INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

December 19, 2008

The Honorable John H. Hill
Administrator
Federal Motor Carrier Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590-0001

Petition for Reconsideration of Final Rule
Hours of Service of Drivers, 49 CFR Parts 385 and 395;
Docket No. FMCSA-2004-19608

Dear Administrator Hill:

The Insurance Institute for Highway Safety petitions the Federal Motor Carrier Safety Administration (FMCSA) for reconsideration of the final rule pertaining to the hours of service of drivers that was issued on November 19, 2008 (73 FR 69567). Although virtually identical rules have been struck down twice by the United States Court of Appeals for the District of Columbia Circuit (*Owner-Operator Independent Drivers Association, Inc. v. Federal Motor Carrier Safety Administration*, 494 F.3d 188) (DC Cir. 2007), FMCSA has made no serious effort to remediate the severe flaws noted by the court and the safety organizations who sued them. As described below, we are petitioning for reconsideration because FMCSA failed to respond fully or accurately to comments submitted by the Institute and other safety organizations showing that the proposed rule would have an adverse effect on safety. By failing to address these comments, the agency again has failed to fulfill its mission to improve the safety of truck drivers and those sharing the road with them.

FMCSA has demonstrated a consistent bias toward research supporting its rule and disregards other important research

FMCSA claims that its final rule is based on high quality studies, stating:

> The first principle that the Agency uses in evaluating research is that studies based on quantifiable, objective data that can be independently verified and tested are preferable to those based on subjective data such as individuals' opinions or perceptions. Where no objective data that was collected through strictly controlled, unbiased scientific experimentation exist, the Agency will use the best alternatives available; that could, in some instances, be subjective data. FMCSA prefers to use well-designed objective studies like the Virginia Tech Transportation Institute (VTTI) naturalistic driving research, rather than surveys of drivers.
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> The second principle is to rely primarily on independent studies that are sufficient in scope, are peer reviewed, and use an application of statistics (power analysis) to determine appropriate sample sizes (73 FR 69575).

These statements are accurate in one respect: FMCSA announced its strong preference for studies performed by Virginia Tech Transportation Institute (Hanowski et al., 2005; Hanowski et al., 2007a; Hanowski et al., 2007b). Unfortunately, those studies are riddled with flaws that the agency ignored

even though the Institute pointed out their limitations. These include using a small sample of drivers who were not necessarily representative of the general truck driver population, studying drivers who almost exclusively began their shifts at night (thereby confounding comparisons between later and earlier hours of driving shifts), studying drivers who simultaneously were being alerted by a drowsy driving warning device, overestimating driving time during the 11th hour of driving, and other methodological flaws.

In the preamble to the final rule, the agency responded that some trips were made when the drowsy driving device was inactivated, but the study findings were not based exclusively on those trips. The at-fault analysis relying on trips in which the device was inactive suggested a nearly twofold increased risk among those operating vehicles during the 11th hour versus the 10th hour, but the agency disregarded those findings because they were not statistically significant. A large observed effect that is not statistically significant is a strong indicator of inadequate sample size. Statistical significance is not the sole criterion for determining whether effects are likely to be real; statistical significance is a tool to help quantify evidence for or against a hypothesis.

The agency claimed that the overcounting of driving time during the 11th hour in studies by Hanowski and colleagues was not a problem because breaks taken by drivers during earlier hours of their shifts were included in the driving time. However, the agency produced no evidence that the magnitude of overcounting was similar between the 11th hour, when many drivers drove only a fraction of the hour, and other driving hours.

FMCSA's stated preference for laboratory/instrumented studies rather than surveys is misguided for several reasons. Surveys, if conducted properly, provide information from a more representative sample of the driver population than small laboratory or driver-instrumented studies. It is questionable how accurately laboratory studies reflect the real world. Another concern is that the process of observation in laboratory/instrumented studies may influence the behavior of interest. Some important data can best be obtained through surveys, such as the population prevalence of dozing off behind the wheel. Furthermore, self-reported fatigue or drowsiness should not be dismissed as subjective data; the logical inference of FMCSA's argument is that drivers who experience subjective symptoms of fatigue can safely continue driving. A considerable body of scientific literature indicates that drivers may fail to perceive they are impaired by fatigue, so underreporting of fatigue is likely from surveys.

