Preliminary Regulatory Impact Assessment

Final Rule

Hazardous Materials: Limiting the Use of Electronic Devices by Highway

PHMSA–2010–0221 (HM-256)

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EXECUTIVE SUMMARY

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is amending the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to restrict texting by drivers of motor vehicles that contain a quantity of hazardous materials requiring placarding under Part 172 of the HMR or any quantity of a material listed as a select agent or toxin in 42 CFR Part 73. It is PHMSA's intent to simply expand upon the applicability of a final rule published by the Federal Motor Carrier Safety Administration (FMCSA) on September 27, 2010 under Docket FMCSA-2009-0370 that limits the use of wireless communication devices by motor carriers (75 FR 16391). As described fully in the FMCSA final rule, the Agency's regulatory authority is limited in such a manner that its texting restriction applies only to interstate commerce involving commercial motor vehicles (CMVs). As a result, the population of motor carriers covered by PHMSA's final rule is comprised of a very small portion of motor carriers that operate exclusively in intrastate commerce. The goal of the regulatory change is to prevent or reduce the prevalence of motor vehicle crashes, fatalities, and injuries on our Nation's highways due to texting while driving by covered intrastate motor carriers and drivers. In addition, the texting prohibition will reduce the financial and environmental burdens associated with crashes, and promote the efficient movement of traffic and commerce on interstate highways.

Recent studies show that texting is among the riskiest behaviors of the distracting activities that are undertaken by CMV drivers. Because texting while driving is a fairly recent phenomenon, empirical research on its impact on safety is limited. Much of this regulatory evaluation is based on FMCSA's carefully evaluation of all available national-level crash data. FMCSA has found and PHMSA agrees that data shows that distracted driving often results in crashes. While these data do not identify the number of fatalities or crashes attributable to texting, there are numerous studies on driver distraction in general. An analysis of those studies shows that many of their findings can be applied as a supplementary explanation to a texting prohibition. With regard to the current data on texting, the regulatory analysis focuses on one particular study — "Driver Distraction in Commercial Vehicle Operations" (also referred to as "The VTTI Study")[1] —

[1] Olson, R. L., Hanowski, R.J., Hickman, J.S., & Bocanegra, J. (2009). Driver distraction in commercial vehicle operations. (Document No. FMCSA-RRR-09-042) Washington, DC: Federal Motor Carrier Safety Administration, July 2009. Retrieved on October 20, 2009.

which, though limited in scope and application, does shed light on the potential harmful consequences of texting while driving CMVs.

This regulatory evaluation considers the following potential costs: (a) loss in carrier productivity due to time spent while parking or pulling over to the side of the roadway to perform texting activities; (b) increased fuel usage due to idling as well as exiting and entering the travel lanes of the roadway; and (c) increased crash risk due to parking a CMV on the side of the roadway and exiting and entering the travel lanes of the roadway. The regulatory evaluation also considers potential costs to the states. However, since the analysis does not yield appreciable costs to the states, further analysis pursuant to the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1532) was deemed unnecessary.

PHMSA estimates that this rule will cost $5,227 annually. Additionally, it found no significant increase in crash risk associated with drivers' strategies for complying with the rule. As indicated above, a PDO crash costs approximately $17,000. Consequently, the texting restriction would have to eliminate just one PDO crash every 3.25 years for the benefits of this rule to exceed the costs.

Currently, PHMSA does not have sufficient data that show an explicit empirical link between texting and crashes involving the covered population. Therefore, the Agency exercised its professional judgment consistent with Office of Management and Budget Circular A-4 ("Regulatory Analysis") and conducted a threshold analysis. A threshold or break-even analysis is called for when it is impossible, or difficult, to express in monetary units all of the important benefits and costs of a rule. The most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate. In such cases, the Agency is required to make a determination of how important the non-quantified benefits or costs may be in the context of the overall analysis. The threshold analysis approach therefore answers the question: how small does the value of the non-quantified benefits (safety benefits in terms of crash prevention) have to be in order for the rule to yield zero net benefits (i.e., break even)?

Summary of Costs and Threshold Analysis

Cost of Lost Carrier Productivity	$438
Cost of Increased Fuel Consumption	$3,411
Cost of Parking, Entering and Exiting Roadway Crashes	$1,378
Total Costs	$5,227
Benefit of Eliminating One Fatality	$6 million
Break-even Number of Lives Saved	< 1

PHMSA also conducted a sensitivity analysis (the details of which are explained below) whereby the extent of texting while using a dispatching device or fleet management system is varied. The results of that analysis show an estimated minimum total cost of this rule of $4,428 and an estimated maximum total cost of $6,407.

1. Background

1.1 Agency Mission

Transportation safety is the Department of Transportation's (DOT's) top strategic priority. Because the human toll and economic cost of transportation crashes are substantial, improving transportation safety is an important objective of all DOT modes. Within DOT, PHMSA's Office of Hazardous Materials Safety is the Federal safety authority for the transportation of hazardous materials by air, rail, highway, and water. Under the Federal hazardous materials transportation law (Federal hazmat law; 49 U.S.C. 5101 et seq.), the Secretary of Transportation is charged with protecting the nation against the risks to life, property, and the environment that are inherent in the commercial transportation of hazardous materials. The final rule specifically address the highway subset of PHMSA's authority and is intended to reduce or prevent fatalities, injuries, and property loss due to the ever growing driver distraction-texting.

1.2 Executive Order 12866 and Executive Order 13563

Executive Orders 12866 and 13563 require agencies to regulate in the "most cost-effective manner," to make a "reasoned determination that the benefits of the intended regulation justify its costs," and to develop regulations that "impose the least burden on society." PHMSA has determined that the final rule is a significant regulatory action under Executive Order 12866, Regulatory Planning and Review, and significant under DOT regulatory policies and procedures because of the substantial Congressional and public interest concerning the crash risks associated with distracted driving, even though the economic costs of the rule do not exceed the $100 million annual threshold.

