Crashes Involving Commercial Motor Vehicles in Michigan: 2015-2019

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1.0 Executive Summary

This report utilizes police-reported crash data in Michigan from 2015 through 2019 to study commercial motor vehicle crash trends. Major findings include:

- From 2015-2019, the greatest number of crashes involving commercial motor vehicles (CMVs) occurred in 2019 with 15,798.
- Same direction sideswipe crashes were the most common crash type among CMV crashes, with 30.8% of all CMV crashes.
- A total of 78.1% of all CMV crashes occurred under daylight conditions, compared with only 62.4% of crashes that did not involve a CMV.
- The peak month for CMV crashes was January with 10.6%.
- Most CMV crashes took place on weekdays, 90.8% of all CMV crashes. Tuesday was the peak day with 19.1% of the CMV crashes.
- About two-thirds (67.1%) of all CMV crashes took place between the hours of 8 AM and 5 PM.
- CMV crashes were less likely to involve alcohol or drugs than non-CMV crashes.
- When a CMV crash involved alcohol, the CMV driver was the drinking party 14.4% of the time. Among drug-involved CMV crashes, the CMV driver was the party suspected of drug use 20.7% of the time.
- CMV drivers in crashes were overwhelmingly male, and 27.1% of CMV drivers were age 45 to 54.
- The most common hazardous action reported for CMV drivers was unable to stop in assured clear distance, with 8.9% of crash-involved CMV drivers.
- When large trucks were distinguished from buses, truck crashes were found to be more likely to involve a single vehicle and take place in dark, unlighted conditions, on Interstates, during the summer months, and between the hours of 9 AM and 3 PM, compared with bus crashes.

2.0 Introduction

This report analyzes trends in police-reported traffic crashes involving commercial motor vehicles in Michigan from 2015-2019. Michigan traffic crashes are defined as taking place on public roadways in Michigan, involving at least one motor vehicle in transport, and resulting in death, injury, or property damage of $1,000 or more. In this report a commercial motor vehicle (CMV) is one that is recorded as "truck/bus" under vehicle type on the Michigan UD-10 police report. According to the UD-10 instruction manual, a truck/bus unit is defined as any of the following:

- A truck or truck/trailer having a Gross Vehicle Weight Rating (GVWR) or Gross Combined Weight Rating (GCWR) of 10,001 pounds or more, whichever is greater.
- Any vehicle designed or used to transport more than eight passengers including the driver. Note: this includes buses, school buses, limousines, and courtesy vans.
- Any vehicle displaying or requiring a hazardous material placard, regardless of weight. Note: this includes automobiles, vans, and pickup trucks.

In this report, injury severity of people involved in crashes is frequently categorized according to the KABCO scale:

- K – fatal injury
- A – suspected serious injury
- B – suspected minor injury
- C – possible injury
- O – no apparent injury

Similarly, crashes are sometimes classified according to the most severe injury suffered by anyone involved in the crash. Again, the KABCO scale is used, with "property damage only" (PDO) referring to crashes where no one was killed or injured.

The report begins with a discussion of the number and severity of CMV crashes from 2015-2019, followed by mileage-based rates of CMV crashes. Next are comparisons of crashes that involved CMVs with those that did not. Factors include characteristics of the crash, such as crash type, light condition, road condition, and road class, as well as temporal variables, like month, day of the week, and hour of the day of crashes. An impairment section examines the role of alcohol and drugs in CMV crashes and how often CMV drivers were themselves impaired. The next section examines crash-involved CMV drivers in terms of age, gender, restraint use, and hazardous action and also compares registration state for CMVs versus other vehicle types. The report concludes by distinguishing large trucks from large buses where possible and comparing their crash distributions according to several factors of interest.

3.0 Overall Crash Trends

A total of 67,358 police-reported CMV crashes took place in Michigan from 2015 through 2019. The number of CMV crashes has increased each year during this time, from a low of 11,890 in 2015 to a high of 15,798 in 2019 (Table 1). The majority of the CMV crashes involved property damage only, 82.1% of

the total. At least one person was injured in 17.2% of the CMV crashes, and 0.7% of the CMV crashes were fatal.

Table 1. Severity of CMV Crashes

Worst Injury in Crash	2015	2016	2017	2018	2019	Total	Percent
Fatal	78	104	84	102	98	466	0.7%
A Injury	203	233	288	300	309	1,333	2.0%
B Injury	523	566	688	701	761	3,239	4.8%
C Injury	1,305	1,286	1,368	1,508	1,572	7,039	10.5%
Property Damage Only	9,781	9,792	10,458	12,192	13,058	55,281	82.1%
Total Crashes	11,890	11,981	12,886	14,803	15,798	67,358	100.0%

The five-year trend of fatalities and suspected serious injuries (A-injuries) resulting from CMV crashes is shown in Figure 1. There is no clear trend in the number of fatalities from 2015-2019. Fatalities ranged from a low of 85 in 2015 to a high of 120 in 2016, with 106 fatalities in 2019. The number of A-injuries sustained in CMV crashes generally rose from 2015-2019. While the 2019 count of 369 A-injuries was down 4.7% from 2018, it was up 38.2% from 267 A-injuries in 2015.

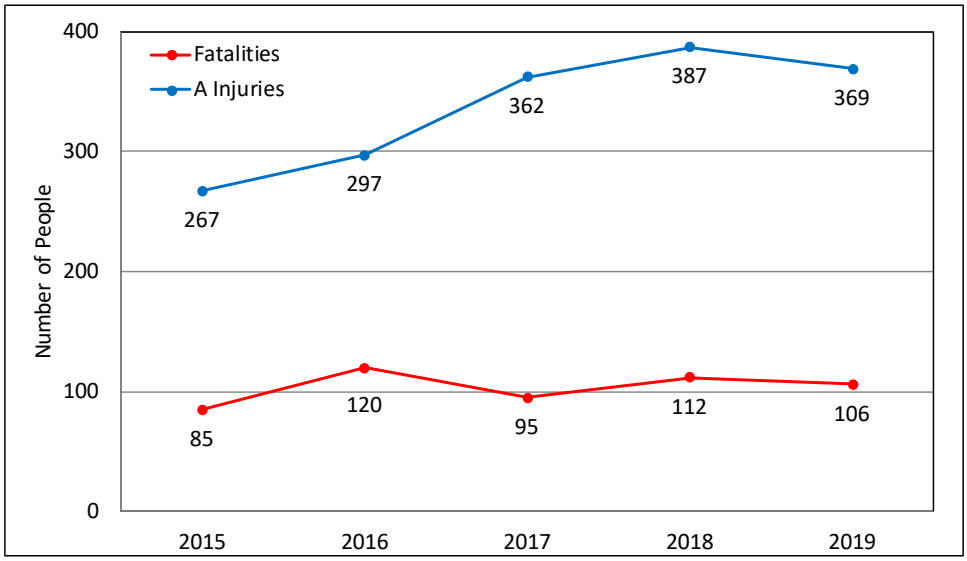

Figure 1 – Fatalities and A Injuries in CMV Crashes

4.0 CMV Crash Rates

Along with the number of CMV crashes and their resulting fatalities and injuries each year, mileage-based rates of these occurrences can be calculated. The first row of Table 2 shows the total vehicle miles traveled (VMT) by CMVs in Michigan from 2015-2019 (source: Michigan Department of Transportation). The next row shows the number of CMV crashes per 100 million VMT, followed by rows for the number

of fatalities and injuries in CMV crashes per 100 million VMT. The column on the far right of Table 2 shows the average VMT from 2015-2019 and the average crash rates over this period.

Table 2. Rates of CMV Crashes, Fatalities, and Injuries

Mileage and Rates	2015	2016	2017	2018	2019	Average
CMV VMT (thousands)	5,908,219	5,919,150	7,102,150	6,181,923	6,443,607	6,311,010
Crashes per 100 Million VMT	201.25	202.41	181.44	239.46	245.17	213.46
Fatalities per 100 Million VMT	1.44	2.03	1.34	1.81	1.65	1.64
Injuries per 100 Million VMT	49.10	50.89	46.86	57.31	57.19	52.19

Figure 2 depicts the mileage-based rates of CMV crashes from 2015-2019. The CMV crash rate was higher in 2018 and 2019 than earlier in the five-year period, and the 2019 CMV crash rate of 245.17 crashes per 100 million VMT was the highest of all. Table 1 indicated that 2019 was also the high year for the number of CMV crashes. The 2019 CMV crash rate was up 21.8% from 2015 and up 35.1% from the low point in 2017.

