Hours-of-Service Rules
Safety Impacts
2010 Analysis

Submitted to the

American Trucking Associations

By the

American Transportation Research Institute
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In response to the upcoming Federal Motor Carrier Safety Administration (FMCSA) Hours-of-Service (HOS) rulemaking process, the American Trucking Associations (ATA) commissioned the American Transportation Research Institute (ATRI) to examine HOS safety impacts on the trucking industry. ATRI previously studied this relationship using 2003 and 2004 motor carrier and government data[1].

Methodology

A motor carrier HOS survey was developed using the template from ATRI's previous HOS study[2]. Specific survey questions utilized in the 2003/2004 data collection effort were included in this survey to ensure that cross-comparisons could be completed. Additional questions were also included to solicit data on use of the 11-hour driving and 34-hour restart provisions (see Appendix A for survey form).

The survey was provided in an online format and carriers were solicited for participation by ATA and ATRI through broadcast email to both groups' contact lists and through general news alerts soliciting carrier participation. As an alternative to the online survey, carriers were also provided the opportunity to respond via fax using a paper survey. A total of 257 responses (online and fax) were received, representing 127,033 drivers and 8,989,994,524 fuel tax miles. The dataset primarily represented small (<50 power units) and medium (50-250 power units) carriers at 49 and 30 percent, respectively.

Analysis

Carriers were asked to provide overall safety performance data for 2009 as well as specific data regarding use of the 11- and 34-hour provisions. Therefore, the analysis includes two separate components. The first examines overall yearly collision statistics for 2004 (from the earlier ATRI study) and 2009 (from this latest data collection effort). The second analysis focuses on collision involvement by hour driving and 34-hour restart usage.

Section 1: 2004 vs. 2009

Collision and injury data comparisons were made by computing the percent change that occurred between 2004 and 2009 data. The Mann-Whitney U-Test for independent groups was the specific formula used for this analysis since there were two groups being compared and the yearly data was not a "paired sample" (e.g. same carriers).

Three independent analyses were conducted. Due to the substantial sample size differences between the two years, the data was weighted by million miles traveled. Each of the following variables was compared across the 2004-2009 data.

[1] American Transportation Research Institute. *Safety Impacts of the New Hours-of-Service*. March 2006. Alexandria, VA.
[2] Ibid.

- DOT Recordable Collisions
- Preventable Collisions (as a subset of all DOT recordable collisions)
- Driver Injuries

Section 2: Collisions by Hour Driving; Driver use of the 34-Hour Restart

The data analysis focused on the following:

- Frequency of DOT recordable collisions by hour driving
- Driver use of the 9-10 and 10-11 driving hours and 34-hour restart

Distribution by industry sector (LTL, TL and Specialized) is also shown. For these, there were two methods of isolating the data (mutually exclusive vs. independent); both were examined for differences. Significant differences did not exist between the two methods; therefore the "independent" technique was selected to portray the data. The mutually exclusive option would have only included responses where one industry sector was selected by the responding carrier; whereas, the independent alternative incorporates all data into the analysis.

Results

Table 1 includes the three fleet performance measures (total collisions, preventable collisions and total driver injuries) weighted by million vehicle miles traveled.

The "all fleets" measure includes the total number of carriers that provided a response for that particular metric. For instance, under total collisions, 239 out of 257 carriers provided data for 2009. Carriers that did not select either LTL or TL were only analyzed within the "all fleets" category. The percent changes from 2004 to 2009 as well as the statistically significant[3] changes (at the < .05 level) are displayed in the following table. As can be seen, under the collisions per million miles "all fleets," the collision rate change between 2004 and 2009 data was significant.

Table 1. Collision and Driver Injury Rates Weighted Per Million Miles, 2004 v. 2009

	2004 N	2004 Rate	2009 N	2009 Rate	% Change	Significance
Total collisions per million miles						
LTL	8	0.525	17	0.481	-8.5	›.293
TL	11	0.812	83	0.726	-10.6	›.107
All Fleets	23	0.684	239	0.604	-11.7	*.028
Preventable Collisions per million miles						
LTL	6	0.222	15	0.192	-13.6	›.161
TL	10	0.422	82	0.333	-21.0	›.057
All Fleets	19	0.378	235	0.262	-30.6	*.005
Total driver injuries per million miles						
LTL	6	1.526	16	1.624	6.4	›.180
TL	8	0.930	83	0.716	-23.0	*.003
All Fleets	17	0.939	236	0.924	-1.6	*.000

Note: * = significant at the .05 level; › = not significant at .05 level

[3] Statistical significance detects the differences that occur more frequently than would be attributed to chance.

