EFFECTS OF THE HOURS-OF-SERVICE REGULATIONS
REPORT TO CONGRESS – 2021

Pursuant to the Joint Explanatory Statement accompanying
the Consolidated Appropriations Act, 2021 (P.L. 116-260)
May 2023

The Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2021 (Pub. L. 116-260), requests the Federal Motor Carrier Safety Administration (FMCSA) to analyze the real-world effects of the new hours-of-service (HOS) regulations by comparing safety data from the years prior to the adoption of the HOS amendments that became effective on September 29, 2020, with the data collected after the implementation of those regulations to determine any correlations. Congress requested that FMCSA report the results of this analysis annually in the Congressional budget request, brief the House and Senate Committees on Appropriations upon request, and post the analysis on the Agency's website.

Specifically, the Joint Explanatory Statement requested FMCSA to conduct this analysis by comparing "safety data, including but not limited to, the number of crashes, crash type, number of fatalities categorized by occupant type, number of serious injuries, the rate of involvement that large-trucks have accidents, and the time of day and on what type of roadway the accident occurred." 166 Cong. Rec. H8818 (Dec. 21, 2020).

Background

On June 1, 2020, FMCSA published the HOS final rule in the Federal Register [85 FR 33396]. The final rule revised four provisions of the HOS regulations, including the following:

- **Short-haul exception –** Expands the short-haul exception from 100 air-miles to 150 air-miles for commercial driver's license (CDL) holders and allows a 14-hour work shift for drivers utilizing the exception.
- **Adverse driving conditions exception –** Expands the driving window during adverse driving conditions by 2 hours.
- **30-minute break requirement –** Requires a break of at least 30 consecutive minutes of non-driving time after 8 cumulative hours of driving but allows non-driving, on-duty time to count toward the required break.
- **Sleeper berth provision –** Modifies the sleeper berth exception to allow a driver to meet the 10-hour minimum off-duty requirement by spending at least 7 hours in the berth plus at least 2 hours inside or outside the berth, provided the two periods total at least 10 hours.

The HOS final rule became effective on September 29, 2020.

Approach

To fulfill Congressional requests the analysis examined two questions:

- Did the revised provisions reduce the frequency and severity of HOS violations?
- Did the revision of the four provisions correlate with a change in crash trends?

The analysis compared the following time periods bracketing the change to HOS regulations that became effective on September 29, 2020:

- A pre-change period for inspection and crash data of **01/01/2018 – 09/30/2020.**
- A post-change period for inspection and crash data of **10/01/2020 – 09/30/2021.**

During the pre- and post-change periods, FMCSA examined:

- HOS inspection and violation data (all 49 CFR Part 395 HOS violations, including electronic logging device violations).
- Large truck and bus crash trends.
- Large truck and bus crash and fatality rates per 100 million vehicle miles traveled (VMT).
- Relationships between HOS out-of-service (OOS) rates and large truck and bus crash and fatality rates. An OOS HOS violation requires that the driver be placed out of service for the violation.

Overview of Findings

Table 1 compares pre- and post-change rates for the studied variables.

Table 1. Comparison of rates pre- and post-change.

Subject—averaged by year	Pre-change value	Post-change value	Statistically significant
Driver inspections with one or more HOS violation	7.6%	8.5%	Yes
Driver inspections with one or more OOS HOS violation	2.6%	3.2%	Yes
Monthly large truck crash rate (crashes per 100 million VMT)	5.58	5.70	No
Monthly large truck fatality rate (fatalities per 100 million VMT)	0.164	0.167	No

In general, the revisions did not diminish HOS violation rates. The percentage of driver inspections with at least one HOS violation or at least one OOS HOS violation was significantly higher during the post-change period. In contrast to a regular HOS violation, an OOS HOS violation requires that the driver be placed out of service until the violation is corrected.

The data do not show a significant difference in crash or fatality rates, although it is important to note that initial trends may have been confounded by the COVID-19 pandemic's effects on industry operations and FMCSA's emergency declaration that provided HOS regulatory relief for commercial motor vehicle operations providing direct assistance in support of COVID-19 relief efforts. There was also the implementation of the Automatic On-Board Recording Device/Electronic Logging Device mandate in Decembers 2017 and 2019. Finally, there are

numerous confounding factors that influence crash rates, so this comparison does not specifically identify the effect of the HOS rule changes.

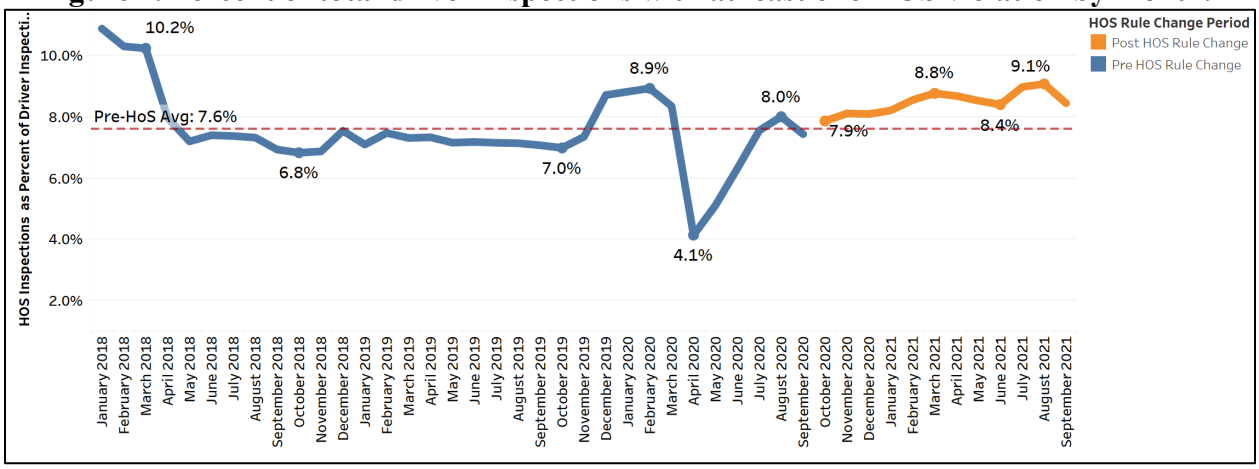
Findings: Trends in HOS Inspections

From Calendar Year 2018 to 2021, the total number of inspections with at least one HOS violation has consistently declined. For this analysis, HOS violations include all part 395 HOS violations. In 2018, there were 274,441 inspections with at least one HOS violation. This dropped by 30 percent to 191,797 inspections in 2020 and available data for the first 9 months of 2021 shows that there were 183,248 inspections with at least one HOS violation. The number of inspections with at least one HOS violation decreased by approximately 33% between January 2018 and September 2021.

To compare HOS enforcement between pre- and post-change periods, FMCSA normalized the count of HOS inspections by dividing total HOS inspections by total driver inspections. Figure 1 shows the percent of total driver inspections with at least one HOS violation by month.