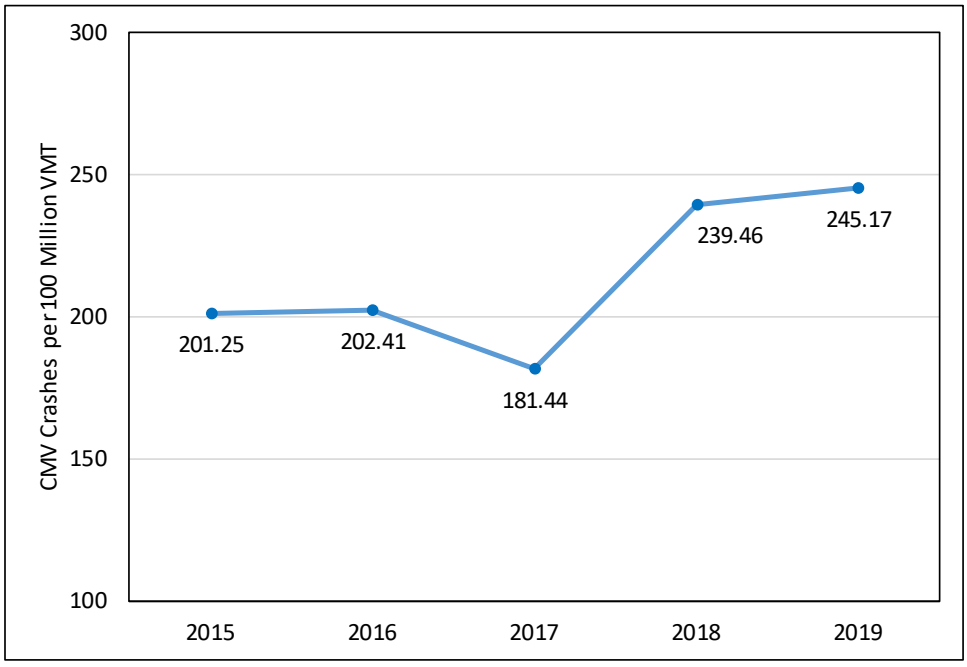

Figure 2 – CMV Crash Rates

Rates of fatalities in CMV crashes are shown in Figure 3 and no trend is apparent from 2015 to 2019. Fatalities in CMV crashes per 100 million VMT ranged from a low of 1.34 in 2017 to a high of 2.03 in 2016. The rate of 1.65 in 2019 nearly matched the overall average rate for the time period of 1.64.

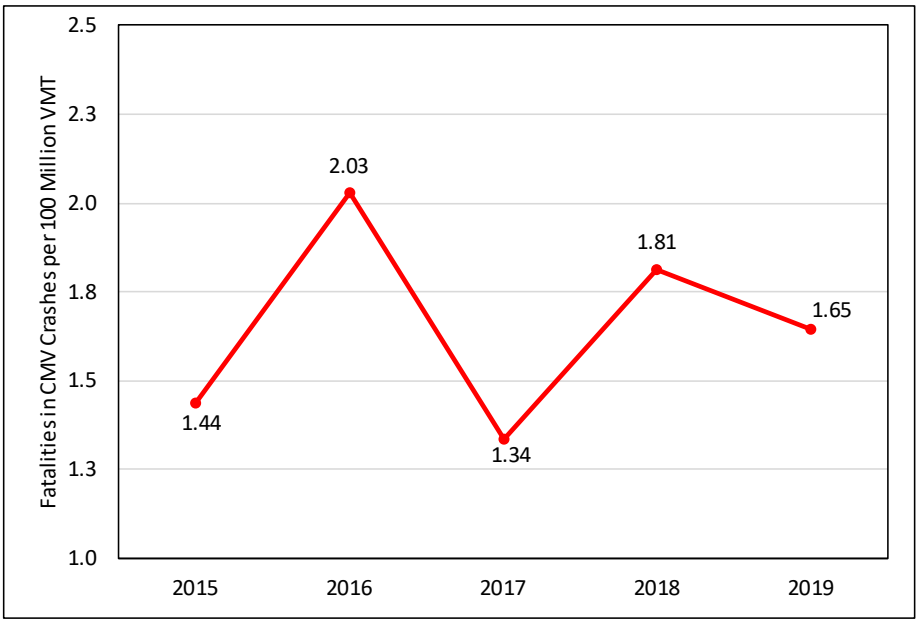

Figure 3 – Rates of Fatalities in CMV Crashes

The trend in injury rates in CMV crashes from 2015-2019 (Figure 4) closely matches the CMV crash rate pattern (Figure 2). The injury rates in 2018 and 2019 were higher than earlier in the five-year time period. The highest injury rate was in 2018 with 57.31 people injured per 100 million miles of CMV travel, but the rate of 57.19 in 2019 was only a 0.2% drop from 2018.

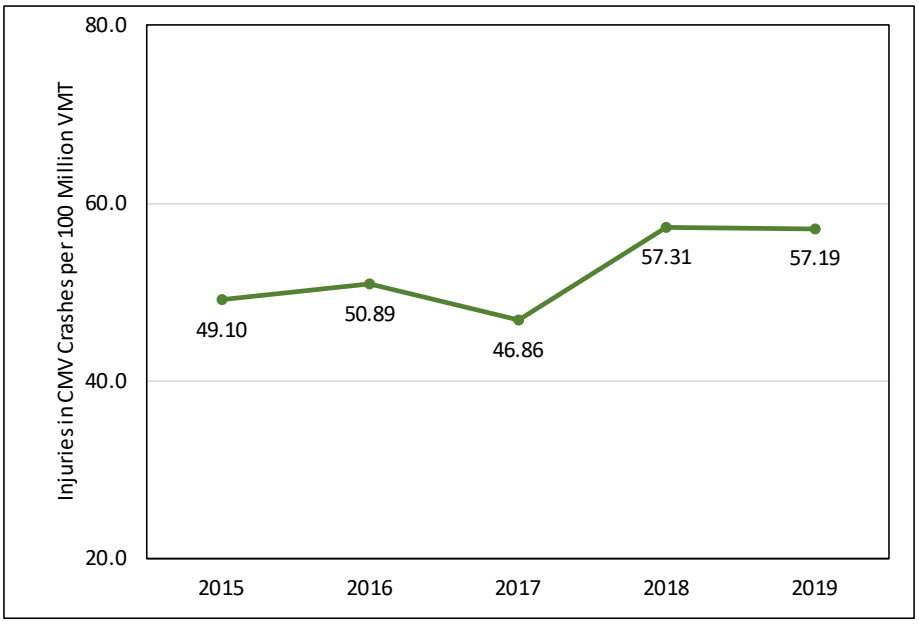

Figure 4 – Rates of Injuries in CMV Crashes

5.0 Crash Characteristics

5.1 Crash Type

This section looks at several factors pertaining to crashes and compares crashes involving CMVs with crashes without any CMVs. Figure 5 shows crash distributions by the type of crash for CMV crashes versus non-CMV crashes. The categories of crash type are single-vehicle, head-on, head-on/left turn, angle, rear-end (includes general rear-end crashes as well as rear-end/right turn and rear-end/left turn), sideswipe/same direction, sideswipe/opposite directions, backing, and other/unknown.

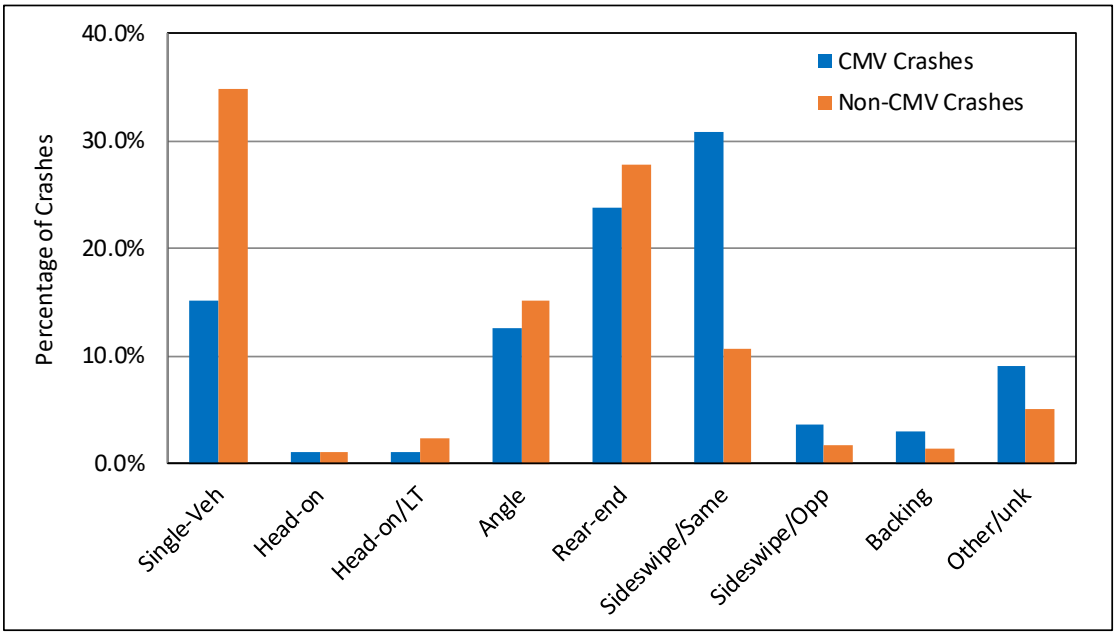

Figure 5 – Crash Type Distributions for CMV Crashes vs. Non-CMV Crashes, 2015-2019