1.3 Policy Issues Spurring Regulation

The Secretary has pledged to work to ensure that the issue of distracted driving is appropriately addressed. At a Distracted Driving Summit held from September 30 through October 1, 2009 in Washington, D.C., safety experts, researchers, industry representatives, elected officials, and members of the public shared their expertise, experiences, and ideas for reducing distracted driving behavior and addressed the safety risk posed by this growing problem across all modes of transportation. At the conclusion of the Summit, the Secretary pledged to work with Congress to ensure that the issue of distracted driving would be appropriately addressed. He also announced a number of immediate actions the Department would take to combat distracted driving, including the Department's plan to address distracted driving in the motor carrier industry.

As a result of this Summit, and based on data from studies on distracted driving, the PHMSA and FMCSA are considering a number of immediate actions to combat distracted driving by CMV drivers. In addition to PHMSA's final rule supported by this regulatory evaluation and the final rule issued by FMCSA on September 27, 2010, the Agencies are considering future actions that would restrict the use of cell phones and address other interactive devices in vehicles. Various entities of the Federal government have responded to the risks of wireless communication devices and texting. The Federal Railroad Administration (FRA) of DOT issued an emergency order in October 2008 restricting on-duty railroad operating employees' use of cell phones and other distracting electronic and electrical devices. In an NPRM published May 18, 2010, FRA proposed to amend its railroad communications regulations by restricting the use of mobile telephones and other distracting electronic devices by railroad operating employees (75 FR 27672). President Barack Obama issued an executive order on October 1, 2009 (Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving"), banning Federal employees from text messaging while driving in a government-owned vehicle, or when driving a personally owned vehicle while on official Government business, or when using electronic equipment supplied by the Government while driving.

A majority of States have already implemented some type of texting restriction, which have varying degrees of enforcement and compliance. Currently, 30 States, plus the District of Columbia, have implemented laws or regulations restricting texting and/or cell phone use while driving.

2. Economic Analysis

2.1 Regulatory Alternatives Considered

This section provides an overview of the alternatives PHMSA considered for this regulatory evaluation. Texting while driving constitutes a safety risk to the motor vehicle driver, other motorists, and bystanders. FMCSA's final rule prohibits texting while driving a CMV. FMCSA's hazardous materials authority under the final rule is limited to motor carriers transporting hazardous materials in interstate commerce. Therefore, hazardous materials motor carriers and drivers operating exclusively in intrastate commerce are not subject to the FMCSA requirements. PHMSA options for addressing this gap in authority are as follows:

1. Amend the HMR to expand the scope of the FMCSA final rule to include those intrastate motor carriers and drivers that transport a quantity of hazardous

materials requiring placarding under Part 172 of the 49 CFR or any quantity of a material listed as a select agent or toxin in 42 CFR Part 73 or

2. Take no action.

These options are further described below, followed by an assessment of their potential costs and benefits.

Option One: IMPLEMENTING A RESTRICTION AGAINST TEXTING WHILE DRIVING

The safety benefits associated with prohibiting texting are equally applicable to drivers transporting covered hazardous materials via intrastate as they are to interstate commerce. Texting while driving constitutes a safety risk to the motor vehicle driver, other motorists, and bystanders. As required in the FMCSA final rule, the consequences of texting while driving can include state and local sanctions, fines, and possible revocation of commercial driver's licenses. Due to the inherent dangers of texting while driving, PHMSA concluded that a restriction of such activity was the best course of action.

Option Two: NO-ACTION

This option would maintain the status quo and provide for no new action – allowing a gap in the coverage of intrastate motor carriers to develop. This would allow the unsafe practice of texting to continue for the covered population. PHMSA does not support this option. This option serves as baseline upon which this analysis is conducted.

2.2 Research and Data

2.2.1 Current Research on Driver Inattention and Distraction

Driver distraction has been defined by Trezise et al. [2] as the voluntary or involuntary diversion of

[2] Trezise, I., Stoney, E. G., Bishop, B., Eren, J., Harkness, A., Langdon, C., & Mulder, T. (2006). Report of the road safety

attention from primary driving tasks that is not related to impairment (from alcohol, drugs, fatigue, or a medical condition), where the diversion occurs because the driver is performing an additional task (or tasks) and temporarily focusing on an object, event, or person not related to the primary driving tasks. The diversion reduces a driver's situational awareness, decision making, and/or performance, resulting, in some instances, in a collision, near-miss, or corrective action by the driver or other road user.

From a practical standpoint, driver distraction can be defined as the combination of inattention and a critical incident(s). Driver inattention is related to driver behavior and is caused by many possible events or tasks. These tasks vary in complexity, but are typically divided into three categories: (1) primary tasks (required for vehicle control), (2) secondary tasks (driving-related, but not required for vehicle control, such as checking mirrors or the speedometer), and (3) tertiary tasks (non-driving related, such as texting or eating). For tertiary tasks, the level of complexity is further divided into complex, moderate, and simple. Among complex tertiary tasks, texting ranks the highest,[3] meaning that the odds of being involved in a critical incident are greater than when this task is nonexistent.

According to the National Highway Traffic Safety Administration (NHTSA), there are four types of driver distraction: Visual (taking one's eyes off the road), auditory (listening to something that would distract one from driving/road), physical (taking one's hands off the wheel), and cognitive (thinking about something other than the road/driving). Texting while driving involves at least three types of distraction,[4] and thus poses a considerable risk to road safety.
Critical incidents can be viewed as near-crash events. There are three main factors that could lead to a critical incident:[5] driver factors, vehicular factors, and environmental factors. Driver factors are the most prominent cause of traffic crashes. Driver distraction statistics based upon police accident reports attribute driver distraction as a primary factor in 25-30 percent of crashes.