FMCSA's self-described aversion to surveys is inconsistent. The agency cites some poorly designed surveys in support of its final rule while disregarding other well designed surveys. For example, FMCSA cited its own field surveys as sources of data on driving hours and use of the restart rule. The worst example of FMCSA's disregard of strong data that contradict its position while relying on weak data that support it was the omission of peer-reviewed research published by McCartt et al. (2005; 2008) in the preamble to the final rule and the lengthy defense of the unpublished and not peer-reviewed survey of 23 motor carriers conducted by the American Transportation Research Institute (ATRI) (Dick et al., 2006).

McCartt et al. (2008) surveyed long-haul truck drivers before and after the final rule went into effect during 2003, 2004, and 2005. The study population had good statistical power to detect associations because it included 1,921 drivers who were interviewed at inspection sites along interstate highways in 2 states. Data were collected anonymously so drivers would be willing to report violations of work rules without fear of legal or other repercussions. The most important survey finding was an increase in drivers who reported falling asleep at the wheel during the month before being interviewed. In Pennsylvania, 19 percent admitted dozing at the wheel in 2005, up from 13 percent in 2003. Proportions in Oregon were 21 percent in 2005 compared with 12 percent in 2003.

The unpublished and not peer-reviewed ATRI survey purported to find reductions in crash risk. But the motor carriers participating in the survey, all of whom were members of the American Trucking Associations, were not selected systematically and, therefore, likely are not representative of all motor carriers. Notwithstanding the small number of motor carriers included in the survey and the likelihood of biased representation, FMCSA defended ATRI's survey, mentioning the large number of drivers and large numbers of miles driven that were reported by the 23 participating motor carriers. In its comments on the interim final rule, Advocates for Highway and Auto Safety pointed out the problems with relying on data from motor carriers who receive economic benefits from the revised hours-of-service rules, saying they were "immune to objective evaluation." The many shortcomings of the ATRI study included no attempt to obtain independent verification of crash data, driving hours based on logbooks (which are notoriously inaccurate) rather than automated recording devices, and lack of verification of miles driven.

Other examples of FMCSA's selective use of research

The Institute repeatedly has drawn FMCSA's attention to controlled epidemiologic studies, but it appears that the agency is determined to dismiss their findings. These studies suggest that driving long hours increases crash risk substantially and that the crash risk increases as driving hours increase. These studies appear in peer-reviewed journals and provide better evidence regarding effects of long driving hours than laboratory studies because of their large numbers, more representative driver populations, and use of actual crash data rather than "critical incident data" or other surrogates for declines in driver performance. These studies controlled for important confounding factors, including time of day.

The studies with findings that have been disregarded include Frith (1994), Jones and Stein (1987; 1989), Jovanis et al. (2005), Kaneko and Jovanis (1992), Lin et al. (1993; 1994), Park et al. (2005), Saccomanno et al. (1995; 1996), and Summala and Mikola (1994). FMCSA does devote some space in its preamble to criticize Jovanis et al. (2005); yet this study is more definitive than small laboratory studies or studies of instrumented drivers, on which NHTSA relied heavily. FMCSA has given no credible reasons for its lack of reliance on these studies. In answer to prior Institute comments, FMCSA said that extensive literature reviews have been conducted. The mere existence of reviews does not mean that FMCSA put proper weight on the existing research. At least one of the reviewers, under contract to FMCSA, had been a researcher in the laboratory that developed the SAFTE/FAST model relied on by the agency, a potential conflict of interest.

Assessing relative crash risk by driving hour yields far more credible findings than analyses of databases like TIFA and FARS, which use police reports as a measure of fatigue. FMCSA places heavy reliance on data from TIFA and FARS. As discussed extensively in comments by the Institute, TIFA cannot remedy the inherent underascertainment of fatigue's contribution to crash involvement from use of police reports in TIFA or FARS. The agency also failed to acknowledge that TIFA cannot collect objective measures of driving hours in the absence of data from onboard recorders or global positioning systems. Motor carriers and drivers whose trucks have been involved in crashes have strong legal and economic incentives to understate driving hours. FMCSA conceded that such databases underestimate the magnitude of the fatigue problem but used them anyway.

FMCSA applied inconsistent criteria when evaluating studies

The agency dismissed findings by Park et al. (2005) that crash risk dramatically increased with driving time, relying instead on Hanowski et al. (2005; 2007a; 2007b) to support its position that allowing driving in the 11th hour does not increase crash risk. FMCSA noted, "That study [Park, 2005] did indeed find that crash risks in the 10th hour were twice as high as in the first—but largely because the first hour was so far

below the average" (73 FR 69580). FMCSA had no apparent qualms about relying on studies by Hanowski et al. in which the first hour of driving had substantially elevated crash risk. Park's dataset included truck drivers who started their shifts at various times of the day, while the drivers in the studies by Hanowski et al. primarily began their driving shifts at night, so the effects of driving hours could not be disentangled from the effects of time of day.