During the pre-change period, an average of 7.6 percent of driver inspections had at least one HOS violation. During the post-change period, an average of 8.5 percent of driving inspections had least one HOS violation. The drop in HOS enforcement in April of 2020 reflects the immediate impact of the COVID-19 pandemic on roadside enforcement activities. Enforcement rebounded shortly thereafter.

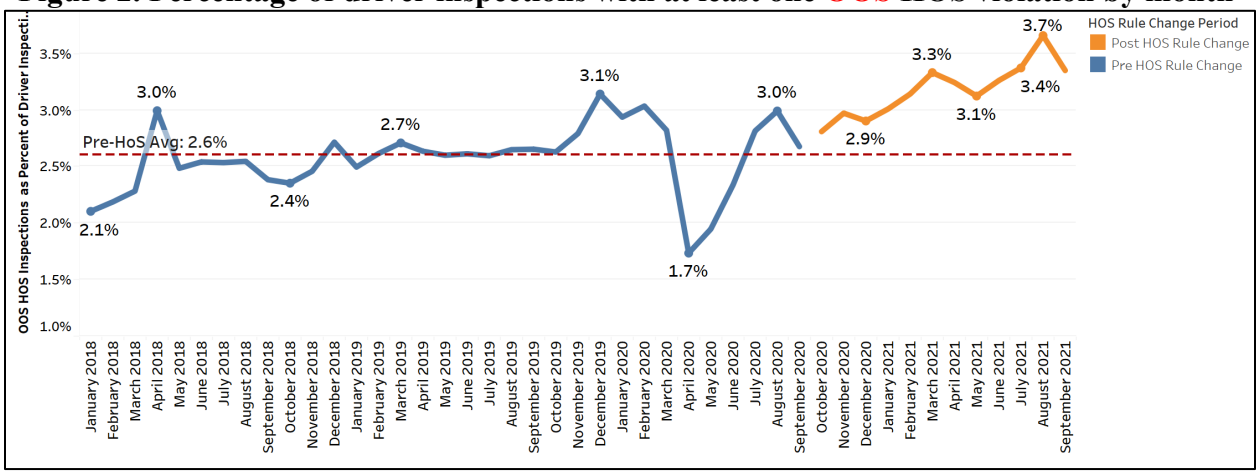
Figure 1. Percent of total driver inspections with at least one HOS violation by month.



Source: Motor Carrier Management Information System (MCMIS), November 26, 2021.

Figure 2 depicts the severity of HOS violations between the pre- and post-change periods by showing the percentage of driver inspections with at least one OOS HOS violation by month.

Figure 2. Percentage of driver inspections with at least one OOS HOS violation by month



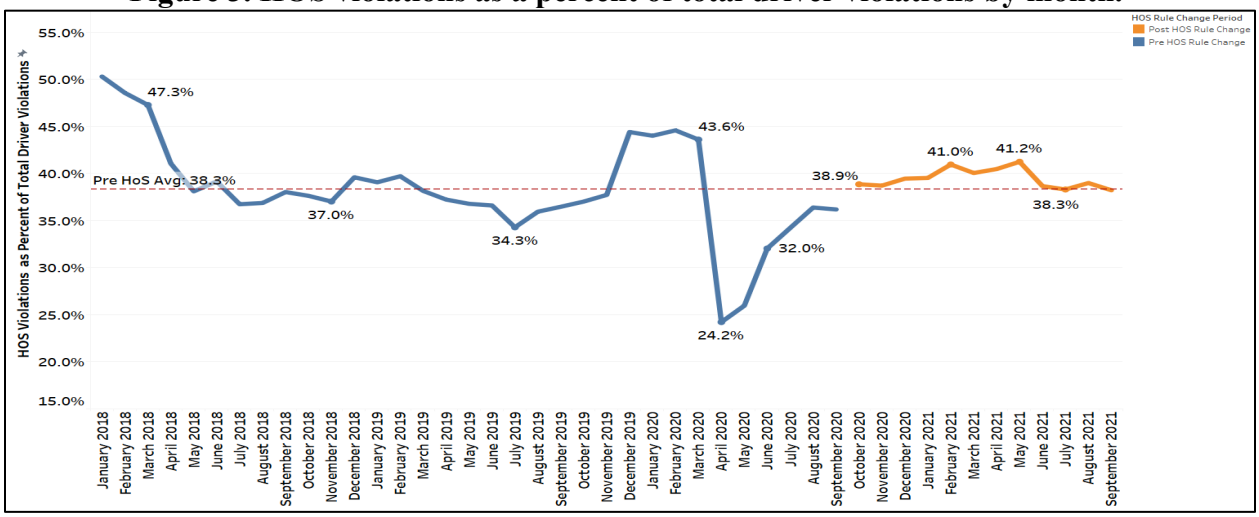
Source: MCMIS, November 26, 2021.

During the pre-change period, an average of 2.6 percent of driver inspections had at least one OOS HOS violation. During the post-change period, an average of 3.2 percent of driver inspections had least one OOS HOS violation. The incidence of HOS enforcement identifying OOS violations appears to have initially increased, following the change to HOS regulations. While the total number of inspections with HOS violations and OOS HOS violations declined over the years examined, normalized metrics show that the percentage of driver inspections with HOS violations and OOS HOS violations trended higher during the post-change period.

Findings: Trends in the Makeup of HOS Violations

The incidence of non-HOS driver violations during the period studied provides a baseline for understanding how HOS violation rates have changed relative to violations unaltered by the 2020 revision. Figure 3 depicts HOS violations as a percent of total driver violations by month.

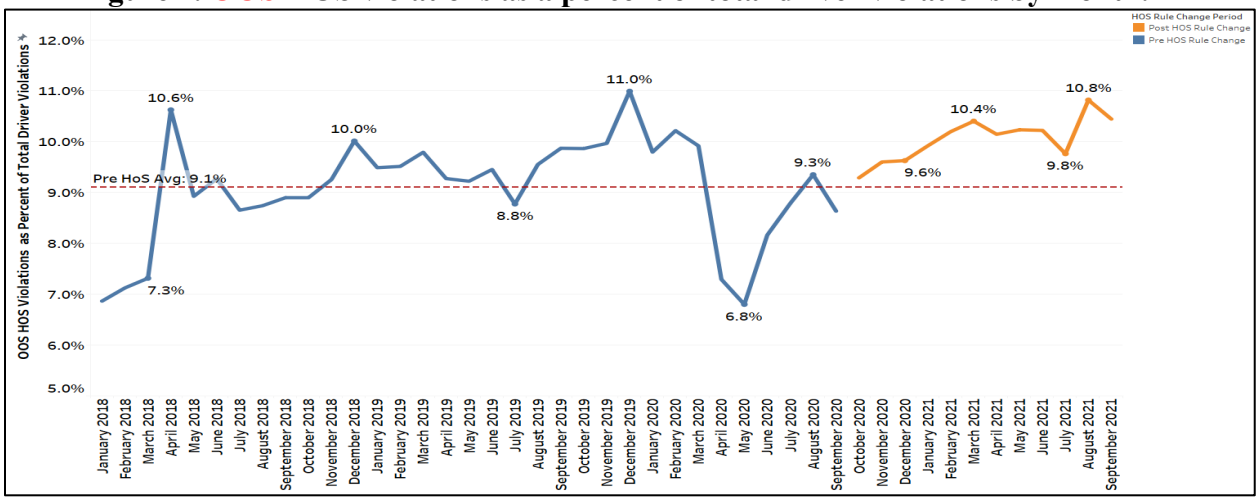
Figure 3. HOS violations as a percent of total driver violations by month.