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committee on the inquiry into driver distraction. Rep. No. 209. Melbourne, Victoria, Australia: Road Safety Committee, Parliament of Victoria.

[3] Olson et al. (2009).

[4] Auditory distraction is the least applicable to texting.

[6] For critical incidents attributable to long-haul and short-haul drivers, the three most prevalent types are: Entering roadway without sufficient clearance, backing in roadway (in presence of through traffic), and late braking for stopped/stopping traffic, tied with wide turn into adjacent lane (FMCSA Technical Brief: Light Vehicle-Heavy Vehicle Interactions: A Preliminary Assessment Using Critical Incident Analysis,), August 2004). Available ate http://www.fmcsa.dot.gov/facts-research/research-technology/tech/lv-hv-inteeractions-tech-brief.htm).

However, most research attributes a much higher percentage since there are potential errors and deficiencies with police accident reports. First, these reports are not designed to account for pre-crash behavior. Second, they cannot account for near-crashes or close-calls. Considering the relative rarity of traffic crashes in relation to the total number of vehicle miles traveled, it is imperative, from statistical and practical standpoints, to also account for pre-crash behavior and near-crashes.

Many studies have examined the link between driver distraction and potential crashes. For a review of literature, the reader may refer to "Driver Distraction: A Review of the Current State-of-Knowledge."[6] Following is a recapitulation of some recent studies on driver distraction, in general, and some studies on texting-related activities in particular.

2.2.2 Studies and Data on Texting-Related Crashes

Driver Distraction in Commercial Vehicle Operations ("the VTTI Study") – Olson et al., 2009[7]

Under contract with FMCSA, the Virginia Tech Transportation Institute (VTTI) completed its "Driver Distraction in Commercial Vehicle Operations" study[8] and released the final report on October 1, 2009. The purpose of the study was to investigate the prevalence of driver distraction in CMV safety-critical events (i.e., crashes, near-crashes, lane departures) recorded in a naturalistic data set that included over 200 truck drivers and 3 million miles of data. The dataset was obtained by placing monitoring instruments on vehicles and recording the behavior of drivers conducting real-world revenue-producing operations. The study found that drivers were engaged in non-driving related tasks in 71 percent of crashes, 46 percent of near-crashes, and 60 percent of all safety-critical events. Tasks that significantly increased risk included texting, looking at a map, writing on a notepad, or reading.

[6] NHTSA- Driver Distraction: A Review of the Current State-of-Knowledge, April, 2008.
[7] Olson, R. L., Hanowski, R.J., Hickman, J.S., & Bocanegra, J. (2009) Driver distraction in commercial vehicle operations. (Document No. FMCSA-RRR-09-042) Washington, DC: Federal Motor Carrier Safety Administration, August 2010, from http://www.fmcsa.dot.gov/facts-research/art-public-reports.aspx?
[8] The formal peer review of the "Driver Distraction in Commercial Vehicle Operations Draft Final Report" was completed by a team of three technically qualified peer reviewers who are qualified (via their experience and educational background) to critically review driver distraction-related research.

Odds ratios (OR) were calculated to identify tasks that were high risk. For a given task, an odds ratio of "1.0" indicated the task or activity was equally likely to result in a safety-critical event as it was a non-event or baseline driving scenario. An odds ratio greater than "1.0" indicated a safety-critical event was more likely to occur, and odds ratios of less than "1.0" indicated a safety-critical event was less likely to occur. The most risky behavior identified by the research was "text message on cell phone,"[9] with an odds ratio of 23.2. This means that the odds of being involved in a safety-critical event are 23.2 times greater for drivers who text message while driving than for those who do not. Texting drivers took their eyes off the forward roadway for an average of 4.6 seconds during the 6-second interval surrounding a safety-critical event. At 55 mph (or 80.7 feet per second), this equates to a driver traveling 371 feet, the approximate length of a football field, including the end zones, without looking at the roadway. At 65 mph (or 95.3 feet per second), the driver would have traveled approximately 439 feet without looking at the roadway. This clearly creates a significant risk to the safe operation of the CMV.

Other tasks that drew drivers' eyes away from the forward roadway in the study involved the driver interacting with technology: calculator (4.4 seconds), dispatching device (4.1 seconds), and cell phone dialing (3.8 seconds). Technology-related tasks were not the only ones with high visual demands. Non-technology tasks with high visual demands, including some common activities, were: reading (4.3 seconds), writing (4.2 seconds), looking at a map (3.9 seconds), and reaching for an object (2.9 seconds).

The study further analyzed population attributable risk (PAR), which incorporates the frequency of engaging in a task. If a task is done more frequently by a driver or a group of drivers, it will have a greater PAR percentage. Safety could be improved the most if a driver or group of drivers were to stop performing a task with a high PAR. The PAR percentage for texting is 0.7 percent, which means that 0.7 percent of the incidence of safety-critical events is attributable to texting, and thus, could be avoided by not texting.

Table 1. Odds Ratio and Population Attributable Risk Percentage by Selected Task

[9] Although the final report does not elaborate on texting, the drivers were engaged in the review, preparation and transmission of, typed messages via wireless phones.

Task	Odds Ratio	Population Attributable Risk Percentage*
Complex Tertiary Task**		
Text message on cell phone	23.2	0.7
Other – Complex (e.g., clean side mirror)	10.1	0.2
Interact with/look at dispatching device	9.9	3.1
Write on pad, notebook, etc.	9.0	0.6
Use calculator	8.2	0.2
Look at map	7.0	1.1
Dial cell phone	5.9	2.5
Read book, newspaper, paperwork, etc.	4.0	1.7
Moderate Tertiary Task**		
Use/reach for other electronic device	6.7	0.2
Other – Moderate (e.g., open medicine bottle)	5.9	0.3
Personal grooming	4.5	0.2
Reach for object in vehicle	3.1	7.6
Look back in sleeper berth	2.3	0.2
Talk or listen to hand-held phone	1.0	0.2
Eating	1.0	0
Talk or listen to CB radio	0.6	*
Talk or listen to hand-free phone	0.4	*

* Calculated for tasks where the odds ratio is greater than one.
** Non-driving related tasks

In addition to the studies mentioned above, PHMSA considered other research reports and studies that highlight the safety risks of distracted driving in general or of texting, specifically. These studies conclude that texting is extremely risky and that it impairs a driver's ability to respond to driving situations. Most of these studies were small simulator studies, involving young automobile drivers. However, they provide support for the conclusions of the comprehensive study of CMV operations commissioned by FMCSA and conducted by VTTI. This information, which includes ongoing research, is summarized below.