FMCSA has demonstrated a lack of understanding of proper study design and made errors in estimating the effects of additional driving hours

FMCSA states, "As explained in the preamble of the 2007 IFR and in the RIA accompanying today's final rule, the appropriate baseline for calculating the relative risk ratios for driving hours (most importantly, the 11th driving hour) is not the first hour of driving, but a combined weighted average of driving hours 1 through 10" (73 FR 69579). But the agency's statement here and in the preamble is without merit. The proper approach for studying the effects of increasing driving hours is to use epidemiologic methods for ascertaining dose-response. Epidemiologic studies define a dose-response curve by comparing successively higher doses to a low-dose or no-dose reference group (i.e., the first hour of driving). Effects of each dose group (successive numbers of driving hours) are estimated in relation to the reference group. Using the same reference group allows for comparability between risk ratios for each dose group and allows statistical modeling of the effects of increasing dose, in this case, increased exposure to driving.

How relative risk curves are used to estimate the effect of eliminating the 11th hour of driving is another issue, namely, what driving hours are substituted for the missing 11th hour. FMCSA's methods of estimation were problematic. The agency reported only a 0.7 percent overall crash reduction from reducing the driving-hour limit from 11 to 10 hours (73 FR 69580). It derived this number by dividing 2.03 (estimated relative crash risk during the 11th hour) by 1.505, the average relative crash risk over the first 7 hours of driving, which equaled 1.35. Then FMCSA multiplied the excess risk (defined as equal to 1.35 – 1) by the estimated percentage of affected drivers (2 percent, according to the agency) to arrive at an estimated decrease of 0.7 percent.

The first step in this calculation is logically unjustified, while the second minimizes the hazards from driving 11 hours. The use of average crash risk over 7 hours as the reference reflects the agency's attempt to reassign the 11th hour to any hour of driving between 1 and 7 (FMCSA did not use the relative risk for hours 1–10 because it assumed that trips averaged 7 hours). The assumption that hours 1–7 are equally likely to be used to complete the work of the 11th hour is unjustified. If there is work left undone at the end of 10 hours, the most likely time that work will be completed is in the 1st hour of the driver's next shift. This is especially true for long-haul drivers. While it could be argued that some of the incomplete 11th work hour would go to other hours of another driver's shift, it is illogical to assume that the 10th hour is equally likely to go to other hours of a driving shift. Thus, the relative risk of 1.35 used by the agency for crash risk associated with the 11th hour of driving is an underestimate of the relative risk, which was estimated at 2.03 by the researchers (Park et al., 2005).

The agency's second step in this calculation minimizes the considerable excess 11th hour risk. A relative risk of 1.35 means the agency estimates that the work completed in the 11th hour of driving has 35 percent higher crash risk than if it were completed during hours 1-7, yet the agency concluded that this large increase in crash risk is acceptable and does not compromise truck safety. FMCSA reached this conclusion by estimating that only 2 percent of driving hours occur during the 11th hour. Why should FMCSA allow the public and truck drivers to be endangered by those high-risk driving hours? Eliminating the 11th hour risk would reduce large truck crashes by almost 1 percent according to FMCSA, and the

reduction would be even greater with a more logical allocation of the 11th hour of driving to the 1st or 2nd driving hour in a shift. A 2 percent absolute crash reduction would be anticipated if the 11th hour were shifted to the 1st hour, based on data from Park et al. (2005).

Elsewhere in the preamble, FMCSA narrowed the focus to the difference in crash risk between the 10th and 11th hour of driving and, consequently, further obscured the adverse safety impact of allowing drivers to drive during the 11th hour. Whether or not the 11th driving hour poses a greater danger of crashing compared with the 10th hour, the 11th hour is a high-risk period for truck drivers and other road users. For most trips, eliminating the 11th hour of driving shifts that hour to a period of lower risk. Reducing the permissible driving hours per shift and per work week reduces exposure to excess risks associated with long driving hours.