CMV crashes are overrepresented among sideswipe/same direction crashes and underrepresented among single-vehicle crashes. Sideswipe/same direction crashes are the most common crash type among CMV crashes, representing 30.8% of CMV crashes, compared with just 10.6% of non-CMV crashes. Since CMVs are large vehicles that occupy a lot of space on the road, there is less margin for error when another vehicle is next to them, either when they are passing or being passed. Additionally, CMV drivers must contend with large blind spots that increase the potential for sideswipe crashes. When no CMV is involved in the crash, the most common crash type is single-vehicle crashes, at 34.9%. In comparison, only 15.1% of CMV crashes are single-vehicle crashes. CMV drivers are typically professional drivers who should be less likely to engage in the types of risky driving behaviors that are often associated with single-vehicle crashes among the general driving population.

5.2 Light Condition

The distribution of crashes by light condition is shown in Figure 6 for crashes with and without CMVs. Crashes where light condition was other or unknown (0.3% of CMV crashes and 1.0% of non-CMV crashes) were excluded from the chart. While crashes generally are more likely to occur in light than

dark conditions, this is even more the case when CMVs are involved in the crash. This is likely due to relatively more travel by CMVs in the daytime compared with other types of vehicles. A total of 78.1% of CMV crashes occurred in daylight, compared with 62.4% of non-CMV crashes. Crashes without CMVs were relatively more likely to occur during dawn/dusk, dark lighted conditions, and dark unlighted conditions than CMV crashes. The difference was especially pronounced for dark unlighted conditions, which made up 18.6% of non-CMV crashes and just 9.3% of CMV crashes.

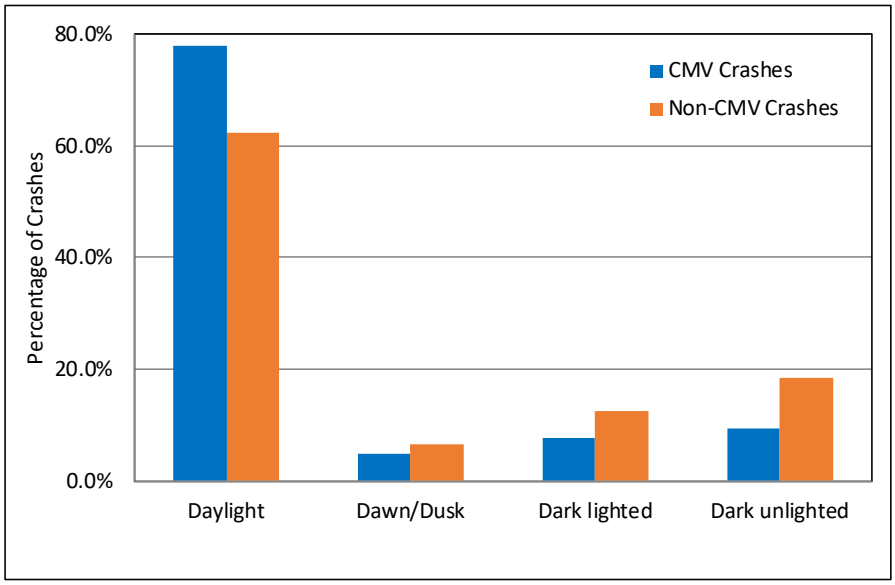

Figure 6 – Light Condition Distributions for CMV Crashes vs. Non-CMV Crashes, 2015-2019

5.3 Road Conditions

The distribution of crashes by road condition is very similar between crashes with and without CMVs (Figure 7). Crashes occurred on dry roadways in 66.6% of CMV crashes and 68.1% of non-CMV crashes. The percentage of crashes on wet roads was nearly identical between CMV crashes (16.0%) and non-CMV crashes (15.8%). CMV crashes were slightly more likely to take place on icy roads and snowy roads than crashes without CMVs.

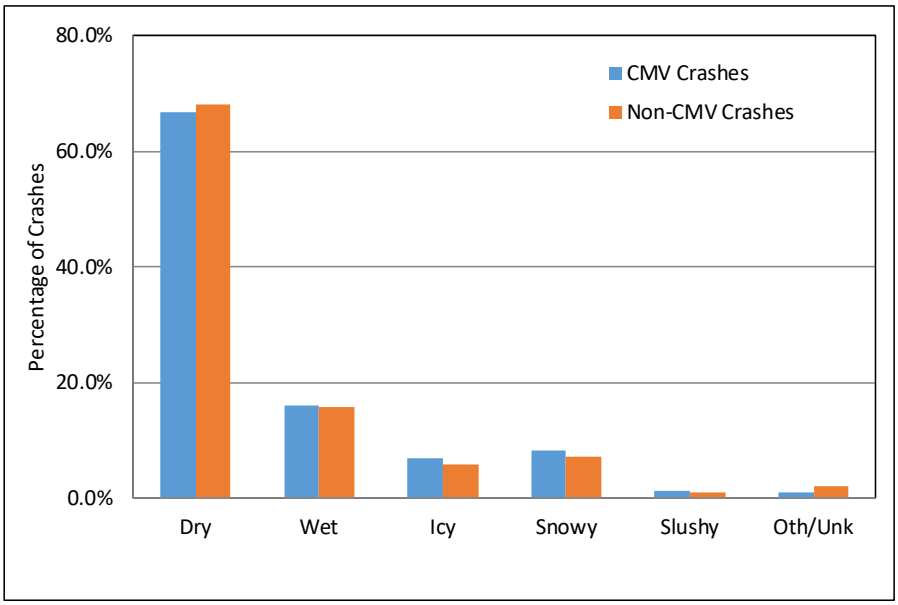

Figure 7 – Road Condition Distributions for CMV Crashes vs. Non-CMV Crashes, 2015-2019

5.4 Road Class

Crashes with and without CMVs have distinct road class distributions (Figure 8). A higher share of CMV crashes took place on Interstates and, to a lesser extent, US routes compared with non-CMV crashes. Relatively more non-CMV crashes occurred on local streets and, to a lesser extent, state routes compared with CMV crashes. Road class was undetermined for about 0.2% of crashes and these are excluded from the figure.

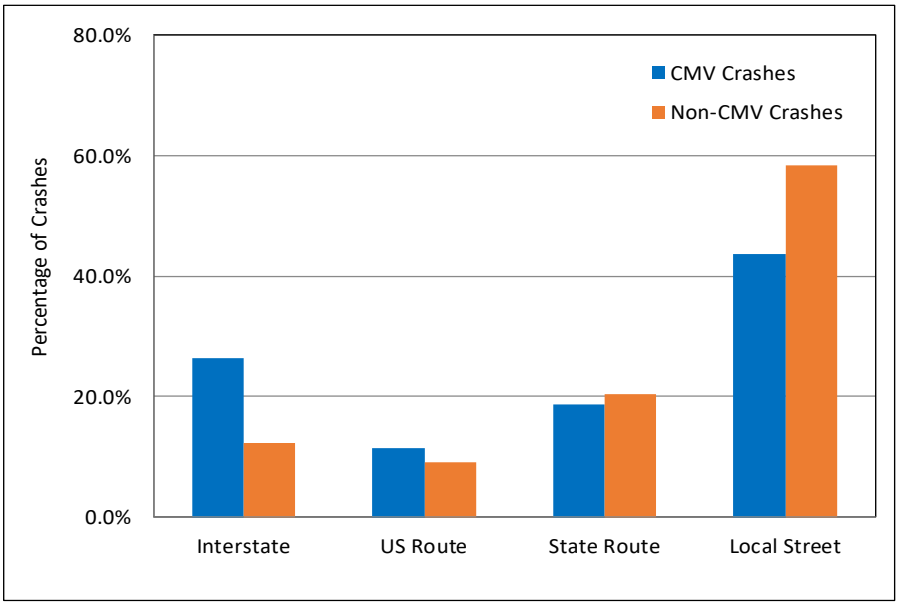

Figure 8 – Road Class Distributions for CMV Crashes vs. Non-CMV Crashes, 2015-2019

6.0 Temporal Variables

6.1 Month of Year

The distribution of CMV crashes by month (Figure 9) suggests that winter weather increases the likelihood of CMV crashes. From 2015-2019, more CMV crashes occurred in January (10.6%) than any other month. About 55% of CMV crashes occurred during the months from September through February, and about 45% took place from March through August. Non-CMV crashes were slightly more likely to occur in November and December than CMV crashes. November/December crashes represented 20.2% of all non-CMV crashes, compared with 17.6% of CMV crashes.