Source: MCMIS, November 26, 2021.

During the pre-change period, on average, HOS violations accounted for 38.3 percent of monthly driver violations. The monthly post-change average is slightly higher at 39.5 percent. In general, HOS-related violations still account for a similar share of all driver violations despite the revised HOS provisions. Figure 4 depicts similar analysis but confines the data to OOS HOS violations as a percentage of total driver violations by month.

Figure 4. OOS HOS violations as a percent of total driver violations by month.



Source: MCMIS, November 26, 2021

During the pre-change period, OOS HOS violations accounted for an average of 9.1 percent of monthly driver violations. During the post-change period, this value held higher at a 10.1 percent monthly average. Changes to the HOS regulations appear to have not diminished the percentage of total driver violations that are OOS HOS violations.

Findings: Crash and Fatality Rate Trend Analysis

Table 2 compares average monthly crash statistics during the pre-change and post-change periods. The average number of large truck and bus crashes per month did not change. Normalizing crash counts with VMT shows a slight upward tick in the crash rate from the pre-change to the post-change period. The average monthly large truck and bus crash rate increased from 5.58 crashes per 100 million VMT to 5.70 crashes per 100 million VMT. However, this difference in crash rates is not statistically significant.

Table 2: Pre and post HOS rule change comparison of large truck and bus crashes

Subject - averaged by month	Pre-change value	Post-change value	Statistically significant[1]
Total Crashes	14,497	14,495	No
Truck Bus Crash Rate	**5.58**	**5.70**	No
Fatal Crashes	382	379	No
Truck Bus Fatal Crash Rate	**0.147**	**0.148**	No
Non-Fatal Crashes	14,115	14,116	No

[1] Test of statistical significance based on a t-test difference in group means (P-value < 0.05)

Truck Bus Non-Fatal Crash Rate	**5.43**	**5.56**	No
Fatalities	427	428	No
Truck Bus Fatality Rate	**0.164**	**0.167**	No
Injuries	7,652	7,131	Yes
Truck Bus Injury Rate	**2.93**	**2.79**	No

Source: MCMIS, December 31, 2021.

Fatal crashes dropped by 0.8 percent from the pre-HOS change period to the post-period, while the fatal crash rate (fatal crashes per 100 million VMT) increased by 0.7 percent. Non-fatal crashes (defined as injury and towaway crashes) remained unchanged, while the non-fatal crash rate increased by 2.4 percent.

Lastly, from the pre-change to the post-change period, the average number of fatalities per month increased by 0.2 percent, while the fatality rate increased by 1.8 percent. The number of persons injured in crashes decreased by 6.8 percent, while the injury rate decreased by 4.8 percent from the pre-change to the post-change period.

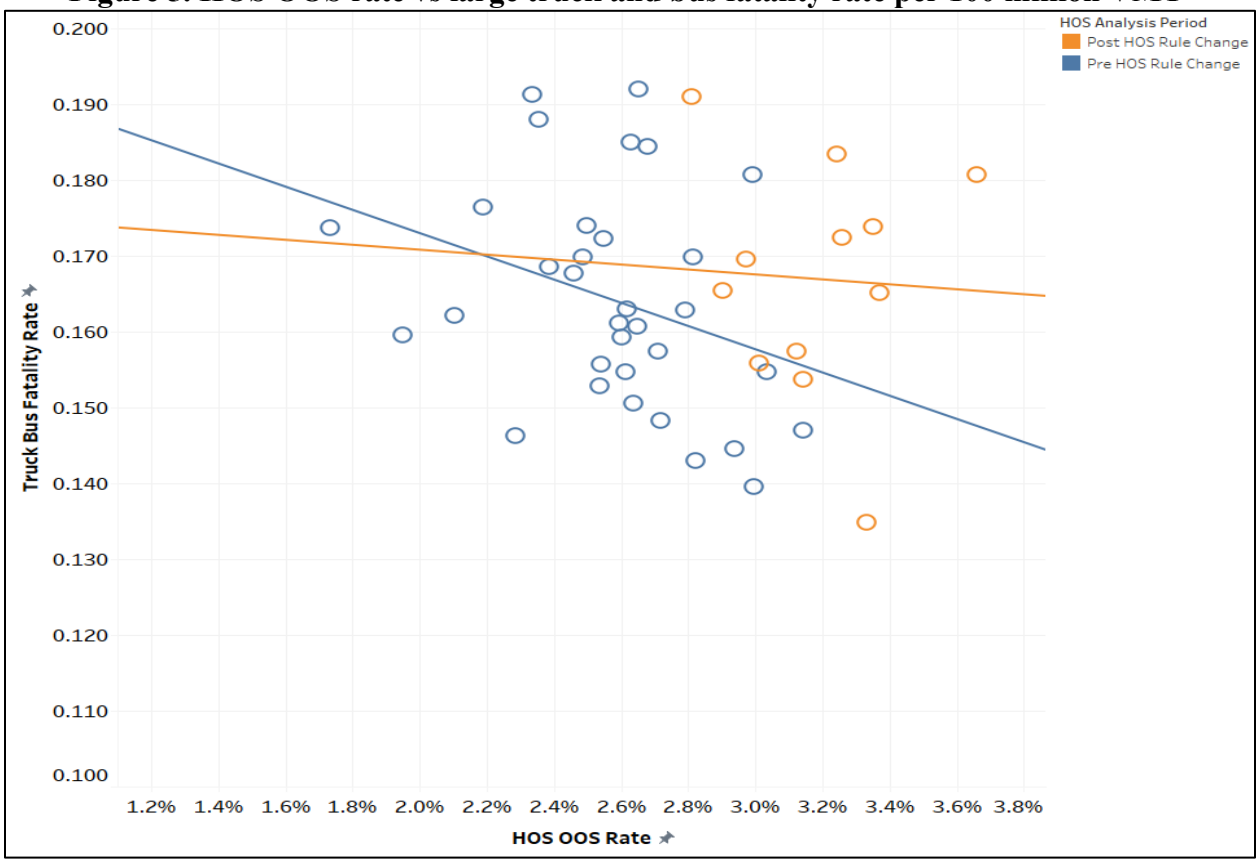
No conclusions can be drawn yet about the observed crash trends. The analysis could not distinguish between drivers using and not using the HOS waivers. Based on the limited data available for this initial report, the observed differences in all but one of the crash-related measures considered were not statistically significant. It must be noted that the COVID-19 pandemic may have had a confounding effect on the observed trends by disrupting industry operations. FMCSA also put in place an emergency declaration that provided HOS regulatory relief for commercial motor vehicle operations providing direct assistance in support of COVID-19 relief efforts.