FMCSA misread the record

FMCSA says the Institute misunderstood Hall and Mukherjee (2008) by stating that they estimated a 2 percent reduction in crashes from changing the driving hour limits from 11 to 10 hours, but it is the agency that misunderstood the origin of the number cited in this study. Table 1 of Hall and Mukherjee shows the estimated percent reduction in crashes, based on an exponential distribution of driving time, for various average driving times. Hall and Mukherjee present their formula for the proportional reduction in crashes in equation 16 of the paper. They go on to say, "Following the same method, the reduction in crashes is shown in Table 1 for HOS constraints of 6, 7, 8, 9, 10, 11, and 12 h, and mean driving times of 2, 4, 6, and 8 h." Table 1 shows a 12 percent reduction in crashes if the upper bound on driving hours is 10 hours and a 10 percent reduction in crashes if the upper bound on driving hours is 11 hours, assuming that the mean driving hours are equal to 8 among all truck drivers. The estimate of a 2 percent absolute reduction in crashes in changing driving limits from 11 to 10 hours arose from subtracting 10 percent from 12 percent. An exponential distribution of driving time resembles real-world driving time (relatively few drivers operating vehicles for 16 hours, for example). Yet FMCSA chose to rely on Table 2, which is based on a normal distribution of driving time. Note that both tables show an increase in crash risk associated with driving in the 11th hour.

The Table 1/Table 2 example is instructive because it demonstrates a consistent pattern of ignoring research that shows elevated crash risk in the 11th hour. Instead FMCSA has relied on research that minimizes the additional risk at the 11th hour.

FMCSA's analysis of Large Truck Crash Causation Study (LTCCS) data has egregious errors

FMCSA devotes considerable attention to its supplemental analysis of the Large Truck Crash Causation Study (FMCSA, 2008)). This analysis is the most seriously flawed of all the problematic research relied on by the agency. Even a superficial review of the analysis shows that the agency violated the most basic assumptions of regression analysis. In one set of analyses, the dependent variable was driver fatigue. The independent variables included time of day, hours of driving, hours awake, hours worked last week, hours worked that day, and hours of sleep prior to working.

Driver fatigue was determined by the investigators based on the driver interview, log-books, and other information (FMCSA, 2008).

> The primary data source here is the driver interview, however, due to the inaccuracies inherent in these data, the Case Reviewer should compare driver responses with other data sources including log book entries, time stamped fuel and toll receipts, carrier records, and other interview sources to determine the veracity of the driver responses. The final assessment of fatigue involvement is made from all of these sources and may include the on-site assessments of the NASS Researcher (LTCCS Analytical User's Manual, FMCSA et al., 2006).

These records reflect such factors as the amount of hours last slept and hours worked in the past day and week. Each of the independent variables was considered in the decision to code a driver as fatigued. Building a model that predicts an outcome that is defined in part by the predictors is wrong. The results of such a model give insight into how LTCCS data coders used these variables to code the presence of fatigue, but they do not reveal how these variables actually are related to fatigue of drivers on the road.

LTCCS data do not permit a determination of fault, or crash causation. FMCSA's own description of LTCCS recognizes that multiple factors operate together to cause crashes.

> LTCCS defines "cause" as any factor that increases the risk of being involved in a crash. Many factors are commonly identified as "causes" of traffic crashes, including alcohol consumption, fatigue, and speeding. Yet those factors do not invariably, or even usually, result in crashes. It is clear, however, that such behaviors and conditions increase the risk of having a crash (Blower and Campbell, 2005).

The factor in the causal chain that made the crash unavoidable is coded in LTCCS as the "critical reason," defined as the "immediate reason for this event … not the cause of the crash nor does it imply the assignment of fault" (FMCSA, 2008). Defying all LTCCS conventions, FMCSA used "critical reason" to create a new dependent variable for this study called "driver critical responsibility." Crashes coded for driver critical responsibility are nothing more than the subset of crashes for which driver factors were deemed to have been the "critical reason." By focusing on driver critical responsibility, FMCSA arbitrarily eliminated all crashes in which fatigue was a factor but not the "critical reason" (FMCSA, 2008). Elsewhere, FMCSA cautioned that "critical reason" cannot be used to establish the cause of a crash and that using it as a cause would narrow the scope of possible countermeasures.

> The critical reason is not intended to establish the "cause" of the crash, although many of the code levels look like causes and could be taken as proximate causes. However, use of the critical reason variable as capturing "the cause" both misconstrues the variable and masks the range of contributing factors. Again, the ultimate purpose of the LTCCS is to establish countermeasures that will reduce the number and severity of large truck crashes. Focusing the search only on cases of legal fault would unnecessarily limit the scope of possible countermeasures (Blower and Campbell, 2005).