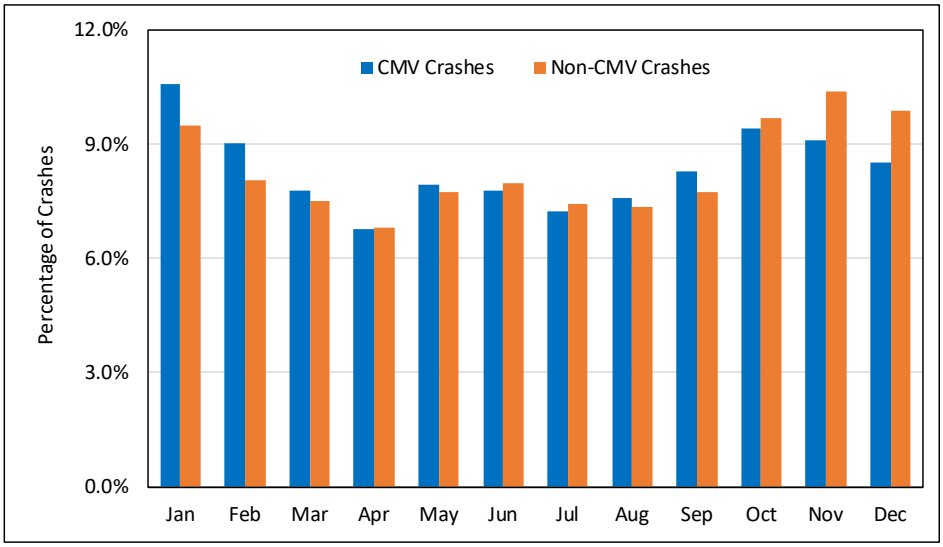

Figure 9 – Month Distributions for CMV Crashes vs. Non-CMV Crashes, 2015-2019

6.2 Day of Week

CMV crashes were far more likely to occur on weekdays than weekend days (Figure 10). Weekdays accounted for 90.8% of CMV crashes from 2015-2019, and Tuesday was the peak day with 19.1% of the CMV crashes. Only 9.2% of CMV crashes took place on Saturday and Sunday. Generally speaking, there is less truck travel on the weekends than during the week. Non-CMV crashes were also more likely to occur on weekdays than weekend days, but the difference was not as great as with CMV crashes. About 23.4% of non-CMV crashes took place on weekends, compared with 9.2% of CMV crashes.

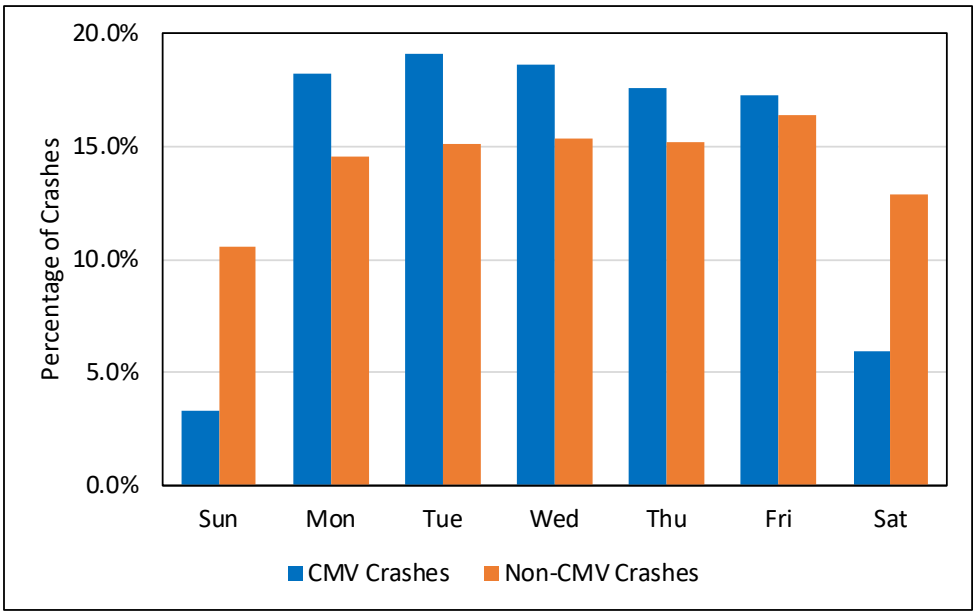

Figure 10 – Day of Week Distributions for CMV Crashes vs. Non-CMV Crashes, 2015-2019

6.3 Time of Day

The peak hours for CMV crashes were the 8 AM hour with 8.1% of all crashes and the 3 PM hour with 8.5% of all crashes (Figure 11). About two-thirds (67.1%) of all CMV crashes took place between the hours of 8 AM and 5 PM. In comparison, the peak hour for crashes without CMVs was the 5 PM hour with 8.4% of crashes, and a smaller peak was observed during the 7 AM hour with 6.1% of crashes. CMV crashes were relatively more likely to occur during the daytime hours than non-CMV crashes. In contrast, non-CMV crashes were more likely in every hour from 4 PM until 6 AM compared with CMV crashes. The 0.1% of crashes where the time of crash was unknown are excluded from Figure 11.

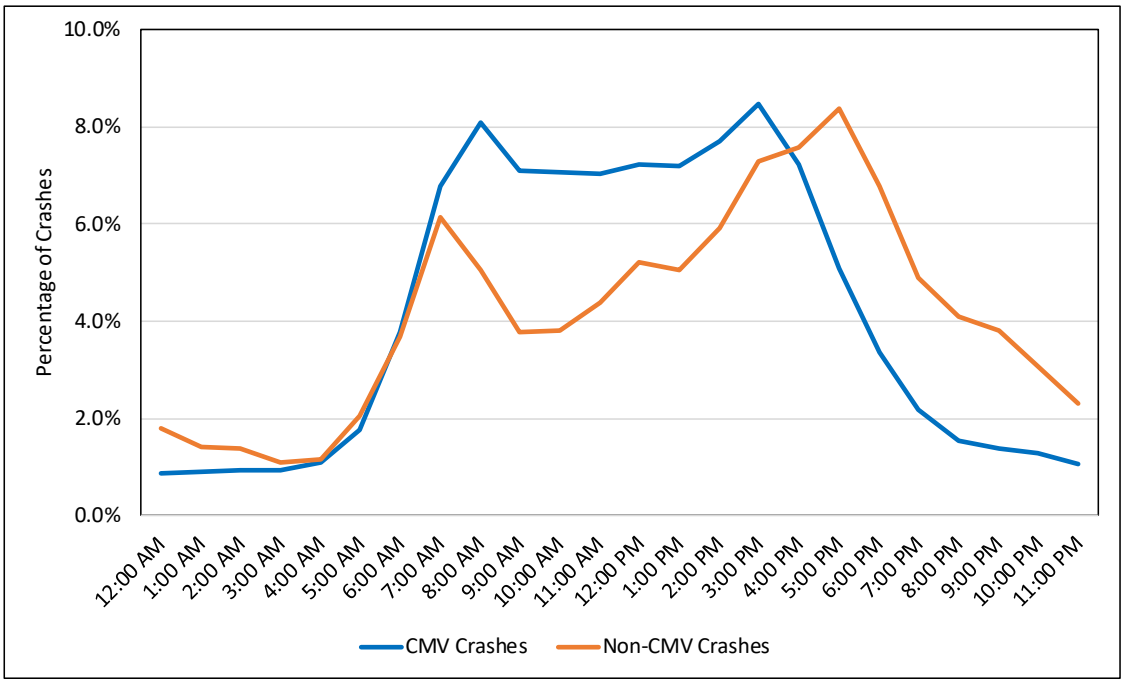

Figure 11 – Time of Day Distributions for CMV Crashes vs. Non-CMV Crashes, 2015-2019

7.0 Impairment

Alcohol is not usually a factor in CMV crashes. From 2015-2019, 1.3% of CMV crashes involved alcohol, while 3.3% of crashes without CMVs involved alcohol. Table 3 shows the counts of CMV crashes with and without alcohol according to the severity of the crash. While CMV crashes involving alcohol are not common, when they occur they tend to be much more severe than CMV crashes not involving alcohol. When alcohol was involved, 7.4% of CMV crashes were fatal and 11.7% involved at least one A injury. When alcohol was not involved, just 0.6% of CMV crashes were fatal and 1.9% involved A injuries. Only 47.5% of CMV crashes involving alcohol were property damage only, compared with 82.5% of CMV crashes not involving alcohol.

