

# AGRICULTURAL COMMODITY CARRIERS AND HOURS OF SERVICE EXEMPTION ANALYSIS

Volpe National Transportation Systems Center, U.S. DOT, May 22, 2008

## 1. BACKGROUND

In recognition of the relatively local and seasonal nature of their operations, farmers and others in agriculture-related industries are exempted from many of the Federal Motor Carrier Safety Regulations (FMCSRs). Among these exemptions are the following:

- Custom harvesters, beekeepers, and certain farm vehicle drivers are exempted from all regulations pertaining to driver qualification.<sup>1</sup>
- Farm drivers of articulated vehicles may be 18 years of age and are exempted from other driver qualification and record-keeping requirements.<sup>2</sup>
- States may exempt farm vehicle operators from the Commercial Driver's License (CDL) requirements under certain conditions.<sup>3</sup>
- States may issue a restricted CDL to certain drivers in farm-related industries (such as agri-chemical businesses, custom harvesters, and farm retail outlets and suppliers).<sup>4</sup>
- Carriers are exempted from hours of service (HOS) or record-of-duty-status requirements when transporting agricultural commodities and farm supplies within a 100-air-mile radius from the source of the commodities or distribution point for the supplies during the planting and harvesting season determined by each State.<sup>5</sup>

This analysis examines the safety impacts of the HOS exemption and the safety performance of agricultural carriers and it compares the crash rates, out of service (OOS) rates, and violation rates for agricultural and non-agricultural carriers for the period 2005 through 2007. In addition, because the HOS exemption is limited to transportation within a 100-mile radius, the analysis compares crash, violation, and OOS rates for agricultural carriers with 100 percent of drivers operating *within* a 100-mile radius (operations are exempt from HOS) to those with 100 percent of drivers operating *beyond* a 100-mile radius (operations are non-exempt). Finally, this analysis examines the safety performance of two industries, livestock and utility carriers, whose operations were not exempt from HOS regulations prior to the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).<sup>6</sup> For these carrier groups, the analysis compares crash, violation, and OOS rates for the periods before and after August 2005, when SAFETEA-LU was passed.

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<sup>1</sup> 49 CFR 391.2

<sup>2</sup> 49 CFR 391.67

<sup>3</sup> 49 CFR 383.3(d)

<sup>4</sup> 49 CFR 383.3(f)

<sup>5</sup> 49 CFR 395.1(k)

<sup>6</sup> Section 4130(a).

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### 2. KEY FINDINGS

With respect to *crashes*, this analysis showed the following:

- In 2005 through 2007, agricultural carriers with 100 percent of drivers operating within a 100-mile radius had higher crash rates than those with 100 percent of drivers operating beyond a 100-mile radius, indicating that carriers whose operations were exempt from HOS regulations had a higher crash rate than those whose operations were non-exempt. (See Table 1.)

**Table 1. Crash Rates: Agricultural Carriers with 100 Percent of Drivers Operating within a 100-mile Radius and Agricultural Carriers with 100 Percent of Drivers Operating beyond a 100-mile Radius**

Year	Agricultural within 100-Mile Radius				Agricultural beyond 100-Mile Radius				Difference in Crash Rate
	Number of Carriers	Number of Power Units	Vehicles Involved in a Crash	Crash Rate	Number of Carriers	Number of Power Units	Vehicles Involved in a Crash	Crash Rate	
2005	14,675	31,943	555	1.737	18,471	52,519	700	1.333	23%
2006	15,862	34,116	551	1.615	19,475	54,362	695	1.278	21%
2007	17,303	36,930	556	1.506	21,182	57,299	747	1.304	13%

Source: MCMIS Data Snapshot for February 22, 2008.  
Crash rate is the number of crashes per 100 power units.

- The “before and after” analysis demonstrated that utility and livestock carriers had higher crash rates after being granted the HOS exemption compared to the period prior to the exemption. (See Table 2.)

**Table 2. Before and After Crash Rates: Utility/Livestock Carriers and Non-Agricultural Carriers**

Carrier Group	“Before” Period (August 2003–July 2005)				“After” Period (August 2005–July 2007)				Difference in Crash Rate
	Number of Carriers	Number of Power Units (July 2005)	Vehicles Involved in a Crash	Crash Rate	Number of Carriers	Number of Power Units (July 2007)	Vehicles Involved in a Crash	Crash Rate	
Utility	439	7,599	47	0.309	541	8,217	71	0.432	40%
Livestock	4,754	7,888	365	2.314	5,790	9,261	462	2.494	8%
Non-Agricultural	362,051	2,623,007	105,498	2.011	432,310	3,105,612	120,240	1.936	-4%

Source: MCMIS Data Snapshot for February 22, 2008.  
Crash rate is the number of crashes per 100 power units. Crash data were aggregated for the two years prior to August 2005 and the two years after August 2005.