Text Messaging During Simulated Driving — Drews, et al., 2009[10]

This research was designed to identify the impact of text messaging on simulated driving performance. Using a high fidelity driving simulator, researchers measured the performance of 20 pairs of participants while: (1) only driving; and (2) driving and text messaging. Participants followed a pace car in the right lane, which braked 42 times, intermittently. Participants were 0.2 seconds slower in responding to the brake onset when driving and text messaging, compared to driving-only. When drivers are concentrating on texting, reading or entering, their reaction times to braking events are significantly longer.

Driver Workload Effects of Cell Phone, Music Player, and Text Messaging Tasks with the Ford SYNC Voice Interface Versus Handheld Visual-Manual Interfaces ("The Ford Study") — Shutko, et al., 2009[11]

A recent study by Ford Motor Company[12] involving 25 participants compared using a hands-free voice interface to complete a task while driving with using personal handheld devices (cell phone and music player) to complete the same task while driving. Of particular interest were the results of this study with regard to total eyes-off-road time when texting while driving. The study found that texting, both sending and reviewing a text, was extremely risky. The median total eyes-off-road time when reviewing a text message on a handheld cell phone while driving was 11 seconds. The median total eyes-off-road time when sending a text message using a handheld cell phone while driving was 20 seconds.

The Effects of Text Messaging on Young Novice Driver Performance — Hosking, et al., 2006[13]

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[10] Drews, F.A., Yazdani, H., Godfrey, C.N., Cooper, J.M., & Strayer, D.L. (Dec. 16, 2009). Text messaging during simulated driving. Salt Lake City, Utah: The Journal of Human Factors and Ergonomics Society Online First. Published as doi:10.1177/0018720809353319. Retrieved December 22, 2009, from http://hfs.sagepub.com/cgi/rapidpdf/0018720809353319?ijkey=gRQOLrGlYnBfc&keytype=ref&siteid=sphfs.

[11] Shutko, J. Mayer, J., Laansoo, E., & Tijerina, L. (2009). Driver workload effects of cell phone, music player, and text messaging tasks with the Ford SYNC voice interface versus handheld visual-manual interfaces (paper presented at SAE World Congress & Exhibition, April 2009, Detroit, MI). Warrendale, PA: Society of Automotive Engineers International. Available from SAE International at: http://www.sae.org/technical/papers/2009-01-0786.

[12] The Engineering Meetings Board has approved this paper for publication. It has successfully completed SAE's peer review process under the supervision of the session organizer. This process requires a minimum of three (3) reviews by industry experts.

[13] Hosking, S., Young, K., & Regan, M. (February 2006). The effects of text messaging on young novice driver performance. Victoria, Australia: Monash University Accident Research Centre. from: http://www.monash.edu.au/muarc/reports/muarc246.pdf.

Hosking studied a very different driver population, but obtained similar results. This study used an advanced driving simulator to evaluate the effects of text messaging on 20 young, novice Australian drivers. The participants were between 18 and 21 years old, and they had been driving 6 months or less. Legislation in Australia prohibits hand-held phones, but a large proportion of the participants said that they use them anyway.

The young drivers took their eyes off the road while texting, and they had a harder time detecting hazards and safety signs, as well as maintaining the simulated vehicle's position on the road than they did when not texting. While the participants did not reduce their speed, they did try to compensate for the distraction of texting by increasing their following distance. Nonetheless, retrieving and particularly sending text messages had the following effects on driving: difficulty maintaining the vehicle's lateral position on the road; harder time detecting hazards; harder time detecting and responding to safety signs; and up to 400 percent more time with drivers' eyes off the road than when not texting.

The Effect of Text Messaging on Driver Behavior: A Simulator Study — Reed and Robbins, 2008[14]

The RAC Foundation commissioned this report[15] to assess the impact of text messaging on driver performance and the attitudes surrounding that activity in the 17 to 24-year old driver category. There were 17 participants in the study. The results demonstrated that driving was impaired by texting. Researchers reported that "failure to detect hazards, increased response times to hazards, and exposure time to that risk have clear implications for safety." They reported an increased stopping distance of 12.5 meters, or three car lengths, and increased variability of lane position.

[14] Reed, N. & Robbins, R. (2008). The effect of text messaging on driver behaviour: A simulator study. Report prepared for the RAC Foundation by Transport Research Laboratory., from: http://www.racfoundation.org/files/textingwhiledrivingreport.pdf.
[15] The work described in this report was carried out in the Human Factors and Simulation group of the Transport Research Laboratory. The authors are grateful to Andrew Parks [check spelling?] who carried out the technical review and auditing of this report.