Additionally, there are numerous confounding factors that influence crash rates, so this comparison does not specifically identify the effect of the HOS rule changes. Further, the post-change period has only 12 data points (12 months). As the States upload more current crash data to FMCSA, the currently observed trend and difference in crash rates could change. Any such change will be noted in future analysis reports. Charts showing detailed crash trends by crash type, crash rates, and time of day by month are provided in the Appendix. There was no significant difference in the percent of crashes by time of day between the pre- and post- change periods (Figure 15). The MCMIS crash database does not support breakouts by occupant type and the type of roadway on which the crash occurred, so the Report does not include this type of data as requested in the Joint Explanatory Statement.

Findings: Correlations Between HOS OOS Rate and Fatality Rate

The scatter plot in Figure 5 examines the relationship between the HOS OOS rate and the large truck and bus fatality rate during the pre- and post-change periods. Both periods show a weak and non-significant negative (inverse) relationship between the HOS OOS rate and the large truck and bus fatality rate. Lower fatality rates appear to be weakly associated with higher HOS OOS rates during both periods. The relative strength of the relationship between both periods cannot be directly compared at this point because the post-regulations change period has very few data points.

Figure 5. HOS OOS rate vs large truck and bus fatality rate per 100 million VMT



Source: MCMIS, December 31, 2021

Pre-HOS Trend Line:
R-Squared: 0.10
P-value: 0.07
Equation: Truck Bus Fatality Rate = -1.53*HOS OOS Rate + 0.20

Post-HOS Trend Line:
R-Squared: 0.00
P-value: 0.88
Equation: Truck Bus Fatality Rate = -0.33*HOS OOS Rate + 0.18

Conclusion

The analysis of all part 395 HOS violations shows that revisions to the HOS rules did not diminish overall HOS violation rates. Rather, the percentage of driver inspections with at least one HOS violation or at least one OOS HOS violation was significantly higher during the post-change period. A separate FMCSA analysis[2] that focused only on electronic logging device (ELD)-related HOS violations (specifically, violations of the 11-hour driving-time limit, the 14-hour driving "window" and the 70-hour "weekly" on-duty limit) showed a decrease of approximately 32 percent in the number of inspections with HOS violations since December 2017, with significant drops after the ELD compliance and OOS criteria went into effect.

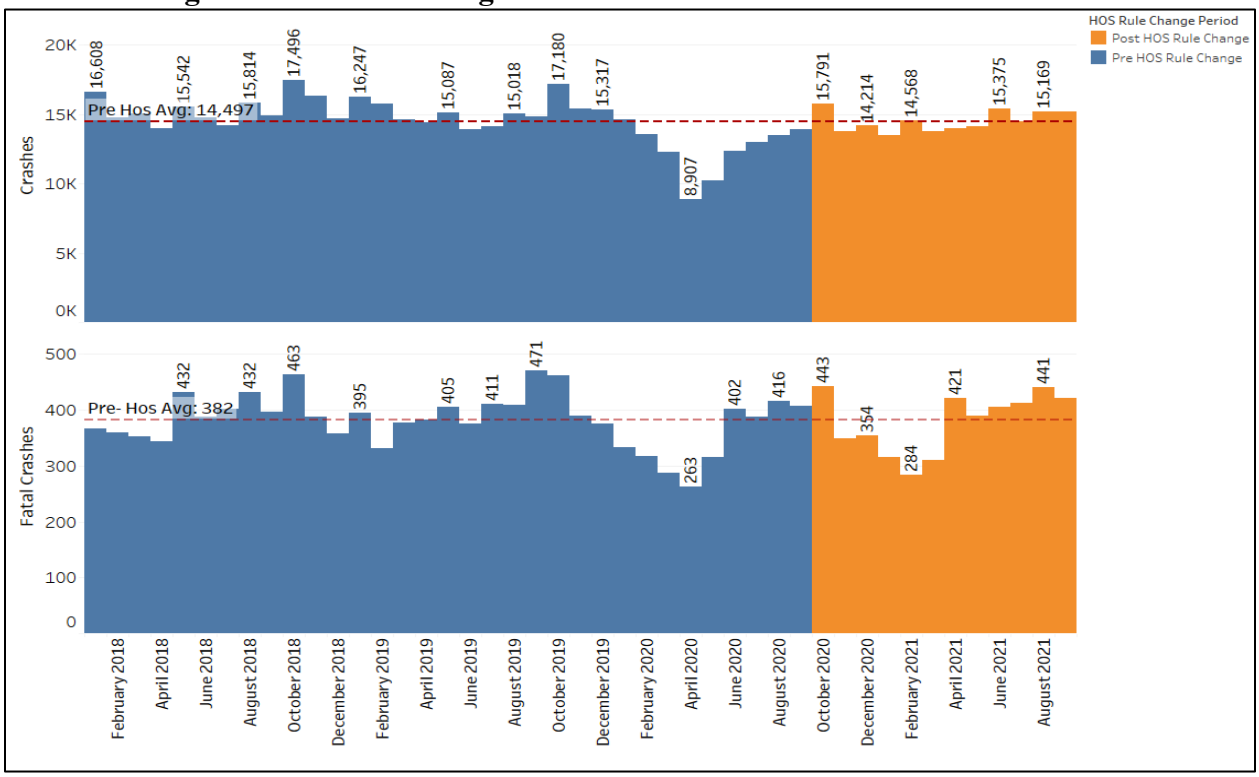
An examination of the overall crash trends did not show a significant difference in most crash-related metrics between the pre- and post-rule change periods. It is important to note that initial crash trends may have been confounded by the COVID-19 pandemic's effects on industry operations, FMCSA's emergency declaration providing HOS regulatory relief for commercial motor vehicle operations providing direct assistance in support of COVID-19 relief efforts, and the implementation of the Automatic On-Board Recording Device/Electronic Logging Device mandate in December 2017 and December 2019. Additionally, there are numerous confounding factors that may influence crash rates, so this comparison does not specifically identify the effect of the HOS rule changes on crash rates.

An alternative approach to understanding the impact of the HOS changes, is to analyze the safety outcomes of those who took advantage of the new provisions and waivers. There is very limited data to support an in-depth analysis of the safety outcomes of carriers that took advantage of the new HOS provisions in comparison to those that did not. The pre- and post-rule change macro trend analysis is limited in its reach given the scale of the HOS rule changes and other confounding factors. Subsequent annual analysis will include more data points and additional data breakouts. FMCSA will work on follow-on analyses drilling down into specific HOS violations or violation groups to attempt to correlate those with crash trends and will present any results in future annual reports.

[2] Pursuant to Infrastructure Investment and Jobs Act, Title III—Motor Carrier Safety, Section 23017 (H.R. 3684), the report analyzed the cost and effectiveness of electronic logging devices (ELD).