Agricultural carriers had higher *violation and OOS rates* compared to non-agricultural carriers during the three-year period covered by this analysis:

- Agricultural carriers had statistically higher violation and OOS rates for the following violation categories:
  - Unsafe Driving (violation rate only)
  - Driver Fitness (violation rate and OOS)
  - Vehicle Maintenance (violation rate and OOS)
  - Improper Loading/Cargo Securement (violation rate and OOS)

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Table 3 shows these differences for 2007. The violation categories are defined in Section 4.

**Table 3. OOS and Violation Rates: Agricultural and Non-Agricultural Carriers (2007)**

Violation or Out-of-Service Category	Z- Statistic	Percent Difference in OOS/ Violation Rate for Agg vs. Non-Agg carriers
Unsafe Driving OOS	1.54	77%
Unsafe Driving Violations	7.97*	32%
Driver Fitness OOS	5.32*	30%
Driver Fitness Violations	16.52*	37%
Controlled Substance OOS	0.46	13%
Controlled Substance Violations	-0.65	
Vehicle Maintenance OOS	36.11*	39%
Vehicle Maintenance Violations	20.17*	13%
Improper Loading OOS	8.47*	29%
Improper Loading Violations	16.90*	44%

Source: MCMIS Data Snapshot for February 22, 2008.

\* A z-value=1.64 or greater indicates significance at level of 95 percent or more which indicates it is statistically significant.

- Agricultural carriers operating within a 100-mile radius had statistically higher violation and OOS rates than those operating beyond a 100-mile radius. The violation and OOS results are similar to those discussed above for agricultural and non-agricultural carriers, except for Driver Fitness.<sup>7</sup> (See Table 4 for results for 2007.)

**Table 4. OOS and Violation Rates: Agricultural Carriers with 100 Percent of Drivers Operating within a 100-mile Radius and Agricultural Carriers with 100 Percent of Drivers Operating beyond a 100-mile Radius (2007)**

Violation or Out-of-Service Category	Z- Statistic	Percent Difference in OOS/ Violation Rate for Agg. Carriers <u>less than 100 Air-mile Radius vs.</u> Agg Carriers <u>greater than 100</u> Air-mile Radius
Unsafe Driving OOS	1.18	100%
Unsafe Driving Violations	3.03*	27%
Driver Fitness OOS	-0.60	-9%
Driver Fitness Violations	8.41*	39%
Controlled Substance OOS	-1.20	-153%
Controlled Substance Violations		
Vehicle Maintenance OOS	4.30*	11%
Vehicle Maintenance Violations	10.30*	13%
Improper Loading OOS	3.76*	28%
Improper Loading Violations	4.71*	29%

Source: MCMIS Data Snapshot for February 22, 2008.

\* A z-value=1.64 or greater indicates significance at level of 95 percent or more which indicates it is statistically significant.

<sup>7</sup> Carriers operating within a 100-mile radius had lower Driver Fitness OOS rates than those operating beyond a 100-mile radius; however, this difference is not statistically significant.

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### 3. CARRIER COMMODITY GROUPS

This analysis grouped motor carriers based on the cargo classifications and driver information in the Motor Carrier Identification Reports (Form MCS-150) as of the MCMIS snapshot on February 22, 2008.<sup>8</sup> Question 24 on the MCS-150 asks carriers to circle all cargo classifications that describe their operations (i.e., carriers can select more than one classification). In addition, Question 27 asks carriers to identify the number of drivers operating within, and beyond, a 100-air-mile radius, as well as those operating in intra- and interstate commerce.

Using the cargo classifications in Question 24, this analysis placed carriers into commodity groups that covered the three years studied (2005 through 2007). An assumption was that the cargo classifications accurately represented the carriers' operations over this three-year period. The carrier commodity groups used in this analysis are shown below in Table 7 and are defined as follows:

*Agricultural Carriers.* The carrier selected at least one of the following agricultural cargo classifications and did not select any other cargo classifications: Logs, Poles, Beams, Lumber; Fresh Produce; Grain, Feed, Hay; and/or Farm Supplies.

*Livestock Carriers.* The carrier selected the Livestock cargo classification and did not select any other cargo classifications.

*Utility Carriers.* The carrier selected the Utility cargo classification and did not select any other cargo classifications.

*Non-Agricultural Carriers.* The carrier did not select any of the four agricultural commodity cargo classifications or the utility or livestock classification.

**Table 7. Carrier Commodity Groups**

Carrier Group	Number of Carriers	Share
Agricultural (Only)	44,596	6.10%
Livestock (Only)	6,327	0.87%
Utility (Only)	596	0.08%
Non-Agricultural, Non-Livestock, Non-Utility (Only)	488,826	66.90%
Mixed Cargo Commodities*	190,317	26.05%
All Carriers	730,662	100.00%

\* Not used in this summary analysis.

