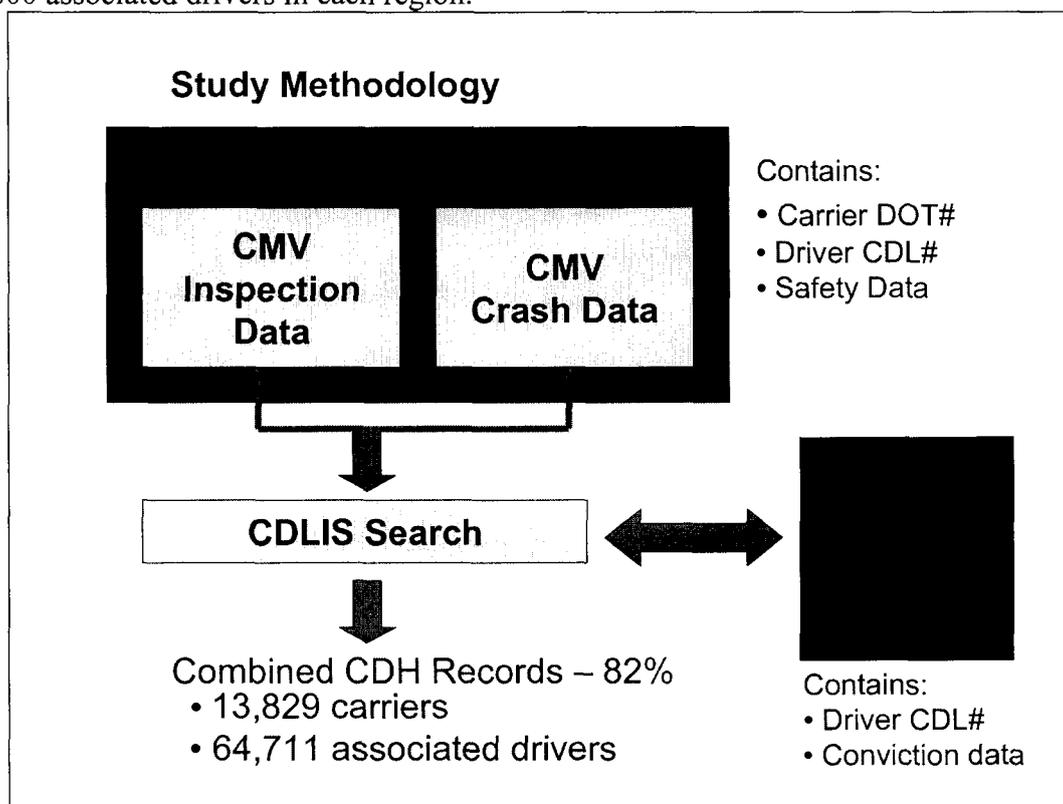
- (1) Deep South Region: Alabama, Florida, Georgia, Louisiana, and Mississippi
- (2) Great Lakes Region: Illinois, Indiana, Michigan, Ohio, and Wisconsin
- (3) Mid-Atlantic Region: Delaware, Maryland, New Jersey, New York, Pennsylvania, Washington, D.C., and West Virginia
- (4) Mid-South Region: Kentucky, North Carolina, South Carolina, Tennessee, and Virginia
- (5) New England Region: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont
- (6) Northwest Region: Idaho, Montana, Oregon, Washington, and Wyoming
- (7) Pacific West Region: Alaska, California, and Hawaii
- (8) South Central Region: Arkansas, Kansas, Missouri, Oklahoma, and Texas
- (9) Southwest Region: Arizona, Colorado, Nevada, New Mexico, and Utah
- (10) Upper Plains Region: Iowa, Minnesota, Nebraska, North Dakota, and South Dakota

Combining the size categories and regions results in a total of 70 groups. Each of the 614,530 carriers that had applicable census data in the MCMIS database was assigned to a unique group. Because there are obviously fewer drivers associated with smaller carriers, and a limited number of larger carriers, a larger sample of smaller carriers was obtained. For each carrier randomly selected from each group, drivers associated with that carrier were randomly selected, with a maximum of 50 drivers per carrier. Only accident or inspection reports within the one-year time frame between September 1999 and September 2000 were used to associate drivers with carriers. If there were no drivers able to be associated with the carrier, the next carrier was selected until there was at least one driver association. In order that there would not be duplicate driver

histories associated with carriers, checks were completed to ensure that a driver was not associated with the same carrier more than once. However, it was acceptable, and expected, that a driver could be associated with more than one carrier.

The initial selection resulted in a sample of 15,829 carriers, with an associated 79,244 drivers. The sample range consisted of approximately 200 carriers and 8,600 drivers from the largest size group to 5,700 carriers and 10,300 drivers from the smallest. Regarding regions of the country, there were 1,200 to 1,700 carriers from each of the 10 regions; and about 4,700 to 9,600 associated drivers in each of the regions.

The identifying information from MCMIS for each of the 79,244 drivers in the sample was sent to TML Information Services, Inc. in order to obtain the driver history records through CDLIS. Driver histories were requested for the three-year time period between September 1997 and September 2000. TML was able to successfully obtain history records regarding 64,711 of the drivers. Because an officer at an inspection or accident site often hand-enters the driver information contained in MCMIS, this 82 percent return rate is surprisingly good. These drivers were associated with 13,829 carriers (Figure 1). The range for this sample was approximately 200 carriers and 7,200 drivers from the largest size group to 4,800 carriers and 8,200 drivers from the smallest. There were between 900 and 1,600 carriers in each region, and between 2,400 and 7,800 associated drivers in each region.



**Figure 1. Study Methodology**

For each driver, the data obtained from the driver history record included the driver's date-of-birth and state, as well as information regarding any convictions in the three-year time frame. The conviction information detailed the date of the conviction, whether or not it was a commercial vehicle offense, and the associated AAMVAnet Code Dictionary (ACD) conviction code and detail.

For each carrier, in addition to their census information - such as state, number of power units and number of drivers - critical safety information was also obtained. This data included the number and type of crashes, number and type of out-of-service roadside inspections and violations, as well as the carriers' scores in each Safety Evaluation Area (SEA) of the Motor Carrier Safety Status Measurement System (SafeStat). SafeStat evaluates carriers in four areas: accidents, drivers, vehicles, and safety management. If a carrier has sufficient data in a 30-month time period to be evaluated in a SEA, they receive a score of zero to 100 in that area, with 100 being the worst. The safety data for each carrier was obtained as of September 2000.

### **Analysis for Rulemaking**

The CDLIS data for the drivers identified through MCMIS (as described above) were obtained from TML March 2001. Approximately 96 percent of the driver license numbers were obtained through inspection reports, with the remaining 4 percent through accident reports. There were 64,797 drivers in the file. Of these, 24,998 (38.58 percent) had a Double/Triple (D/T) Trailer endorsement on their CDL.

In the two-year period 1998-1999, of the 24,998 drivers with a D/T endorsement, there were 172 drivers (0.68 percent) with one (1) or more *disqualifying* convictions. Similarly, in the two-year period 1999-2000, there were 180 drivers (0.72 percent) with one (1) or more *disqualifying* convictions.

In the two-year period 1998-1999, of the 24,998 drivers with a D/T endorsement, there were 1,061 drivers (4.24 percent) with two (2) or more *serious* convictions. Similarly, in the two-year period 1999-2000, there were 1,175 drivers (4.70 percent) with two (2) or more *serious* convictions.

It should be noted that these convictions were from the entire driving record, regardless of whether the violation occurred in a commercial vehicle or not, and regardless of whether the vehicle was an LCV or not.