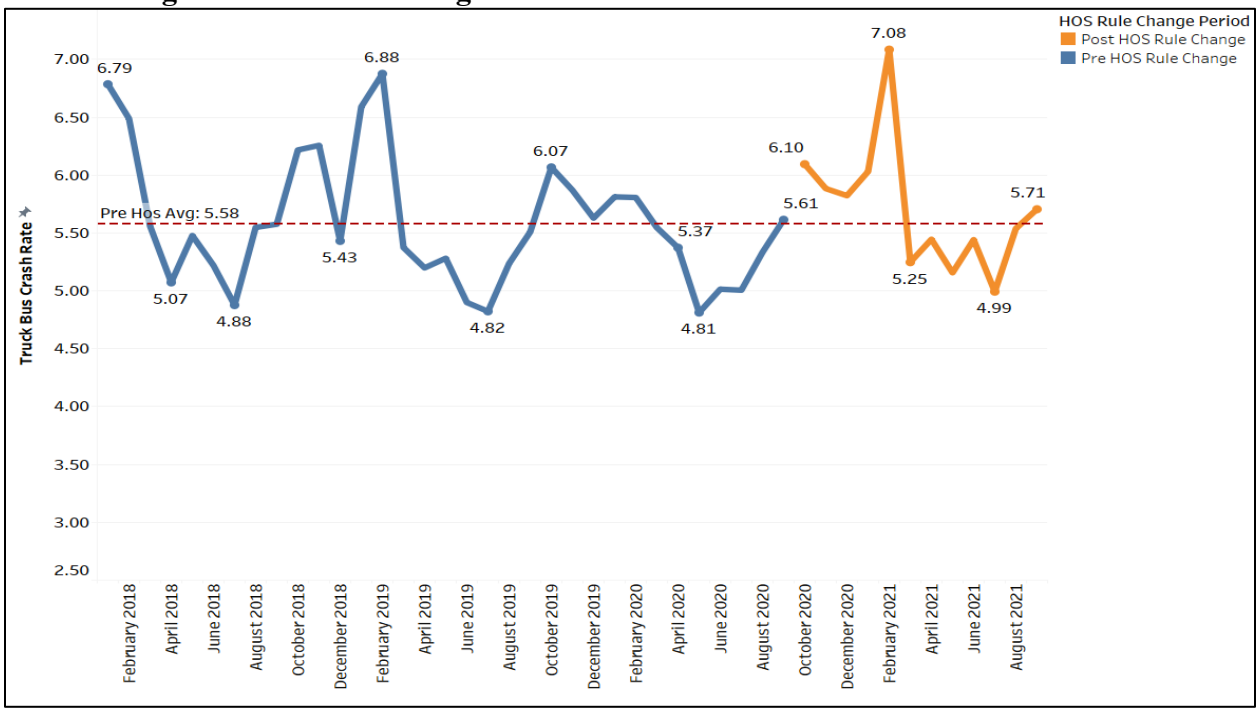
Appendix

Figure 6. Trends in Large Truck and Bus Crashes and Fatal Crashes



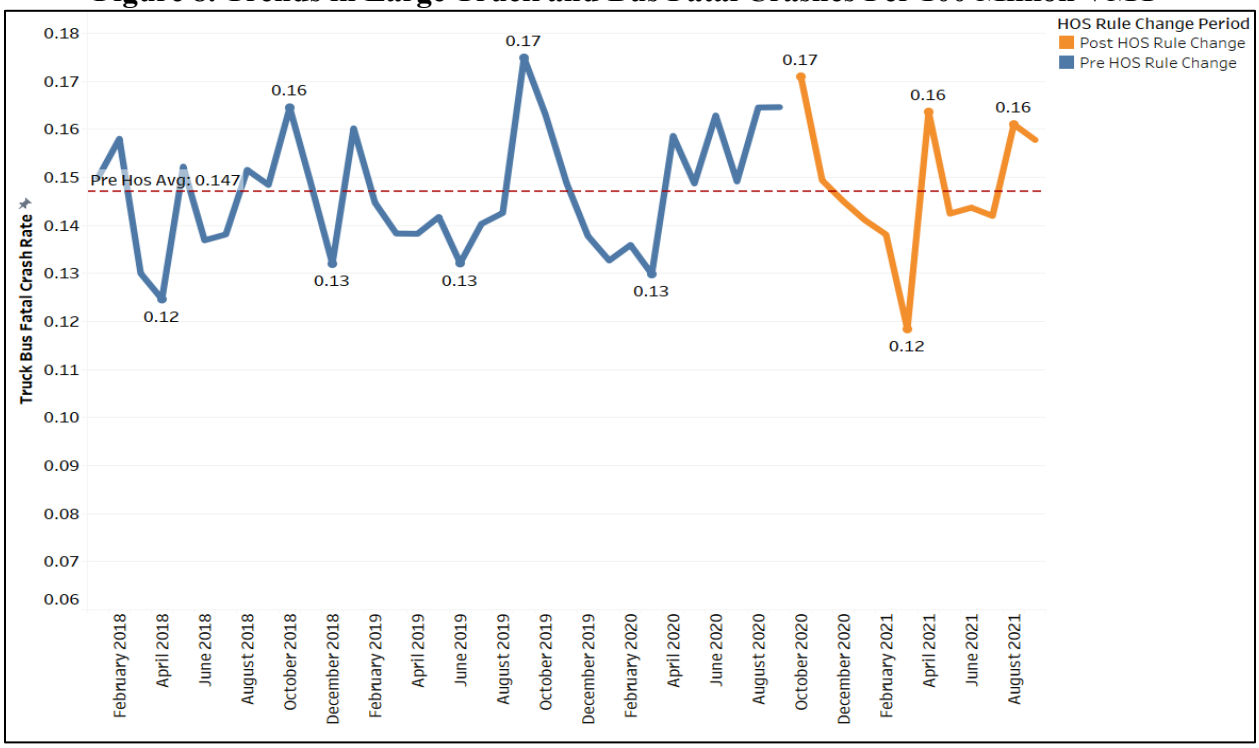
Source: MCMIS, December 31, 2021

Figure 7. Trends in Large Truck and Bus Crashes Per 100 Million VMT



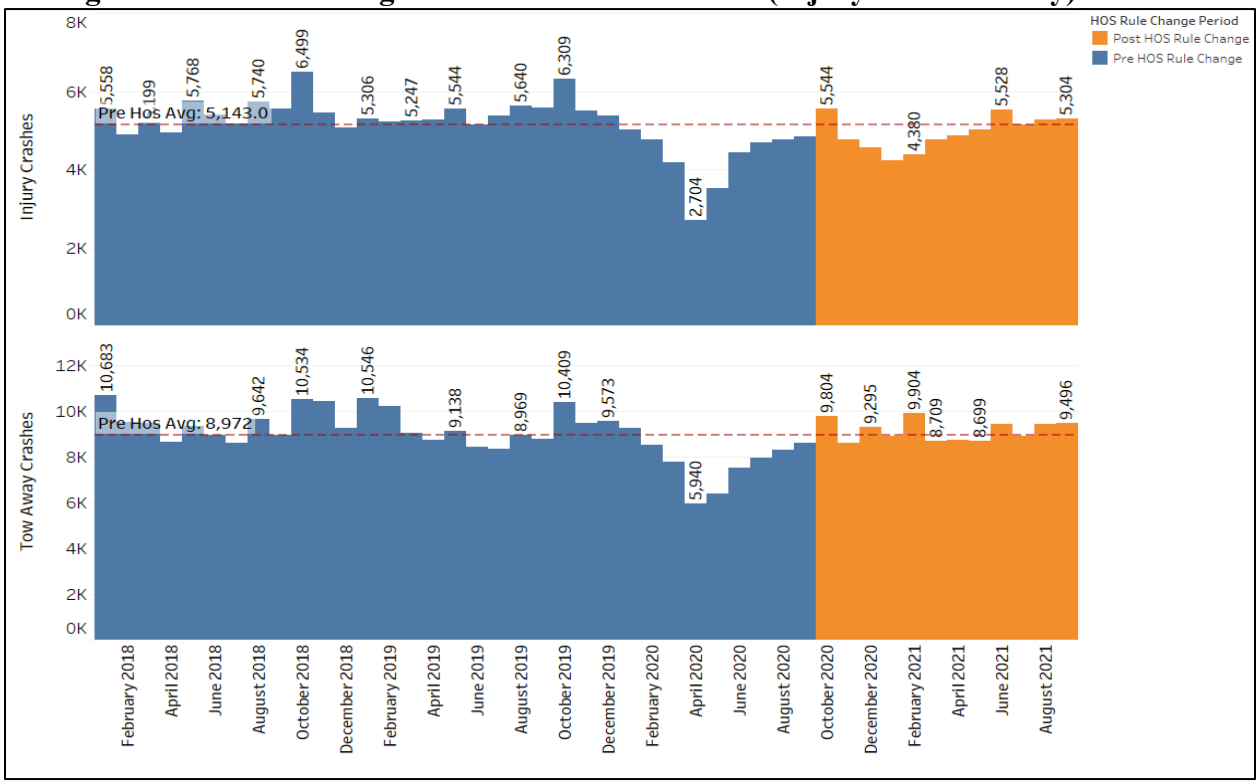
Source: MCMIS, December 31, 2021

Figure 8. Trends in Large Truck and Bus Fatal Crashes Per 100 Million VMT