The safety performance data received from carriers was consistent across October 2009 and January 2010 as shown in Figure 1. For this reason, the remaining driving distribution charts (Figures 2-5) reflect average aggregated data from October 2009 and January 2010.

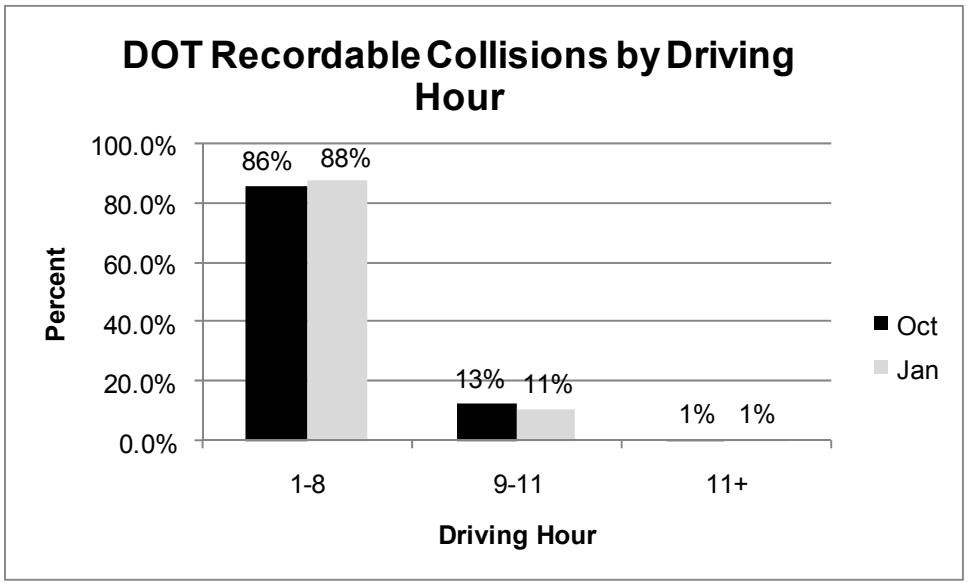

Figure 1. DOT Recordable Collisions by Driving Hour

Q. For each hourly segment of driving, please indicate the number of DOT recordable collisions for all drivers (total should equal all DOT recordable collisions for each month).

The following chart displays the percent of DOT recordable collisions by driving hour for the aggregated October 2009 and January 2010 data. Collisions occurred most often within the first three hours of driving and sharply decreased following the sixth hour. This data suggests that approximately 87 percent of all commercial vehicle collisions may occur within the first eight hours of driving. Only one percent of the DOT recordable collisions took place after 11 hours of driving.

The trend displayed in Figure 2 is similar to findings from an analysis conducted using data from the "Trucks Involved in Fatal Accidents" (TIFA) database. The TIFA data is collected via an annual survey and includes all medium and heavy truck fatal collisions in the United States[4]. ATRI obtained the 2007 TIFA dataset (the most recent TIFA file available) from the University of Michigan Transportation Research Institute (UMTRI), Center for National Truck Statistics, which maintains the TIFA database. In 2007, 80 percent of the fatal truck collisions occurred within the first eight hours of driving[5].