Cell Phone Distraction in Commercial Trucks and Buses: Assessing Prevalence in Conjunction with Crashes and Near-Crashes — Hickman[16]

The purpose of this research was to conduct an analysis of naturalistic data collected by DriveCam®. The introduction of naturalistic driving studies that record drivers (through video and kinematic vehicle sensors) in actual driving situations created a scientific method to study driver behavior under the daily pressures of real-world driving conditions. The research documented the prevalence of distractions while driving a CMV, including both trucks and buses, using an existing naturalistic data set. This data set came from 183 truck and bus fleets comprising a total of 13,306 vehicles captured during a 90-day period. There were 8,509 buses and 4,797 trucks. The datasets in the current study did not include continuous data; it only included recorded events that met or exceeded a kinematic threshold (a minimum g-force setting that triggers the event recorder). These recorded events included safety-critical events (e.g., hard braking in response to another vehicle) and baseline events (i.e., an event that was not related to a safety-critical event, such as a vehicle that traveled over train tracks and exceeded the kinematic threshold). A total of 1,085 crashes, 8,375 near-crashes, 30,661 crash-relevant conflicts, and 211,171 baselines were captured in the dataset.

Odds ratios were calculated to show a measure of association between involvement in a safety-critical event and performing non-driving related tasks, such as dialing or texting. The odds ratios show the odds of being involved in a safety-critical event when a non-driving related task is present compared to situations when there is no non-driving related task. The odds ratios for text/email/accessing the Internet tasks were very high, indicating a strong relationship between text/e-mail/accessing the Internet while driving and involvement in a safety-critical event. Very few instances of this behavior were observed during safety-critical events in the current study and even fewer during control events. Although truck and bus drivers do not text frequently, the data suggest that truck and bus drivers who use their cell phone to text, e-mail, or access the Internet are very likely to be involved in a safety-critical event.

[16] Hickman, J., Hanowski, R., and Bocanegra, J. (2010). Distraction in Commercial Trucks and Buses: Assessing Prevalence and Risk in Conjunction with Crashes and Near-Crashes. Washington, DC: Federal Motor Carrier Safety Administration.

2.3 Cost Benefit Analysis

2.3.1 Estimated Costs of the Rule

This restriction on texting while driving is consistent with the recommendations of some manufacturers of wireless electronic devices — specifically, not to use the devices while operating a motor vehicle. Moreover, the restriction of texting while driving is a rational course of action consistent with common business sense. Many trucking corporations, such as FedEx, Southeastern Freight Lines, and UPS, do not allow their employees to use any electronic devices while behind the wheel.[17] In addition, passenger motor carriers, Greyhound and Peter Pan, prohibit the use of electronic devices by their drivers when vehicles are in motion. Drivers of CMVs, or of any vehicles for that matter, are presumed to perceive the risk to themselves and to others of texting while driving. Refraining from such behavior, voluntarily or otherwise, is therefore in the driver's best interest as well as in the best interest of others. Considering that 30 states have already implemented some type of texting restriction (and more are considering doing so), many CMV drivers are already operating under a texting restriction and have presumably modified their behavior accordingly. This, in turn, suggests that the actual cost of the final rule is likely to be even lower than this analysis indicates.

PHMSA's final rule restricts texting on nearly all types of electronic devices while driving regardless of the device. PHMSA foresees that the costs of imposing the rule will be minimal. This analysis evaluates the following potential costs of the rule: (a) value of lost productivity due to texting while not driving during on-duty time; (b) increased fuel cost due to idling, as well as exiting and entering the travel lanes of the roadway; and (c) increased crash risk due to CMVs that are parked on the shoulder of the road to send and receive text messages, and concurrent exiting and entering the travel lanes of the roadway. This analysis also considers potential costs to states.

The first step in calculating costs is to determine the population of intrastate carriers affected by the final rule. PHMSA's calculated its affected population by assessing hazmat registration data

[17] McNally, S. (November 1, 2009). Government to Ban In-Cab Texting. All Business, a D&B Company- www.allbusiness.com.

from the 2010 - 2011 registration year. This data is collected on DOT form F 5800.2 in accordance with § 107.608(a) of the 49 CFR. Generally, the registration requirements apply to any person who offers for transportation or transports a quantity of hazardous materials requiring placarding under Part 172 of the 49 CFR. Additional data collected on form F 5800.2 verify that the person is indeed a carrier, the mode of transportation used, and the US DOT Number. Using this key data from the registration form submissions we can make some assumptions to estimate the number of persons registered that we consider motor carriers subject to the final rule. Based on our analysis of form F 5800.2 – 18,841 persons have registered as motor carriers of hazardous materials. Of those 18,841 persons 17,599 included a US DOT Number. Therefore, based on PHMSA's registration data, the difference between persons registered as motor carriers and persons that have obtained a US DOT Number is 1,242 (18,841 – 17,599 = 1,242). PHMSA considers these persons to be intrastate motor carriers. We compared these numbers with the FMCSA Motor Carrier Management Information System (MCMIS). Based on MCMIS data we verified that the 1,242 carriers identified through registration data have not been issued a US DOT Number by FMCSA.

To better define the population of intrastate motor carriers subject to this rulemaking we assessed the data further. Generally, registration data is limited to persons that offer or transport placarded quantities of hazardous materials. Registration data does not include persons that transport a material listed as a select agent or toxin in 42 CFR Part 73. In addition, the data includes those intrastate motor carriers that are required to obtain a US DOT Number through their state even if they operate solely in intrastate commerce. FMCSA indicates that 28 states currently require motor carriers to obtain a US DOT Number, regardless if they operate in interstate or intrastate commerce. Based on these assumptions, the number of intrastate carriers identified through hazmat registration data may be underestimated by up to 60% to 70%.

Another assumption that must be considered is that 30 states and the District of Columbia have adopted a broad based ban on texting while driving. As a result, it is likely that 60% of the carriers identified as intrastate carriers are already subject to a ban on texting while driving. Accordingly, this would indicate that the number of intrastate carriers identified as uncovered by a texting ban by evaluating hazardous materials registration data could be over estimated by as much as 60%.

Based on the assumptions outlined above, and PHMSA's desire to take a conservative approach to the affected population, we multiply the number of intrastate carriers identified through registration data by a 20% underreporting factor. This will result in a total population affected by this rulemaking of 1,490 intrastate motor carriers (1,242 x 1.20 = 1,490).