In the current rulemaking, FMCSA did exactly what it warned against. To the extent that fatigue played a role in the crashes for which the driver was not coded as the critical reason, FMCSA "unnecessarily limit[ed] the scope of possible countermeasures," including reducing driving hours as a protective measure.

As FMCSA's own expert review panel explained in 2001:

> [F]atigue can have effects far beyond just falling asleep and running off the road. It can slow perception and reaction time, or cloud judgment. In a particular accident, fatigue *may* cause a driver to misjudge his speed or slow his perception of the movements of traffic ahead, but the evidence in a particular case is often not strong enough for the investigator to identify fatigue as causal in the crash (Committee for Review of FMCSA's Large Truck Crash Causation Study, 2001) [emphases in original].

Repeatedly, FMCSA's expert panel explicitly warned that LTCCS data could not be used to evaluate the role of driver fatigue in crash causation.

> The Committee majority … shares Dr. Shepp's concern as to whether the study will permit inference of the role of certain factors, including fatigue, in increasing crash risk (Committee, 2003).
>
> Among the factors whose relations to crash risk the LTCCS data may not be able to reveal for one or more of these reasons are driver fatigue, driver inattention, driver collision avoidance actions, speed, roadway conditions, driver characteristics, and driver pay and work organization (Committee, 2003).
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> We remain particularly concerned that the method of the present study is not well suited for obtaining reliable data on fatigue, driver inattention, and driver collision avoidance actions (Committee, 2003).
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> [F]atigue-related information is an area where the task force found questionable data entries and missing data, indicating the difficulty of documenting fatigue. Under present data collection procedures, there is a risk that fatigue data may be too unreliable or incomplete to be useful. After analyzing the quality of fatigue data obtained so far, FMCSA should consider the need for changing standard procedures to devote a greater share of investigative resources to collecting the fatigue-related information items (Committee, 2002).

FMCSA did not take the steps suggested by the expert panel to improve the quality of data collected on fatigue. There are additional problems with the data. The supplemental analysis assumes data are missing randomly; however, FMCSA acknowledges that data are not missing randomly because self-reported data and data that are sensitive, like those relating to the hours-of-service rule, are likely to be incomplete or biased because drivers do not want to report that they have exceeded the permitted number of driving hours (Hedlund and Blower, 2006). For the reasons stated above, the LTCCS supplementary analysis cannot reasonably be relied on to support an increase in driver hours of service.

Conclusion

The most disturbing aspect of the final rule is FMCSA's failure to carry out the Congressional mandate to "consider the assignment and maintenance of safety as the highest priority, recognizing the clear intent, encouragement, and dedication of Congress to the furtherance of the highest degree of safety in motor carrier transportation" 49 U.S.C. § 113(b)(2004). The agency repeatedly justifies the final rule by citing its legal obligation to consider economic factors, leaving no doubt that economic considerations trump safety. The agency cannot claim that the rule hasdemonstrably improved safety; instead it claims that

the rule has not worsened safety and that it has increased operational flexibility for the motor carriers. The claim that the rule has not harmed truck safety is contradicted by a peer-reviewed and published scientific study by McCartt et al. (2008), in which long-haul truck drivers reported falling asleep behind the wheel more often since their permissible driving hours were increased. Moreover, it is contradicted by FMCSA's own analysis indicating that the 11th hour of driving is at least 35 percent more risky than other driving hours in which the same work might be done; the excess risk reported by other studies is far higher than in FMCSA's analysis.

FMCSA's failure to comment on the study by McCartt et al. (2008) is one example of a pattern of biased choices of scientific literature to justify a flawed rule. The rule is riddled with inconsistencies and failures to place appropriate weight on good scientific studies disagreeing with the agency's views.

It is absurd for the agency to claim that drivers operating large trucks for 11 hours will not pose any increased risk to the public compared with drivers operating large trucks for 10 hours. If that 11th hour is shifted toward a 1st hour of driving, that will be a driving-hour in which the public and the driver are at lower risk of crashing. An elevated crash risk has been observed among drivers operating vehicles for 8-10 hours. Therefore, the agency is subjecting the public to at least as much excess risk during the 11th hour.

FMCSA should grant this petition and develop a rule that will enhance rather than degrade safety. The current rule is scientifically indefensible and poses a public health hazard to all road users. The driving hour limit should be lowered from 11 hours, and the restart provision should be removed so that weekly work hours cannot exceed 60 hours during 7 days or 70 hours during 8 days.

Sincerely,

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cc: Docket Clerk, Docket No. FMCSA-2004-19608

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