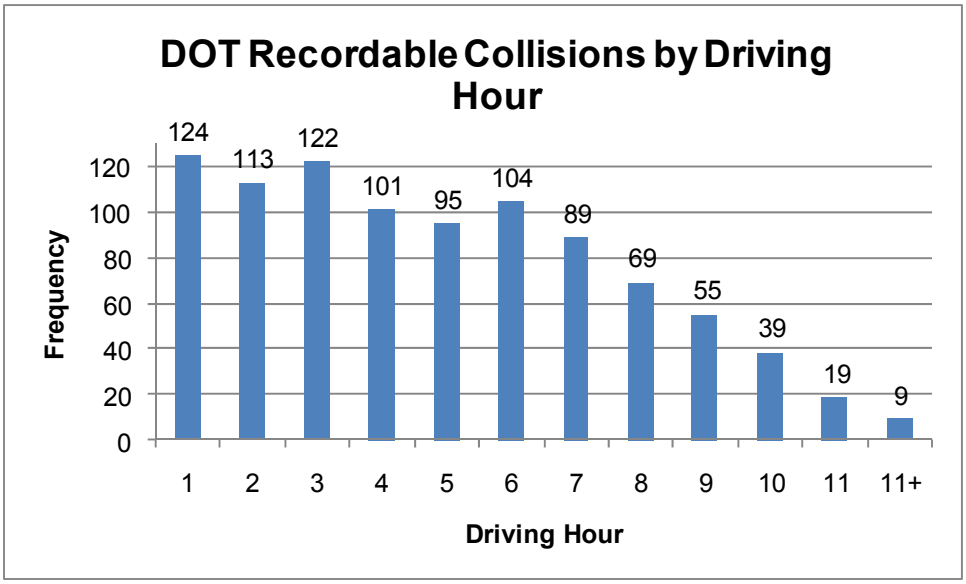

Figure 2. DOT Recordable Collisions by Driving Hour

[4] RITA. 2010. Data Profile: Trucks Involved Fatal Accidents (TIFA). Available Online: http://www.transtats.bts.gov/DatabaseInfo.asp?DB_ID=415&DB_Name=Trucks+Involved+Fatal+Accidents+(TIFA)&Link=0&DB_URL=Subject_ID=1&Subject_Desc=Safety&Mode_ID2=0

[5] ATRI. 2009. Internal Hours-of-Service analysis using 2007 TIFA data.

Figure 3 shows the percent of DOT recordable collisions by grouped driving hours for the aggregated October 2009 and January 2010 data. Nearly 90 percent of the collisions occurred within the first eight hours of driving.

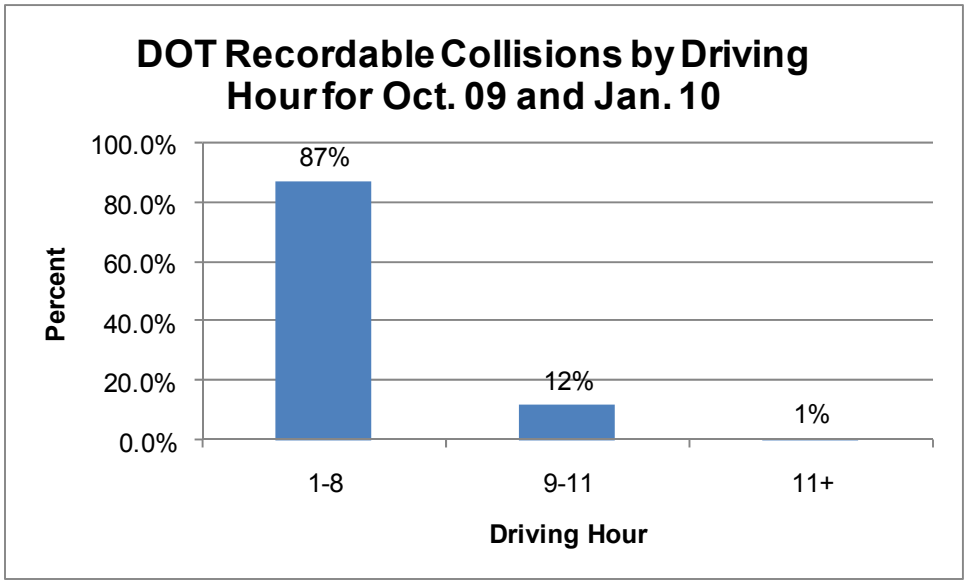

Figure 3. DOT Recordable Collisions by Driving Hour

Q. What percentage of <u>all</u> your drivers used any part of these periods at least once?

Figure 4 displays the percent of drivers using the 9-10 and 10-11 driving hours, and 34-hour restart. On average, 66 percent of drivers used part of the 9-10 driving hour at least once during the month. Although there was a slight difference in the percentage of drivers that used part of the 10-11 driving hour versus the whole hour, the results were relatively consistent at 61 and 52 percent, respectively. More than three quarters of the drivers used the 34-hour restart at least once during the month.