In addition to the number of interstate motor carriers, PHMSA estimates that each interstate motor carrier employs approximately 8 drivers. This estimate was derived from the regulatory evaluation prepared by FMCSA in support final rule limiting the use of wireless communication devices (see Docket FMCSA-2009-0370). FMCSA estimated that 493,000 carriers employed a total of 4 million drivers. Even though the FMCSA estimate applies specifically to interstate motor carriers, the number is valid for motor carriers that operate exclusively in intrastate commerce as well. PHMSA evaluated FMCSA data pertaining specifically to intrastate motor carriers and drivers and found that each intrastate motor carrier transporting covered materials employs an average of 7 drivers. PHMSA uses 8 drivers per carrier to ensure that it is accounting for any possible under reporting of drivers. Therefore, the estimated population of intrastate motor carrier drivers affected by the final rule is 11,920 (1,490 x 8 = 11,920). This conservative estimate ensures that PHMSA is fully considering the impacts of expanding applicability of the FMCSA final rule to prohibit texting by drivers of motor vehicles that contain a quantity of hazardous materials requiring placarding under Part 172 of the 49 CFR or any quantity of a material listed as a select agent or toxin in 42 CFR Part 73.

(a) Cost due to lost productivity

PHMSA has identified four general scenarios for carrier and driver response to the restriction: (1) Driver will forego entering or reading messages altogether; (2) Driver will revert to alternative means of communication; (3) Driver will undertake texting during a scheduled stop; and (4) Driver will pull off the roadway to conduct texting.

Only in the last case does the texting restriction result in a loss of time for the driver and lost productivity to the carrier. The cost impact of pulling over consists of the allocation for both time lost and increased fuel usage, in addition to other environmental costs (addressed in the Agency's Environmental Assessment for the final rule).

Typically, loss in productivity is measured as lost output in terms of units of input(s), but considering the lack of sufficient detailed data on the U.S. transportation industry from which adequate conclusions could be made, PHMSA is applying a general proxy of lost labor (driver) time. It should also be noted that this productivity analysis consists of a one-year projection only and therefore disregards any long-term potential impacts on the industry. Aside from the lack of sufficient data on productivity, PHMSA believes that this short-term projection of productivity loss is appropriate due to the rapidly changing technological environment.

Labor input in the transportation industry constitutes a large percentage of carrier operating expenses.[18] Moreover, labor is a complementary component to other carrier inputs, mainly capital (i.e., vehicles) and technology. Labor transports the output, or passengers, which generate revenues. Impediments or delays in those "movements" impact potential output, and hence revenues. Yet, en-route texting for the purpose of conducting motor carrier business is arguably a minor contributor to a carrier's overall productivity. Therefore, we apply a discount factor of 90% to that productivity proxy, thereby accounting for 10% of driver time lost in the calculation of the total cost of the rule.

The first step in calculating the cost of lost productivity is to estimate the amount of texting occurring throughout the year by covered drivers. PHMSA relied on FMCSA estimates on texting frequency. First, FMCSA estimated the number of trips during which texting on mobile phone devices occurs. FMCSA did not have a direct measure of the frequency of truck driver texting, so a proxy was constructed using crash data from the VTTI study. This frequency was estimated by the ratio of the number of crashes involving texting to the total number of crashes. Based on this data FMCSA estimated that texting on mobile phone devices occurred in approximately 0.20 percent of trips or about once every five hundred trips. Additionally, based

[18] Salaries, wages and fringes constitute 55.4% of carrier operating expenses (2006), American Trucking Associations' American Trucking Trends 2008-2009.

on FMCSA estimates a full-time property driver works 240 days per year.[19] Because some drivers make multiple trips in a day, the number of working days would underestimate the number of trips. However, a fraction of property drivers are not employed full-time. The net result is that it is likely that these drivers average fewer than 240 trips per year. Nevertheless, the PHMSA will use this 240-trip figure to estimate the number of trips conducted each year because it can be associated with an upper bound for the cost estimate of this rule.

PHMSA estimates intrastate carriers transporting covered materials conduct 2,860,800 trips per year (1,490 × 8 × 240 = 2,860,800). Applying the texting rate of 0.20 percent to intrastate drivers transporting covered materials, texting on mobile phone devices is estimated to be occurring on 5,722 trips annually (2,860,800 × 0.002 = 5,722).

Next, we rely on FMCSA estimates for the amount of texting that occurs annually on dispatching devices. In the VTTI study, a broad category of "interact with/ touch dispatching device" is the metric identifying use of dispatching devices. Recognizing that these devices perform multiple and various functions, FMCSA researched the extent to which texting is performed. FMCSA concluded that an estimate of 5 percent[20] of the "interact with/touch dispatching device" metric would be reasonable and would fit the definition of texting.

Additionally, FMCSA determined the frequency of texting on a trip basis. Applying the same methodology as the mobile phone device texting estimate (based on the ratio of the number of crashes involving the use of dispatching devices to the total number of crashes), FMCSA estimated that the activity of "interact with/touch dispatching device" occurred in approximately 1.1 percent of trips or about once in every hundred trips. Therefore, assuming 11,920 drivers (1,490 × 8 = 11,920) are using dispatching devices on 1.1 percent of 2,860,800 trips annually, then the use of dispatching devices occurs during 31,469 trips annually (2,860,800 × 0.011 = 31,469). As stated above, only a fraction of these interactions -estimated to be 5 percent- are texting, however. Adding the estimated 1,573 trips where texting on a dispatching device occurs (31,469 × 0.05 = 1,573) to the estimated number of trips on which texting on mobile phones

[19] See Information Collection Supporting Statement for Hours of Service of drivers (November 19, 2008, 73 FR 69567).
[20] FMCSA conducted a sensitivity analysis using the following alternative percentages: 1 percent and 10 percent. The results are summarized in Appendix A.

occurs (5,722) leads to a total of 7,295 trips annually on which texting occurs (5,722 + 1,573 = 7,295).