Table 3. Severity of CMV Crashes by Alcohol Involvement, 2015-2019

Worst Injury In Crash	No Alcohol Involved		Alcohol Involved	
	Count	Percent	Count	Percent
Fatal	401	0.6%	65	7.4%
A Injury	1,231	1.9%	102	11.7%
B Injury	3,093	4.7%	146	16.7%
C Injury	6,893	10.4%	146	16.7%
Property Damage	54,865	82.5%	416	47.5%
Total Crashes	66,483	100.0%	875	100.0%

The 875 alcohol-involved CMV crashes involved 1,828 traffic units. These included 25 pedestrians, 18 of whom were reported to have been drinking, and three bicyclists, all of whom were reported to have been drinking. Altogether, drinking was reported for 877 drivers or non-motorists in alcohol-involved CMV crashes. Figure 12 shows this distribution. CMV drivers represented 126 (14.4%) of the drinking parties, drivers of other motor vehicles accounted for 730 (83.2%), and the remaining 21 (2.4%) were pedestrians and bicyclists.

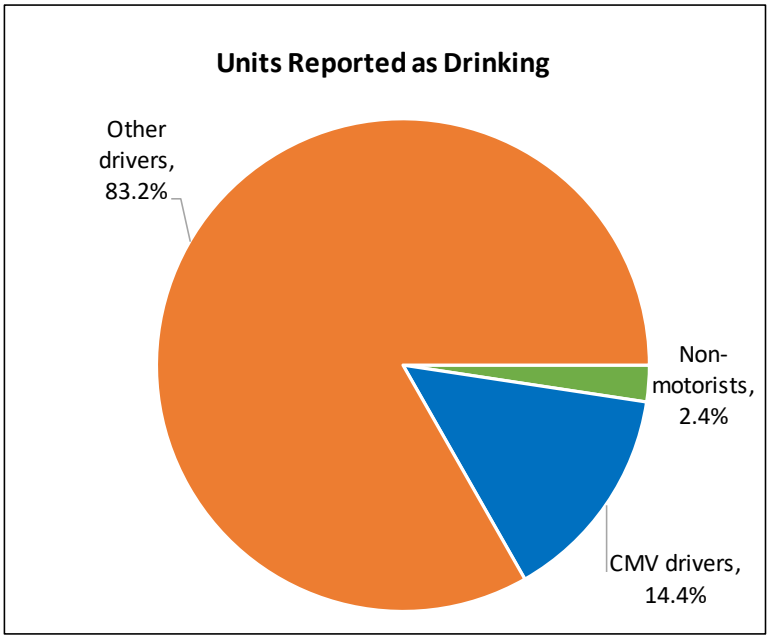

Figure 12 – Distribution of Drinking Units in Alcohol-Involved CMV Crashes, 2015-2019

Drugs were rarely reported to be involved in CMV crashes. From 2015-2019, 0.7% of CMV crashes were reported to have involved drugs, compared with 0.8% of crashes without CMVs. Table 4 shows the crash severity distributions of CMV crashes with and without drugs. The severity distribution for CMV crashes with no drugs is virtually the same as the distribution for CMV crashes without alcohol (Table 3). The distribution of drug-involved CMV crashes is even more severe than the distribution of alcohol-involved CMV crashes. About 17.8% of drug-involved CMV crashes were fatal, 17.4% involved A injuries, and only 34.0% involved nothing more than property damage. Testing for drugs occurs more often in more severe crashes, especially fatal crashes, which probably contributes to the increased severity of CMV crashes that involved drugs.

Table 4. Severity of CMV Crashes by Drug Involvement, 2015-2019

Worst Injury In Crash	No Drugs Involved		Drugs Involved	
	Count	Percent	Count	Percent
Fatal	388	0.6%	78	17.8%
A Injury	1,257	1.9%	76	17.4%
B Injury	3,177	4.7%	62	14.2%
C Injury	6,966	10.4%	73	16.7%
Property Damage	55,132	82.4%	149	34.0%
Total Crashes	66,920	100.0%	438	100.0%

There were 950 traffic units in the 438 CMV crashes that involved drugs. These included 15 pedestrians, seven of whom were reported to have been using drugs, one bicyclist, who was reported to have been using drugs, and 934 motor vehicle drivers. Altogether, drug use was reported for 440 drivers or non-motorists in drug-involved CMV crashes. CMV drivers represented 91 (20.7%) of the people using drugs, drivers of other motor vehicles accounted for 341 (77.5%), and the remaining eight (1.8%) were non-motorists (Figure 13).

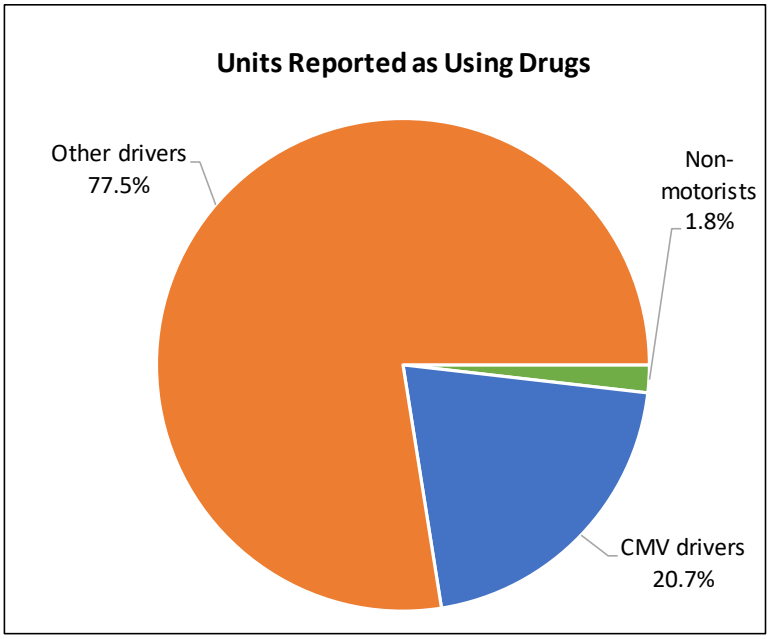

Figure 13 – Distribution of Units Using Drugs in Drug-Involved CMV Crashes, 2015-2019

8.0 CMV Driver and Vehicle Characteristics

8.1 Driver Age, Gender, and Restraint Use

Table 5 shows counts of CMV drivers involved in crashes from 2015-2019 according to the gender of the CMV driver. The drivers were overwhelmingly male. For the five years combined, 85.9% of the drivers

were male, 9.9% female, and 4.2% gender uncoded. The percentage of female drivers ranged from a high of 10.1% in 2015 and 2017 to a low of 9.7% in 2019.

Table 5. Gender of Crash-Involved CMV Drivers

Driver Gender	2015	2016	2017	2018	2019	Total
Male	10,690	10,704	11,502	13,349	14,320	60,565
Female	1,267	1,248	1,361	1,519	1,608	7,003
Uncoded & errors	529	527	553	671	675	2,955
Total CMV Drivers	12,486	12,479	13,416	15,539	16,603	70,523

Table 6 shows the age groups of CMV drivers involved in crashes from 2015-2019, and the overall age group distribution is graphed in Figure 14. The figure excludes the 4.5% of drivers for whom age was unknown. The most common known age group for CMV drivers was age 45 to 54, representing 27.1% of CMV drivers of known age involved in crashes. Next were the 55 to 64 group with 22.6% and the 35 to 44 group with 21.0%. Only 5.8% of CMV drivers in crashes were age 65 and older, and just 5.4% were under the age of 25.