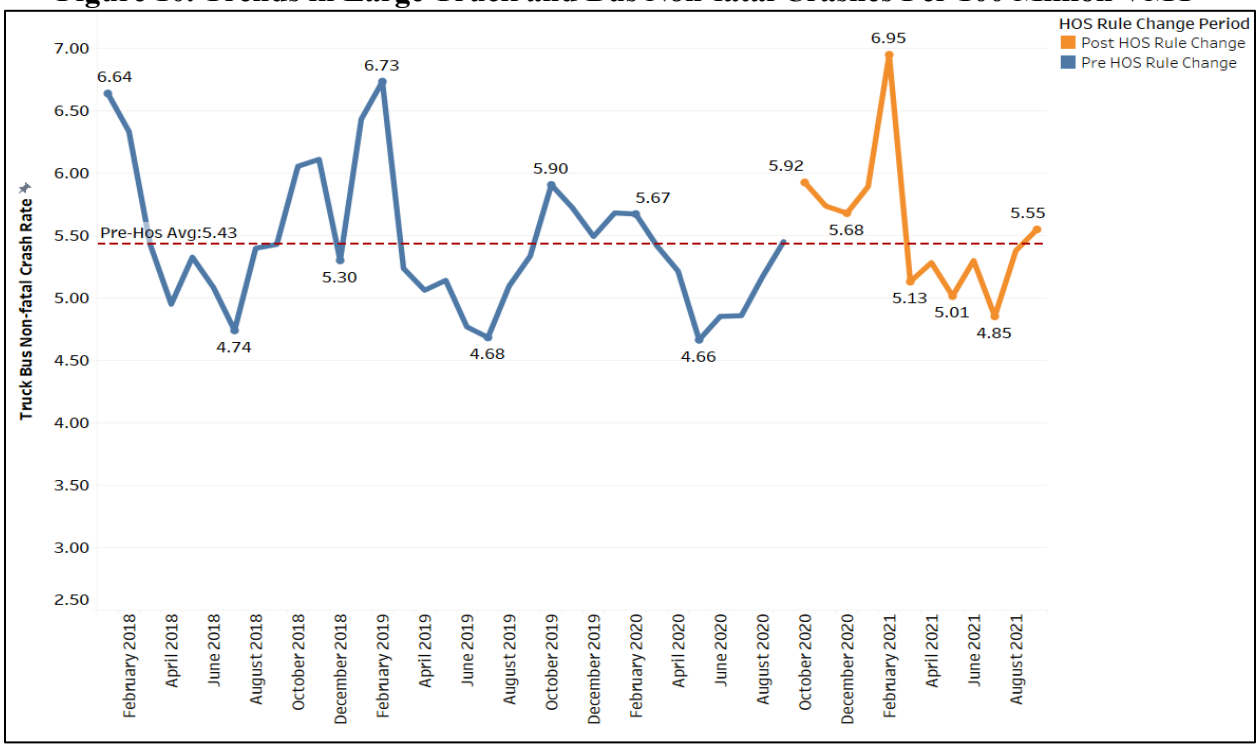
Source: MCMIS, December 31, 2021

Figure 9. Trends in Large Truck and Bus Non-fatal (Injury and Towaway) Crashes



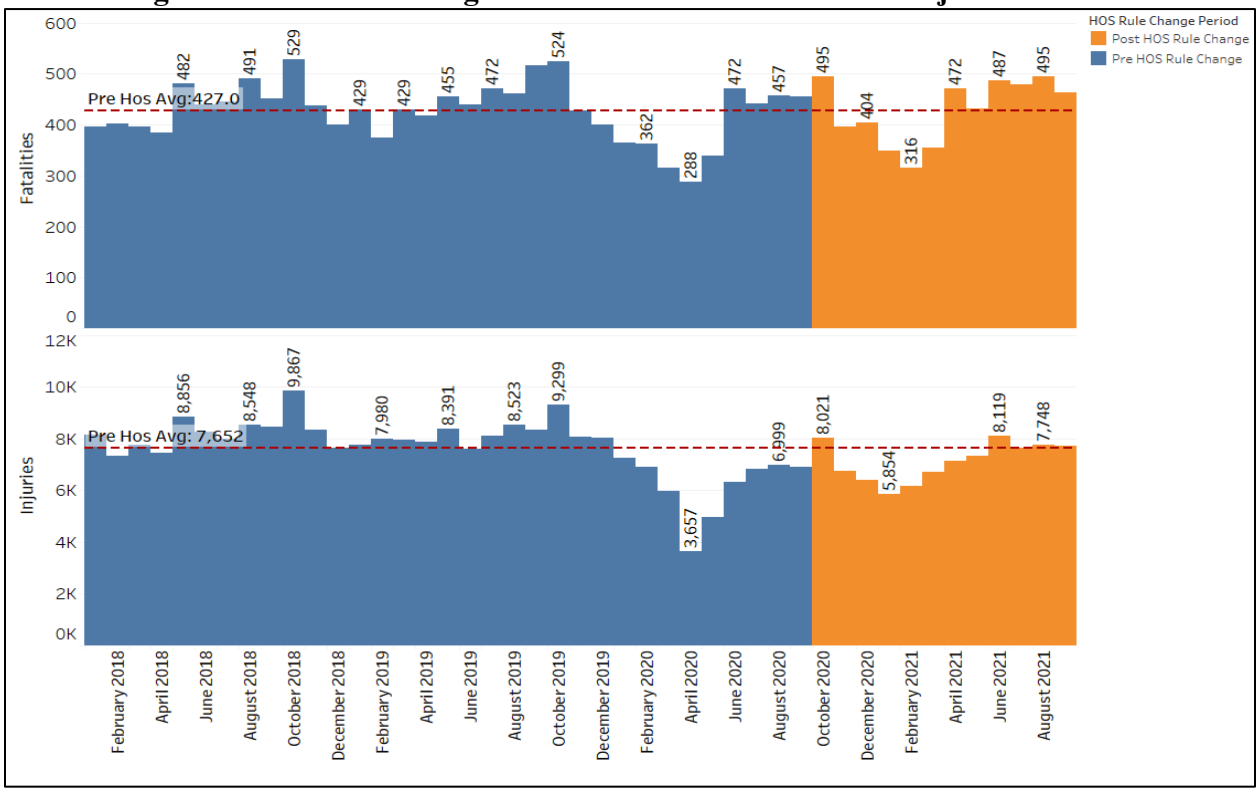
Source: MCMIS, December 31, 2021

Figure 10. Trends in Large Truck and Bus Non-fatal Crashes Per 100 Million VMT



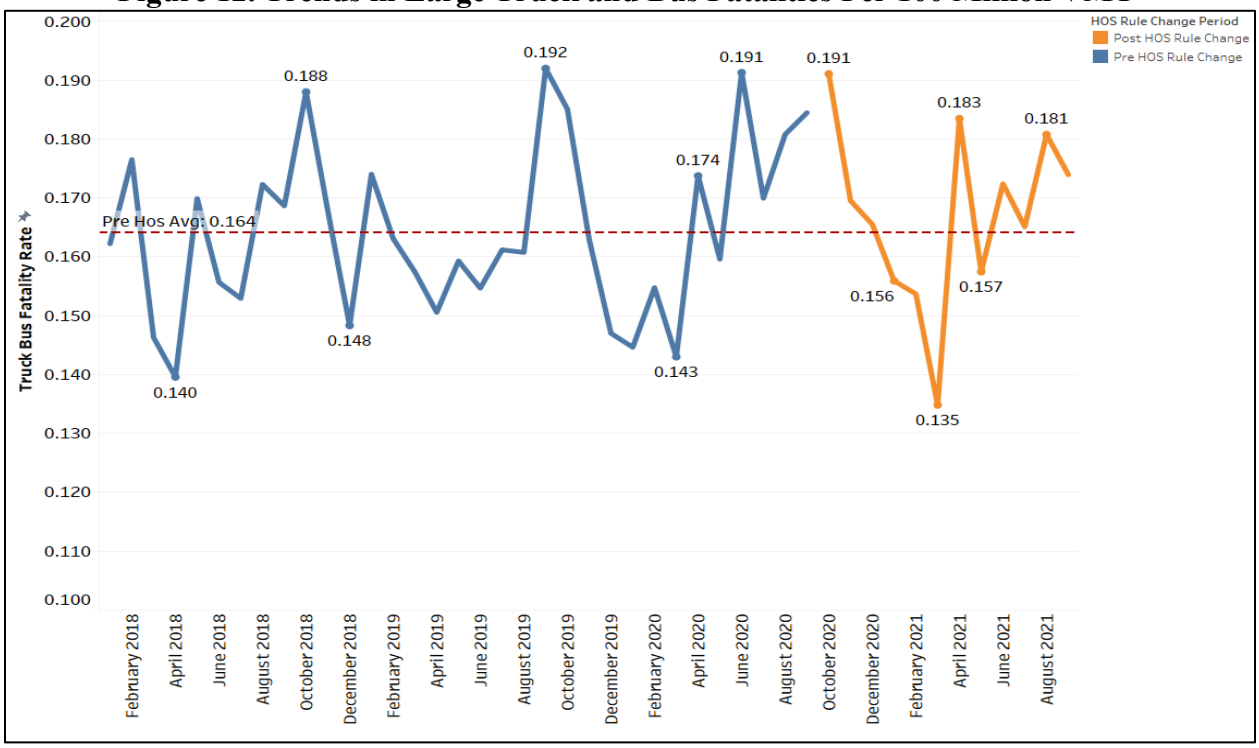