Next, we estimate the average duration of texting per interaction. Text messages tend to be short and abbreviated and can often be entered and sent in less than a minute. Other types of texting covered by this restriction, such as e-mailing, however, may consume more time. Moreover, drivers who engage in texting will likely do so multiple times while driving. PHSMA assumes that a driver on average spends 2 minutes per trip engaged in texting. All things considered, PHMSA estimates the maximum aggregate annual amount of time that drivers subject to the final rule send and receive text messages to be 243 hours ((7,295 trips × 2 minutes) ÷ 60 minutes per hour) = 243 hours).

The next step for calculating the cost of lost productivity is to estimate the value of driver time. The median wage for drivers of medium and heavy vehicles is $18.79 per hour.[21] There is some variation in wages among drivers of different types of vehicles; therefore, PHMSA uses a figure of $18 per hour in this analysis. The estimate of the annual cost of time accumulated by drivers due to the texting restriction is calculated to be $4,377 [243 hours × $18/hour = $4,377)]. Reducing this productivity estimate down to 10% for driver time lost yields $438 ($4,377 × 0.10 = $438)

The productivity losses, as well as other costs, were estimated for only one year, as the entire threshold analysis was performed as an undiscounted annual estimation. The loss of productivity is expected to diminish (but not necessarily vanish within one year), as the motor carrier industry adjusts to the texting restriction and as new (permissible) technologies arise that compensate for the loss of the texting functionality. PHMSA is unaware of the specific future technologies that might arise, but we continue to research and monitor technological changes in the market.

(b) Cost of Increased Fuel Usage Due to Trucks Idling and Exiting and Entering the Travel Lanes of the Roadway

[21] Bureau of Labor Statistics, Occupational Employment Statistics, May 2008. Figure is for Standard Occupational Classification code 53-3032, Truck Drivers, Heavy and Tractor-Trailer for North American Industry Classification System code 484000, Truck Transportation. See http://www.bls.gov/oes/2008/may/naics3_484000.htm#b53-0000, accessed 16 November 2009.

To comply with the texting restriction, some CMV drivers may opt to temporarily park their vehicles on the sides of roadways to send or read text messages. Generally, there are state, city, and local restrictions on where and when a CMV is permitted to park. PHMSA assumes that CMV drivers will obey and adhere to all applicable state and government laws in this regard.

The analysis estimates the cost of increased fuel usage due to trucks being parked on the side of the roadway. If drivers opt to read and send text messages, but do so while being pulled over to the side of the roadway, or at other safe legally permissible places, one can estimate the maximum engine idle-time emissions that could be produced by this rule. For short texting messages, PHMSA assumes that most drivers, if not all, will idle their trucks while performing texting tasks. If drivers pull over to the side of the road or pull off the highway, additional fuel is burned exiting and returning to the roadway.

PHMSA estimates that 0.8 gallons of fuel burned in a large truck per hour of idling.[22] It is estimated above that drivers will spend a total of 243 hours texting while pulled off the roadway. PHMSA estimated that the average text communications will last 2 minutes, during which the driver will idle the engine while conducting the texting. Fuel consumption while idling is therefore estimated at 194 gallons (243 hours × 0.8 gallons/hour = 194 gallons).

In addition, drivers may travel extra distances to arrive at a safe place to text, or they may pull over to the side of the road where legally permitted. PHMSA estimates that, on average, a distance of 1 mile will be travelled to reach a location to park and send/receive text messages. Truck fuel efficiency varies, but it is generally between 5 and 10 miles per gallon, so an average of 7.5 miles per gallon is used in this analysis. Covered drivers are estimated to send or receive 7,295 texts per year using either mobile phones or dispatch devices. Using a distance of 1 mile per session and 7.5 miles per gallon, property carriers will consume an additional 1,066 gallons of fuel (7,295 × 1 ÷ 7.5 = 973).

[22] EPA's Smartway at http://www.epa.gov/smartway/transport/documents/tech/idling-reduction.pdf, last accessed November 25, 20009.

If Option 1 of this rule causes drivers to idle their vehicles while texting and to drive an additional 1 mile to an appropriate location from which to text, a total of 1,167 additional gallons of diesel fuel would be consumed because of this rule (194 + 973 = 1,167). If the current price of a gallon of diesel fuel of $2.924[23] is applied, the cost of this increase in fuel usage amounts to $3,411.

(c) Cost of Increased Crash Risk Due to CMVs Parking and Exiting and Entering the Travel Lanes of the Roadway

PHMSA examined the potential increase in crashes due to the increased frequency of trucks pulling into and out of the travel lanes of a roadway in order to conduct texting activities. Data gathered and analyzed by PHMSA show that such crashes are rare, in terms of total vehicle miles traveled, and are overwhelmingly property-damage-only (PDO) crashes.

Based on weighted crash estimates from NHTSA's 2008 General Estimate System (GES) dataset, Table 2 below presents crashes in which a truck is leaving a parked position, entering a parked position, or merging (not including lane changes) immediately prior to a crash.