Table 6. Age Group of Crash-Involved CMV Drivers

Driver Age Group	2015	2016	2017	2018	2019	Total
0-24	555	599	667	898	937	3,656
25-34	1,871	1,929	2,249	2,837	3,202	12,088
35-44	2,689	2,576	2,677	2,999	3,228	14,169
45-54	3,565	3,370	3,554	3,803	3,979	18,271
55-64	2,640	2,725	2,932	3,396	3,556	15,249
65+	603	711	744	878	975	3,911
Unknown	563	569	593	728	726	3,179
Total CMV Drivers	12,486	12,479	13,416	15,539	16,603	70,523

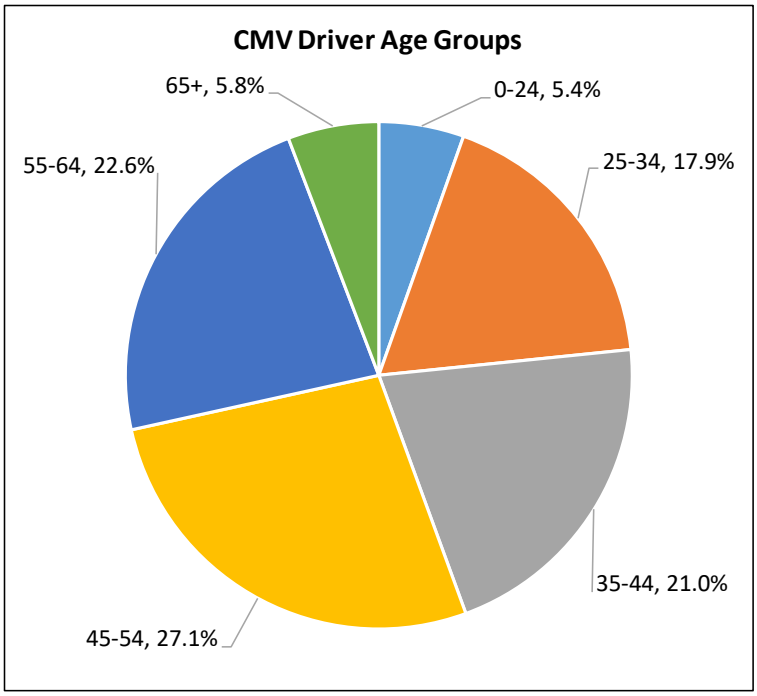

Figure 14 – CMV Driver Age Group Distribution, 2015-2019

Restraint use patterns of CMV drivers involved in crashes from 2015-2019 are shown in Table 7. The vast majority of CMV drivers were reported to have been wearing lap and/or shoulder belts at the time of the crash. Overall, 91.1% of drivers were reported to have been restrained, 1.1% were unrestrained, and restraint use was unknown for the remaining 7.8% of CMV drivers.

Table 7. Restraint Use of Crash-Involved CMV Drivers

Driver Restraint Use	2015	2016	2017	2018	2019	Total
Restrained	11,457	11,353	12,273	14,115	15,054	64,252
Not Restrained	164	169	137	139	154	763
Unknown	865	957	1,006	1,285	1,395	5,508
Total CMV Drivers	12,486	12,479	13,416	15,539	16,603	70,523

8.2 Registration State and Hazardous Action

Figure 15 shows the distribution of registration states for CMVs involved in crashes in Michigan from 2015-2019. The state where the CMV was registered was unknown for about 3.2% of the CMVs, and these cases are excluded from the figure. Unsurprisingly, Michigan was the most common known registration state, representing about 72.7% of the crash-involved CMVs. The next most common states/provinces were Indiana (7.4%), followed by Ontario (3.7%), Illinois (3.2%), Ohio (3.2%), Oklahoma 1.2%), Wisconsin (1.0%), and Tennessee (0.7%).

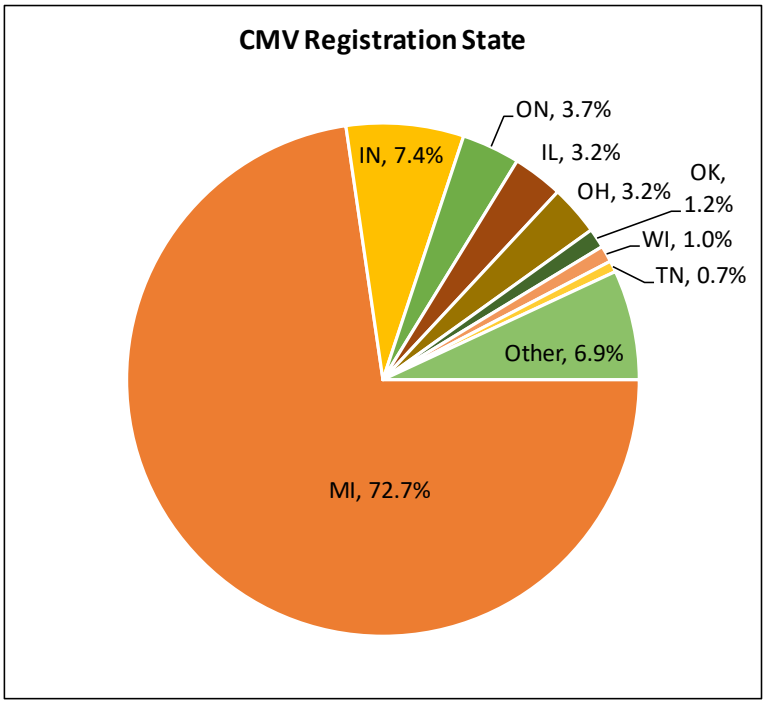

Figure 15 – Registration State of CMVs in Crashes, 2015-2019

For comparative purposes, Figure 16 shows the registration state distribution for all other known vehicle types involved in crashes in Michigan from 2015-2019. The 3.0% of vehicles where registration state was unknown have been excluded from the figure. With CMVs excluded, the percentage of vehicles registered in Michigan, 95.8%, is much higher than the percentage of CMVs registered in Michigan, 72.7%. The next six most common registration states/provinces were, in order, Ohio, Illinois, Indiana, Florida, Wisconsin, and Ontario, but each of these represented less than 1% of crash-involved vehicles.

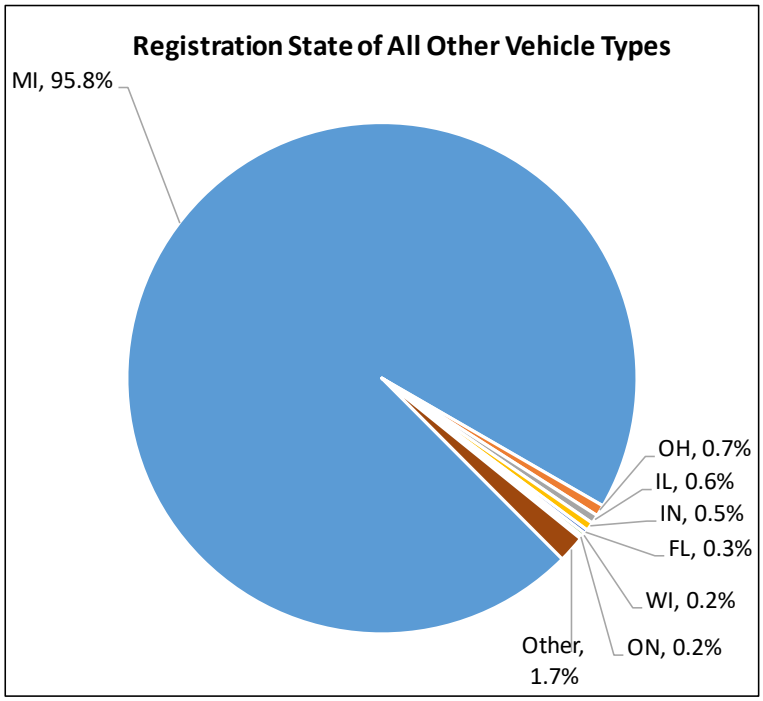

Figure 16 – Registration State of Other Types of Vehicles in Crashes, 2015-2019

Reported hazardous actions for CMV drivers in crashes from 2015-2019 are shown in Table 8. Over half (50.9%) of CMV drivers were not assigned any hazardous action. The most common hazardous action reported was unable to stop in assured clear distance, with 8.9% of the CMV drivers. CMVs are high mass and take longer to come to a stop than other vehicles, so it is not surprising to see unable to stop as a common hazardous action for CMV drivers. The next most frequently reported specific hazardous actions for CMV drivers were failed to yield (5.5%), improper lane use (5.2%), speed too fast (4.5%), improper backing (3.8%), and improper turn (3.4%).