Source: MCMIS, December 31, 2021

Figure 11. Trends in Large Truck and Bus Fatalities and Injured Persons



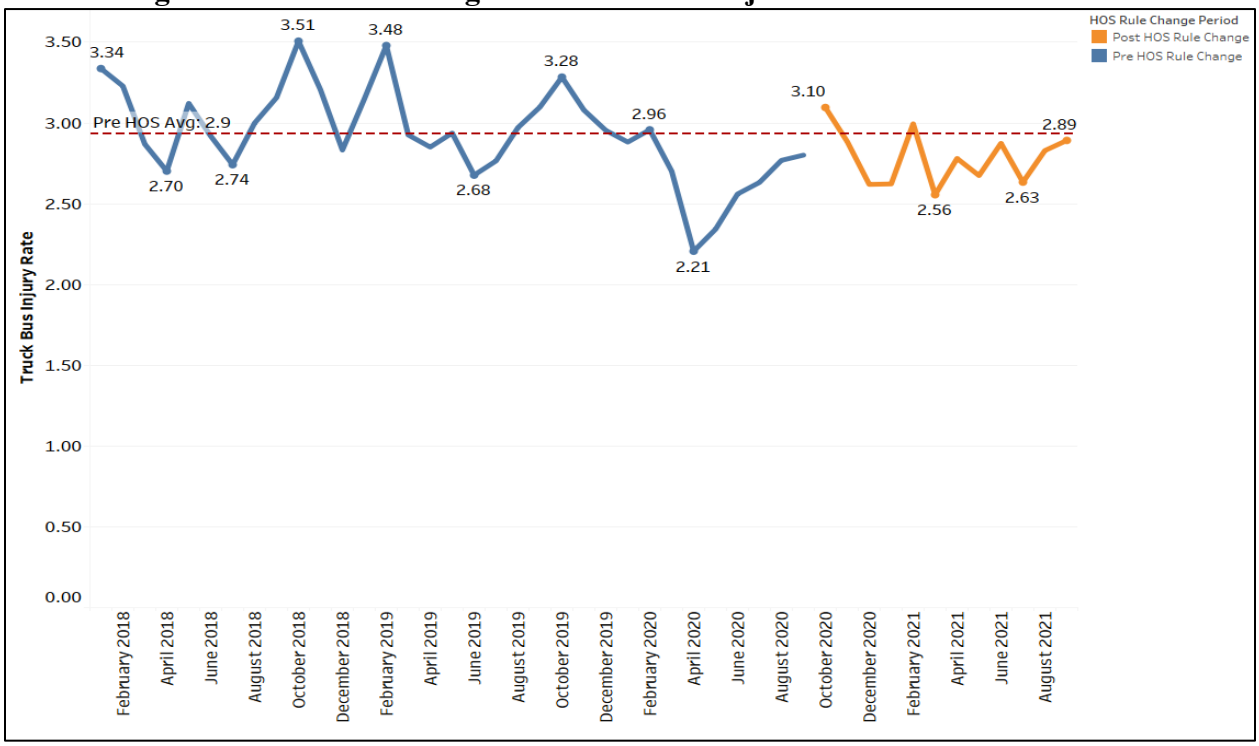
Source: MCMIS, December 31, 2021

Figure 12. Trends in Large Truck and Bus Fatalities Per 100 Million VMT



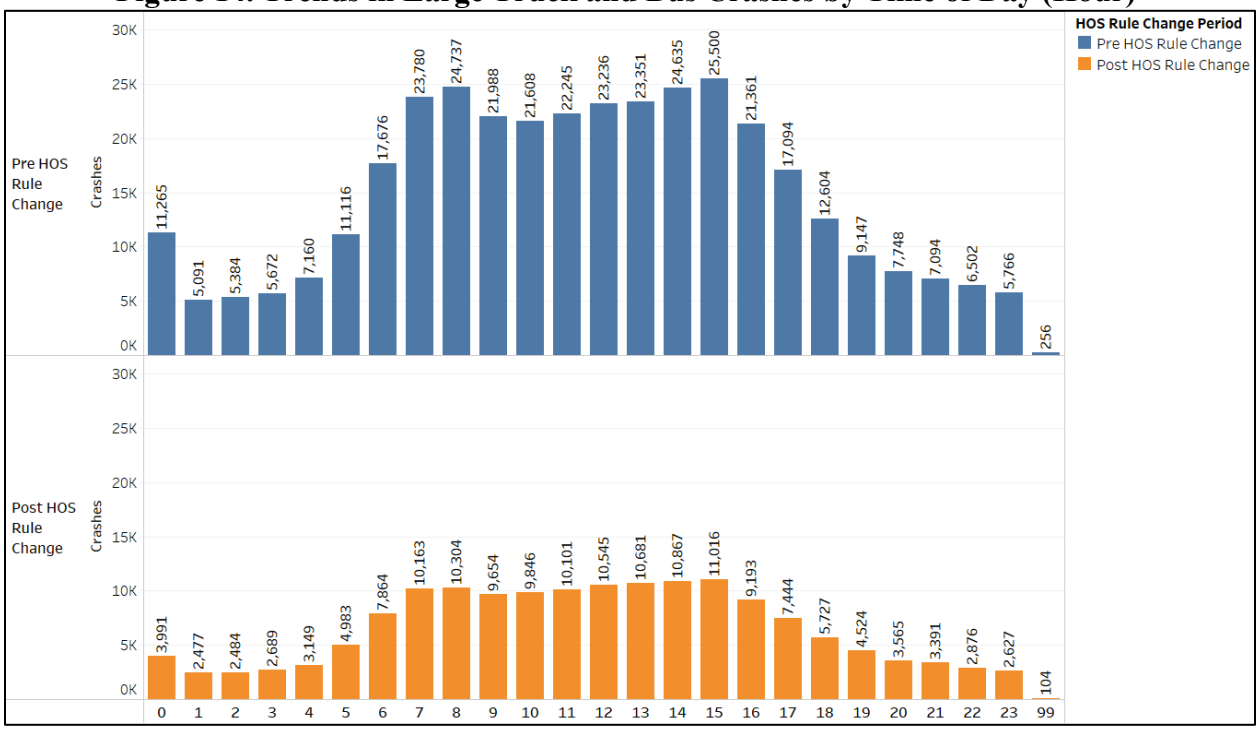
Source: MCMIS, December 31, 2021

Figure 13. Trends in Large Truck and Bus Injuries Per 100 Million VMT