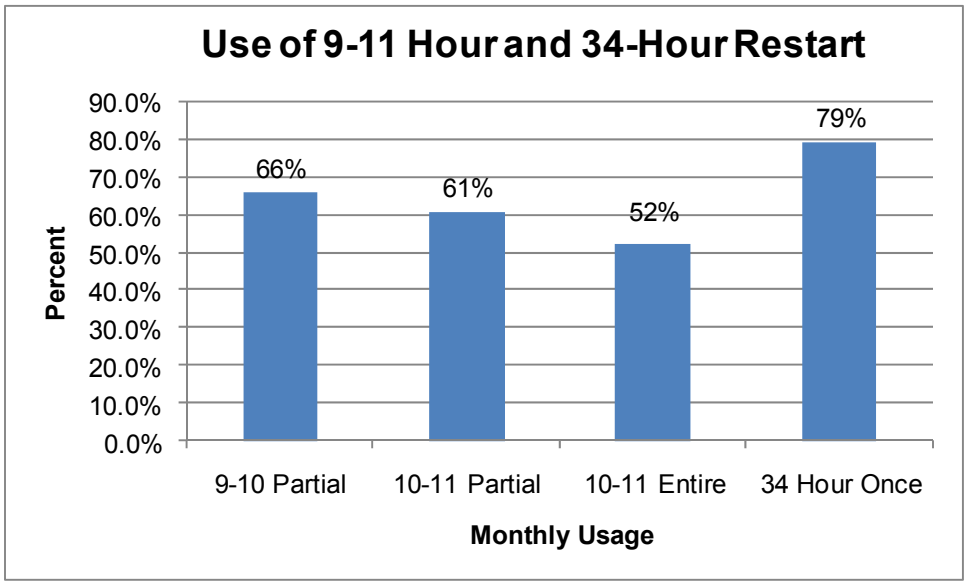

Figure 4. Use of 9-11 Hour and 34-Hour Restart

Q. Of those drivers that DID use the 34-hour restart during the two months, what was the total number of times it was used?

On average, TL drivers used the 34-hour restart 2.7 times per month which was slightly more than LTL at 2.3 and Specialized at 2.1.

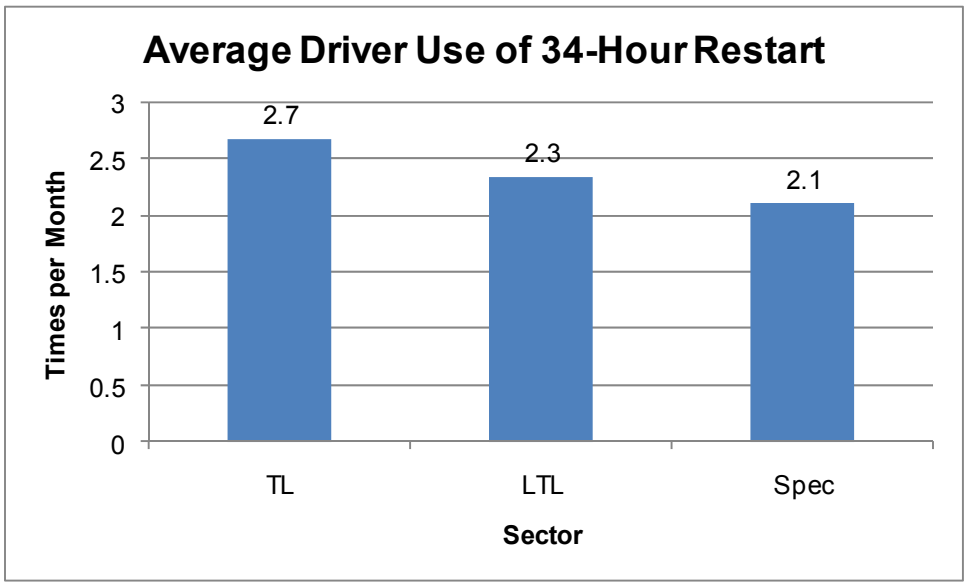

Figure 5. Average Driver Use of 34-Hour Restart

In general, drivers used the 34-hour restart an average of three or fewer times per month. Among TL drivers, 56 percent used the 34-hour restart three or fewer times per month; LTL, 61 percent; and Specialized, 66 percent.

Key Findings

This research utilized motor carrier safety performance data from 2004 and 2009 to examine HOS safety impacts on the trucking industry. The 2004 dataset is from an earlier ATRI study, *Safety Impacts of the New Hours-of-Service* (March 2006). The 2009 safety performance data resulted from a data collection effort initiated by ATRI in March 2010. This survey effort utilized specific survey questions captured from the earlier ATRI study to ensure that cross-comparisons could be completed. Additional questions were also included in the March 2010 data survey to solicit information on use of the 11-hour driving and 34-hour restart provisions.