Additionally, this analysis partitioned the agricultural carriers using Question 27 on the MCS-150 in an attempt to further isolate the carrier population of interest (i.e., those with operations that are exempt from HOS regulations because they are within a 100-mile radius). The analysis did not address the intensity of agricultural carrier operations within the 100-mile radius, since that information is unavailable. Shown in Table 8, the following two agricultural carrier subgroups were used:

*Agricultural Carriers with 100 Percent of Drivers Operating within a 100-Mile Radius.*

The carrier indicated that all drivers operate within a 100-mile radius.

*Agricultural Carriers with 100 Percent of Drivers Operating beyond a 100-Mile Radius.* The carrier indicated that all drivers operate beyond a 100-mile radius.

<sup>8</sup> Interstate and intrastate hazmat carriers.

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**Table 8. Agricultural Carrier Subgroups**

Carrier Subgroup	Number of Carriers	Share
Agricultural (Only) Carriers with 100 Percent of Drivers Operating within a 100-Mile Radius	17,677	39.64%
Agricultural (Only) Carriers with 100 Percent of Drivers Operating beyond a 100-Mile Radius	21,697	48.65%
Agricultural (Only) Carriers with Drivers Operating both within and beyond a 100-Mile Radius*	5,222	11.71%
All Agricultural (Only) Carriers	44,596	100.00%

\* Not used in this summary analysis.

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## 4. METHODOLOGY

This analysis used crash and violation data from the MCMIS snapshot for February 22, 2008. In the “before and after” crash rate analysis for livestock and utility carriers, the MCMIS data were aggregated for the “before” period (two years prior to August 2005, August 2003 through July 2005) and the “after” period (two years after August 2005, August 2005 through July 2007). The violation and OOS analysis also uses August 2005 to split the before and after periods; however, it uses only one year of data before, and one year after.

Though this summary presents key findings for six carrier groups—agricultural carriers; non-agricultural carriers; agricultural carriers with 100 percent of drivers operating within a 100-mile radius; agricultural carriers with 100 percent of drivers operating beyond a 100-mile radius; utility carriers (before and after); and livestock carriers (before and after)—many other comparisons were conducted. These included looking at carriers using fleet-size groups, carriers with drivers operating both within and beyond a 100-mile radius, and “mixed” cargo groups (carriers with both agricultural and other cargoes).

The crash analysis included only those carriers reporting a reasonable number of power units.<sup>9</sup> Crash rates were calculated using crash data from the MCMIS snapshot and power unit data from SafeStat result files at the end of each calendar year; however, the before and after crash rate analysis for livestock and utility carriers used power unit data at the end of July 2005 and the end of July 2007.

This analysis used data from the MCMIS snapshot to compare the violation and OOS rates of the various carrier groups. To test for statistically significant differences, the analysis used a difference in proportions test (Z-test). Violation and OOS rates were calculated by summing up the number of inspections where at least one regulation from the violation category was violated (or resulted in the driver or vehicle being placed OOS) and dividing by the total number of inspections. The violation and OOS analysis used only Level 1 inspection data. Violation categories were based on the Behavior Area Safety Improvement Categories (BASICS) used by FMCSA’s Safety Measurement System (SMS), which was developed under the Comprehensive Safety Analysis (CSA) 2010 Initiative:<sup>10</sup>

*Unsafe Driving.* Dangerous or careless operation of a commercial motor vehicle (CMV). Example violations: speeding, reckless driving, improper lane change, and inattention.

*Driver Fitness.* Operation of a CMV by a driver who is unfit to operate due to lack of training, lack of experience, or medical qualifications. Example violations: failure to have a valid and appropriate commercial driver’s license and failure to have proper medical documentation.

*Controlled Substances/Alcohol.* Operation of a CMV while impaired due to alcohol, illegal drugs, or misuse of prescription or over-the-counter medications. Example violations: use or possession of controlled substances or alcohol.

*Vehicle Maintenance.* CMV failure due to improper or inadequate maintenance. Example violations: brakes, lights, and other mechanical defects, and failure to make required repairs.

*Improper Loading/Cargo Securement.* Shifting loads, spilled or dropped cargo, and unsafe handling of hazardous materials. Example violations: improper load securement, cargo retention, and hazardous materials handling.

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<sup>9</sup> The crash analysis included only those carriers with at least one power unit and applied filters to compare driver counts and power unit counts. Carriers were removed if *the number of power units* > 50\*(*number of drivers* + 1) or *the number of drivers* > 50\*(*number of power units* + 1).

<sup>10</sup> The SMS uses crash and inspection data to quantify the on-road safety performance of motor carriers and drivers.