Table 2
2008 FARS* and GES Truck Crash Data Estimate: Parking or Re-Entering Roadway

	Leaving Parked	Entering Parked	Merging	Totals
All	1875	1352	1326	4,553
Fatal	0	0	0	0
Injury	9	29	181	219
PDO[24]	1609	1323	1145	4,077
Unknown Severity	257	0	0	257

*Fatality Analysis Reporting System

In this regulatory evaluation, PHMSA estimated that drivers make 2,860,800 trips per year, and that texting occurs in 7,295 of those trips. As shown in Table 2, large truck crashes due to pulling into and out of a roadway occurred 4,553 times in 2008 based on Fatality Analysis Reporting System (FARS) and General Estimates System (GES) data. Because the crash data

[23] US Department of Energy, Energy Information Administration @http://tonto.eia.doe.gov, accessed on 7/528/2010.
[24] PDO: Property Damage Only.

includes both interstate and intrastate crashes, and historically 62 percent of the reported crashes involve interstate carriers, the estimated number of annual crashes for vehicles in intrastate operations is 1,730 (4,553 × 0.38 = 1,730). This total includes all CMVs as defined in § 383.5 of the FMCSRs. To account for the portion of CMVs in intrastate transportation covered by the PHMSA rulemaking we assume that 1 percent of the crashes are attributable to covered materials and vehicles. Therefore, it is assumed that the rate of these types of crashes is 0.0006 percent [((1,730 crashes × .01) ÷ (2,860,800 total interstate trips)) × 100 = 0.0006 percent)].

It is difficult to produce an exact estimate of how many crashes this rule will prevent. Therefore, PHMSA applies a threshold analysis to determine how many crashes the rule would have to prevent in order for the costs and benefits to break even. Assuming at worst that all 7,295 texting trips will result in a driver pulling over, we would expect, at most, .04 additional crashes (0.000006 × 7,295 = .04), most of which (90%) would be PDO crashes. A PDO crash costs approximately $17,000. If one allocates[25] the potential crashes between Injury (approximately valued at $331,000) and Unknown Injury Severity (approximately valued at $52,000), as 5 percent each, and PDO as 90 percent the cost of additional crashes occurring because of this rule would be $1,378 ((0.04 × 0.9 × $17,000) + (0.04 × 0.05 × $331,000) + (0.04 × 0.05 × $52,000) = $1,378).

Total Cost of Option One (Rule)

The total cost of Option One is the sum of the value of driver time lost due to having to pull off the roadway to perform texting activities, increased fuel usage due to having to pull over to the side of the roadway or park at a safe permissible location, and increased crash risk of possible rear-end collision of CMVs being parked off the roadway and of pulling into and out of roadway. In monetary terms, this amounts to the following (respectively): $438 + $3,411 + $1,378 = $5,227.

2.4 Estimated Costs to the States

[25] The weighted average crash rate using the three parameters descried in the text is $34,450.

As stated above, 30 states plus the District of Columbia, Guam and the Virgin Islands currently have rules prohibiting or restricting texting while driving. Clearly then, most states are aware of the severity of this problem and have already taken action to correct it. PHMSA does not presume to have knowledge of the likely specific approach of every state in responding to this rule, but it does find that its impact will not be too onerous or too costly. States happen to conduct the overwhelming majority of roadside inspections in the Nation.[26] Consequently, the addition of a texting restriction is not expected to necessitate making considerable new expenditures. Also, states already have various transportation safety programs that cover a wide variety of CMV driver activities. The texting restriction component, if not already included, is only an additional one. We do not anticipate any significant costs to the states in association with PHMSA's rulemaking.

2.5 Threshold Analysis

Currently, PHMSA nor FMCSA have sufficient data to show a significant empirical link between texting while driving by CMV drivers and CMV crashes. Therefore, the Agencies exercised their professional judgment consistent with Office of Management and Budget Circular A-4 ("Regulatory Analysis") and conducted a threshold analysis. While the VTTI study found a large number of occurrences of unsafe driving behavior when CMV drivers were texting, relative to when they are not, it did not observe any texting-related crashes. The study did show there were 31 safety critical events related to texting. However, PHMSA believes that the low cost of the texting restriction requires a quite modest improvement in safety for the rule to break even, that is, for safety benefits to equal or exceed costs.

PHMSA estimates that this rule will cost $5,227 annually. Additionally, it found no significant increase in crash risk associated with drivers' strategies for complying with the rule. As indicated above, a PDO crash costs approximately $17,000. Consequently, the texting restriction would have to eliminate just one PDO crash every 3.25 years for the benefits of this rule to exceed the costs.

[26] In fiscal year 2009, States performed 97 percent of roadside inspections of trucks, and 83 percent of roadside inspections of buses (FMCSA Motor Carrier Safety Progress Report, as of June 30, 2009).

As noted, many states have already implemented texting restrictions, which have varying degrees of enforcement and compliance. Given that some drivers are already operating under a texting restriction and have modified their behaviors accordingly, the already low costs of PHMSA's rule may be even lower. Even without considering the cost of compliance with the rule, the Agency believes that the net safety benefits of a texting restriction are evident.

3. Regulatory Flexibility Analysis

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601-612) requires Federal agencies to consider the effects of the regulatory action on small business and other small entities and to minimize any significant economic impact. The term "small entities" comprises small businesses and not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000. Accordingly, DOT policy requires an analysis of the impact of all regulations on small entities, and mandates that agencies strive to lessen any adverse effects on these businesses.

PHMSA has conducted an economic analysis of the impact of this rule on small entities and certifies that a Regulatory Flexibility Analysis is not necessary because the rule will not have a significant economic impact on a substantial number of small entities subject to the requirements of this rule. This rulemaking will may affect nearly 1,490 small entities; however, the direct costs of this rule that small entities may incur are only expected to be minimal. Costs would likely consist of lost productivity from foregoing texting while on-duty and fuel usage costs for pulling to the side of the road to idle the truck and send or receive a text message. The majority of motor carriers are small entities. Therefore, PHMSA will use the total cost of the rule ($5,227) applied to the number of small entities (1,490) as a worse case evaluation which would average $3.51 annually per carrier.

Appendix A— Sensitivity Analysis

Texting Rate on Dispatching Devices	Productivity Loss	Fuel Usage	Crash Risk	Total Cost
1%	$ 362	$ 2,825	$ 1,241	$ 4,428
5%	**$ 438**	**$ 3,411**	**$ 1,378**	**$ 5,227**
10%	$ 532	$ 4,152	$ 1,723	$ 6,407