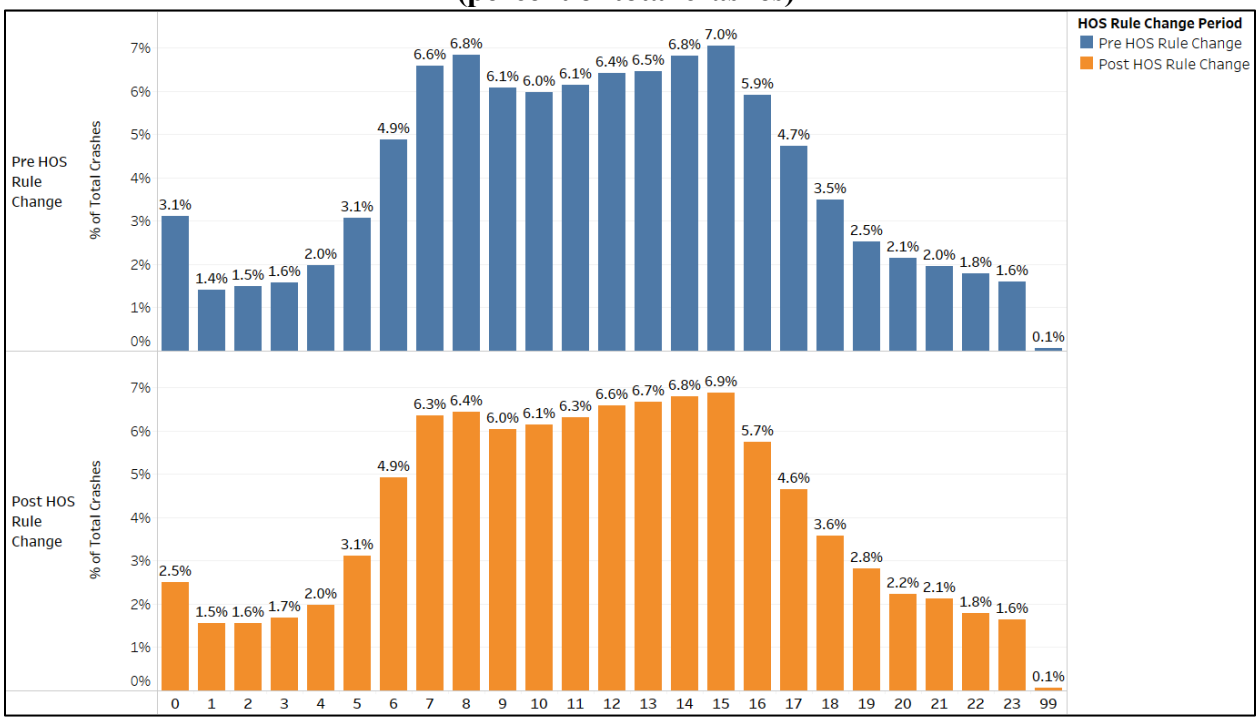
Source: MCMIS, December 31, 2021

Figure 14. Trends in Large Truck and Bus Crashes by Time of Day (Hour)



Source: MCMIS, December 31, 2021
Hour 99: represents unknown hour of day

Figure 15. Trends in Large Truck and Bus Crashes by Time of Day (Hour) (percent of total crashes)



Source: MCMIS, December 31, 2021