Table 8. Hazardous Actions for Crash-Involved CMV Drivers, 2015-2019

Hazardous Action	Count	Percent
None	35,889	50.9%
Speed too fast	3,169	4.5%
Speed too slow	43	0.1%
Failed to yield	3,908	5.5%
Disregard traffic control	705	1.0%
Drove wrong way	27	0.0%
Drove left of center	302	0.4%
Improper passing	467	0.7%
Improper lane use	3,691	5.2%
Improper turn	2,423	3.4%
Improper/no signal	115	0.2%
Improper backing	2,687	3.8%
Unable to stop in assured clear distance	6,260	8.9%
Other	5,229	7.4%
Unknown	3,557	5.0%
Reckless driving	65	0.1%
Careless/negligent driving	1,603	2.3%
Uncoded & errors	383	0.5%
Total CMV Drivers	70,523	100.0%

9.0 Comparisons between Truck Crashes and Bus Crashes

Earlier it was noted that CMVs in this report are defined as vehicles recorded as “truck/bus” on the Michigan UD-10 police report. Along with medium-duty (GVWR over 10,000 pounds) and heavy-duty (GVWR over 26,000 pounds) trucks and buses, these include vehicles designed to transport more than eight passengers, like limousines and courtesy vans. Additionally, the “truck/bus” designation is used for any vehicles with hazardous material placards, regardless of weight, including automobiles, vans, and pickup trucks. The result is a variety of types of vehicles under the heading of “truck/bus.”

To gain a better understanding of the types of vehicles that have been classified as CMVs, cross-tabulations involving several other variables were generated and a review of a sample of police reports was conducted. Based on this, some of the truck/bus vehicles were able to be identified as large (medium-duty and heavy-duty) trucks and others as large buses (transit buses, motor coaches, school buses, etc.). A detailed description of the variables used to define large trucks and buses may be found in the Appendix.

Table 9 shows the result of the subclassification of CMVs. From 2015-2019, 81.3% of the crash-involved CMVs were considered to be large trucks, 12.7% large buses, and 6.0% undetermined CMVs.

Table 9. Types of CMVs Involved in Crashes

CMV Subtype	2015	2016	2017	2018	2019	Total
Large Truck	10,159	10,018	10,840	12,761	13,537	57,315
Large Bus	1,477	1,420	1,882	2,027	2,168	8,974
General CMV	850	1,041	694	751	898	4,234
Total CMV Vehicles	12,486	12,479	13,416	15,539	16,603	70,523

9.1 Crash Type

By classifying CMVs as large trucks or large buses where possible, truck crashes can be compared with bus crashes according to variables of interest. Figure 17 shows crash distributions by the type of crash for truck crashes versus bus crashes. Section 5.1 noted that CMV crashes had a much lower share of single-vehicle crashes compared with non-CMV crashes. Buses have an even lower percentage of single-vehicle crashes than trucks. Just 6.2% of bus crashes involved one vehicle, compared with 16.9% of truck crashes. Bus crashes were more likely to be angle crashes and to a lesser extent rear-end crashes compared with truck crashes.

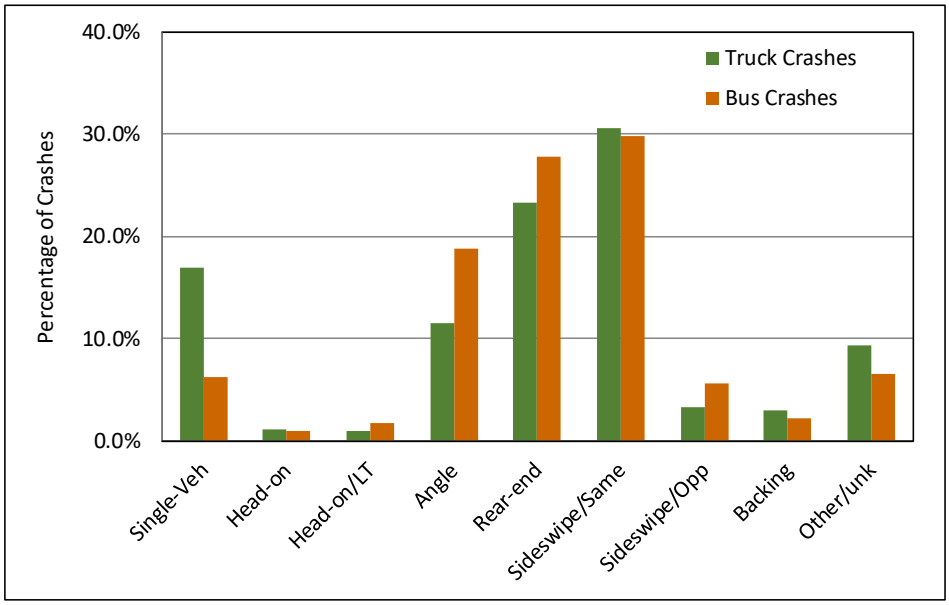

Figure 17 – Crash Type Distributions for Truck Crashes vs. Bus Crashes, 2015-2019

9.2 Light Condition

In terms of light condition, bus crashes were slightly more likely to take place in daylight conditions than truck crashes (Figure 18). While light conditions of dawn or dusk made up a small portion of both bus (6.5%) and truck (4.4%) crashes, bus crashes were 1.5 times as likely to take place during dawn/dusk as truck crashes. Dark lighted conditions were also slightly more common for bus crashes than truck crashes, but dark unlighted conditions were much more common among truck crashes (10.4%) than bus crashes (3.4%). Different travel patterns between trucks and buses are likely responsible for the

observed differences in light condition crash distributions. Long-haul trucks have more travel in rural, unlighted areas, while buses as a whole travel more in urban, lighted areas. School buses, which make up about 39.8% of the vehicles identified as buses, are often out on the roads at dawn. Light condition was undetermined for 0.2% of the truck and bus crashes, and these cases are excluded from Figure 18.

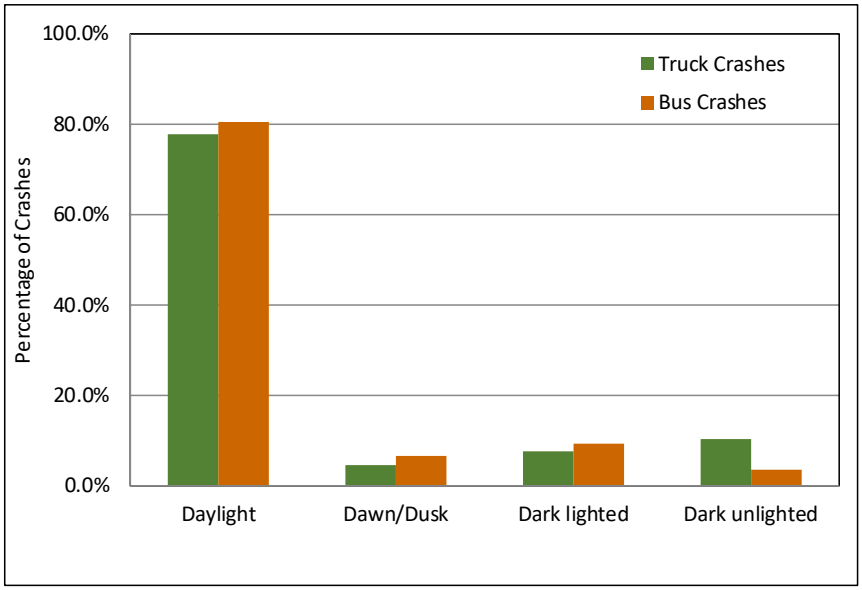

Figure 18 – Light Condition Distributions for Truck Crashes vs. Bus Crashes, 2015-2019

9.3 Road Class

Truck and bus crashes have different road class distributions (Figure 19). Bus crashes overwhelmingly occurred on local streets, with 71.1% of the total, followed by Michigan routes with 17.6%. Truck crashes were more evenly distributed across the four classes of roads, with 38.6% occurring on local streets and 30.0% on Interstates. Again, the different distributions likely reflect different travel patterns between the two types of vehicles. Road class was undetermined in about 0.2% of truck crashes and 0.1% of bus crashes and these crashes are excluded from the figure.