Key findings of the analysis included the following:

- Total collisions per million miles traveled for all fleets decreased 11.7 percent in 2009 from 2004. Preventable collisions per million miles traveled for all fleets also decreased 30.6 percent in 2009 from 2004. Both findings were statistically significant.
- Total driver injuries decreased 1.6 percent for all fleets and 23 percent for TL fleets. Both findings were statistically significant.
- The majority of commercial vehicle collisions (87%) occurred within the first eight hours of driving. A similar trend was found in an analysis of fatal truck collisions using the Trucks Involved in Fatal Accidents (TIFA) database. A review of 2007 TIFA data showed that 80 percent of fatal truck collisions occurred within the first eight hours of driving.
- Nearly 70 percent of drivers used part of the 9-10 hour at least once during the month. Approximately 60 percent of drivers used part of the 10-11 hour and slightly less (52%) used the entire 10-11 hour. The majority of drivers (79%) used the 34-hour restart at least once during a month.
- In general, drivers used the 34-hour restart an average of three or fewer times per month. Among TL drivers, 56 percent used the 34-hour restart three or fewer times per month; LTL, 61 percent; and Specialized, 66 percent.

APPENDIX A – HOS DATA COLLECTION SURVEY

The American Transportation Research Institute (ATRI) is continuing data collection and analysis to measure Hours-of-Service impacts on driver safety. For this latest effort, data is requested on overall safety performance for calendar year 2009. Additionally, you are asked to provide two month's worth of data (October 2009 and January 2010) for more detailed analysis on the 11-hour driving and 34-hour restart provisions. **All data collected by ATRI will remain strictly confidential and presented in cleansed, aggregate form only.**

Name: _____ Company: _____

Phone: _____ Email: _____

Which of the industry segment(s) best describe(s) your company? (Mark all that apply)

For Hire ____	**Private ____**		
Truckload ____	**Less-than-Truckload ____**	**Specialized ____**	**Other ____**

Please use the following definitions in providing the data requested in the table below – if your operation defines the terms differently, please provide your definitions as part of your submission.

DOT recordable collisions – Collisions that meet the definition of an accident as described in Federal Motor Carrier Safety Regulations 390.5.

"Preventable" collisions – Of the DOT recordable collisions defined above, any that could have been avoided by action or inaction on the part of the driver or carrier.

Driver injuries – Reported on the OSHA 300 log.

Collision-related injuries – All injuries that occur during or due to a collision.

Total number of all DOT recordable collisions in 2009	
• **Total number of 2009 DOT recordable collisions defined as "preventable" (*this number will be a subset of the number immediately above*)**	
Total number of driver injuries in 2009 (per OSHA 300 log)	
• **Total number of 2009 driver injuries related to collisions (*this number will be a subset of the number immediately above*)**	
Average number of drivers in 2009	
Average number of trucks in 2009	
Total number of fuel tax miles in 2009	

The data requested below is for October 2009 and January 2010.

	October 2009	January 2010
Average number of drivers		
Average number of trucks		
Total fuel tax miles for the month		

11-Hour Daily Driving Limit

For each hourly segment of driving, please indicate the number of DOT recordable collisions for all drivers (total should equal all DOT recordable collisions for each month). Driving Hour 1 is the first hour of driving after a required 10-hour break (10 consecutive hours off duty or after two periods equaling 10 hours if using the sleeper berth provision) or 34-hour restart.

	# DOT Recordable Collisions			# DOT Recordable Collisions	
	OCT 09	JAN 10		OCT 09	JAN 10
Driving Hour 1	_____	_____	Driving Hour 7	_____	_____
Driving Hour 2	_____	_____	Driving Hour 8	_____	_____
Driving Hour 3	_____	_____	Driving Hour 9	_____	_____
Driving Hour 4	_____	_____	Driving Hour 10	_____	_____
Driving Hour 5	_____	_____	Driving Hour 11	_____	_____
Driving Hour 6	_____	_____	Over 11 Hours	_____	_____

What percentage of <u>all</u> your drivers used any part of these periods at least once?

October 2009 9-10 hr. ____% 10-11 hr. ____% January 2010 9-10 hr. ____% 10-11 hr. ____%

What percentage of your drivers <u>that used the 10-11 hour</u> utilized <u>all</u> versus only a part of it?

October 2009 ____% January 2010 ____%

34-Hour Restart

<u>Note:</u> Use of a 34-hour restart means that at least 34 consecutive off-duty hours were taken by the driver. In many cases, more than 34 consecutive off-duty hours are taken by drivers. Use of a 34-hour restart does not mean: 1) that exactly 34 consecutive off-duty hours were obtained each time; or 2) that it was used each time to extend the driver's cumulative (i.e., weekly) on-duty hours or driving hours.

What percentage of all your drivers used the 34-hour restart at least once during the month?

October 2009 ____% January 2010 ____%

<u>The remaining question is only about the drivers that DID use the 34-hour restart during the two months</u>. Of those drivers, what was the total number of times it was used? (*Ex. Driver A: 1 time + Driver B: 3 times = 4 times*)

October 2009 ____ January 2010 ____