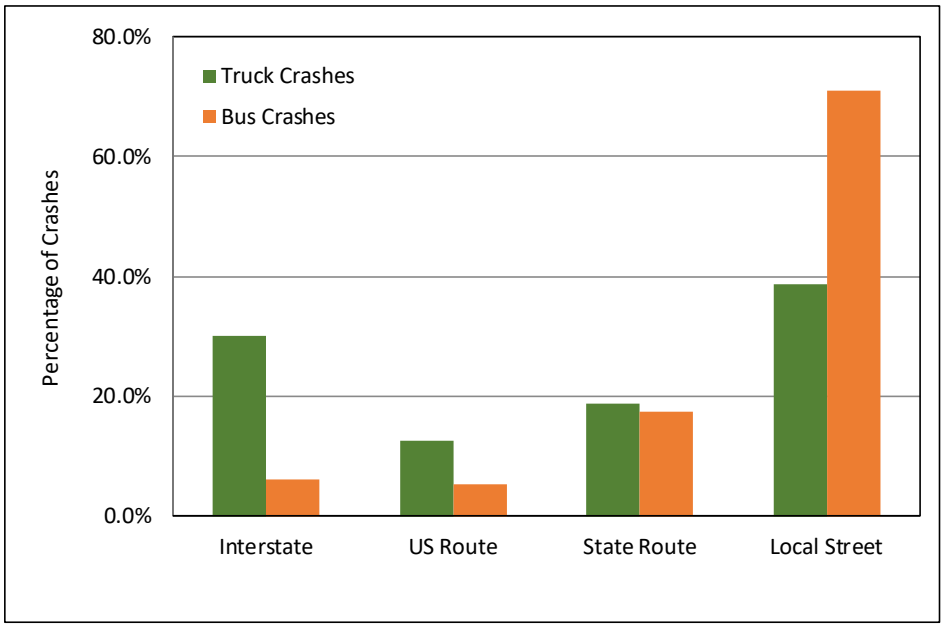

Figure 19 – Road Class Distributions for Truck Crashes vs. Bus Crashes, 2015-2019

9.4 Month

As shown in Figure 20, truck crashes were distributed fairly evenly throughout the months of the year, with a peak in January (10.6% of truck crashes). The two top months for bus crashes were October (11.0%) and January (10.8%), but in general bus crashes tracked fairly closely with the school calendar. The low for the year was July with 4.0% of bus crashes, followed by August with 4.8% and June with 5.8%.

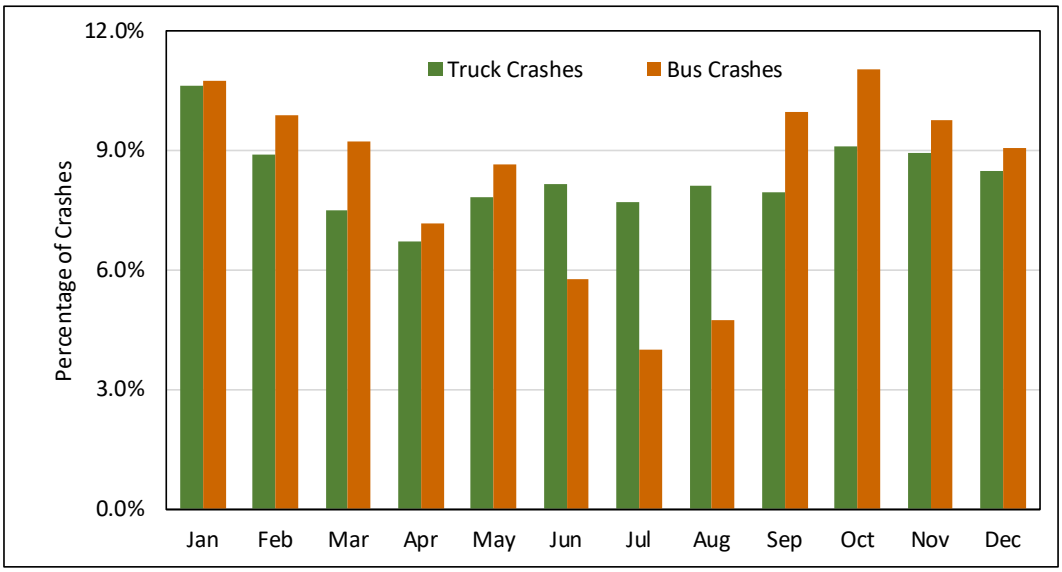

Figure 20 – Month Distributions for Truck Crashes vs. Bus Crashes, 2015-2019

9.5 Time of Day

Truck and bus crashes differ in terms of when they occur across the hours of the day (Figure 21). Bus crashes showed peaks from 3:00-5:59 p.m. (30.7%) and 6:00-8:59 a.m. (27.3%), consistent with many of the buses being school buses and transit buses. Only 4.6% of bus crashes took place between 9:00 p.m. and 5:59 a.m. In contrast, the peak periods for truck crashes were noon to 2:59 p.m. with 23.0% of the truck crashes and 9:00-11:59 a.m. with 22.6%. About 11.1% of truck crashes occurred from 9:00 p.m. to 5:59 a.m.

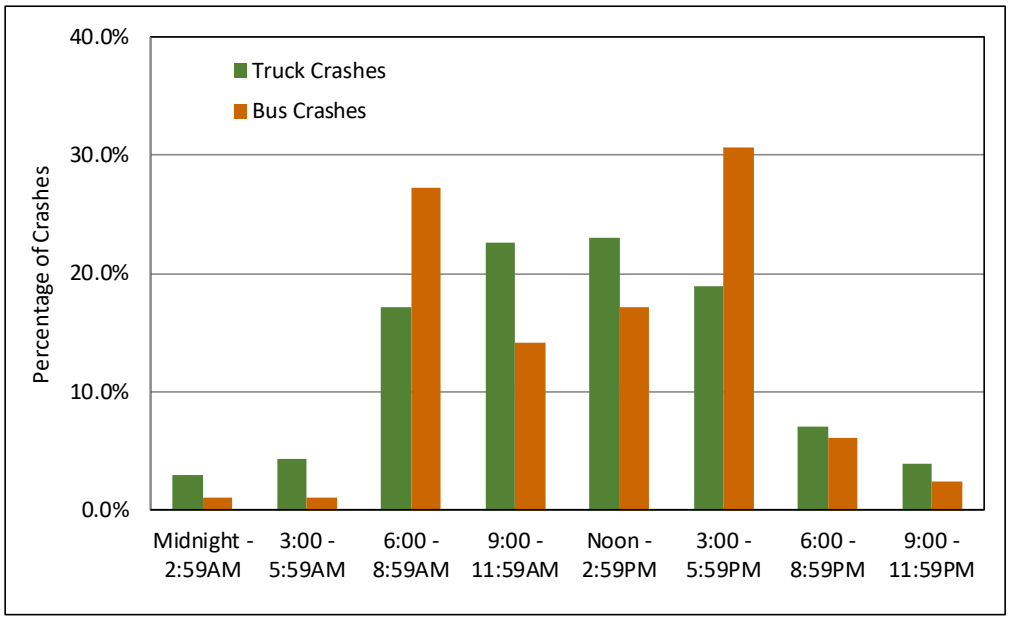

Figure 21 – Time of Day Distributions for Truck Crashes vs. Bus Crashes, 2015-2019

10.0 Summary

From 2015-2019, an average of about 13,472 crashes involving a commercial motor vehicle (CMV) took place annually in Michigan. Of the five years, 2019 had the highest CMV crash total with 15,798 crashes. Each year an average of about 440 people received fatal (K) or suspected serious (A) injuries in CMV crashes, and 2018 was the highest year with 499 KA injuries in CMV crashes.

Crashes involving CMVs were compared with crashes without CMVs. CMV crashes were more likely to be same direction sideswipes and less likely to be single-vehicle crashes, compared with non-CMV crashes. CMV crashes were more likely to take place during daylight than non-CMV crashes. Little difference was observed in road conditions at the time of the crash, but CMV crashes were more likely to occur on Interstates and less likely to take place on local streets, compared with non-CMV crashes.

Compared to crashes without a CMV, crashes with CMVs were more likely to occur during January and February, on weekdays, and between 7 AM and 4 PM. CMV crashes were less likely to involve alcohol compared with non-CMV crashes. When CMV crashes did involve alcohol, the CMV drivers were not usually the ones who were impaired.

Appendix

Several variables were used to distinguish vehicles that were coded “truck/bus” on Vehicle Type into large trucks versus large buses. The classification method was complicated by the fact that some variables in the Michigan crash data changed between 2015 and 2016. The following coding scheme was used:

- If crash year=2015 and Vehicle Type = truck/bus and GVWR = 10,000+ pounds and Special Vehicle ≠ bus, then vehicle = large truck.
- If crash year=2015 and Vehicle Type = truck/bus and GVWR = 10,000+ pounds and Special Vehicle = bus, then vehicle = large bus.
- If crash year=2016-2019 and Vehicle Type = truck/bus and GVWR = 10,000+ pounds and CMV Configuration = single unit or truck/trailer or bobtail or tractor/semi-trailer or tractor/double or tractor/triple or unknown heavy truck, then vehicle = large truck.
- If crash year=2016-2019 and Vehicle Type = truck/bus and GVWR = 10,000+ pounds and CMV Configuration = bus, 9-15 seats or 16+ seats, then vehicle = large bus.

Vehicles that did not meet any of the above coding classifications remained as general CMVs. Some of these are probably large trucks or buses with unknown or errant code values. Others are likely other types of vehicles that carry passengers, like limousines, or that have hazardous materials placards, which would include a variety of vehicle types. No further classification of the general CMV group was attempted.