Safety Implications of Truck Regulations: Speed Limitations and Right Lane Only Operations

MID-AMERICA FREIGHT COALITION

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About the Mid-America Freight Coalition (MAFC)

The industries and farms of the Mid-America region can compete in the marketplace only if their products can move reliably, safely and at reasonable cost to market.

State Departments of Transportation play an important role in providing the infrastructure that facilitates movement of the growing amount of freight. The Mid-America Freight Coalition was created to support the 10 states of the Mid America Association of State Transportation Officials (MAASTO) region in their freight planning, freight research needs and in support of multi-state collaboration across the region.

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Photo credits
Top: Accuweather, Multiple truck pileup, I-80, Iowa
Bottom (middle): WTHR, Semi-truck rear-end crash, I-70, Ohio
(right): Michigan Public, DSL sign in Michigan

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1. INTRODUCTION

Truck crashes make headlines. According to the National Safety Council [1], in 2022 large trucks accounted for:

- 9% of all vehicles involved in fatal crashes,
- 4% of all registered vehicles,
- 10% of total vehicle miles traveled.

Two critical factors associated with crashes on interstate freight corridors are 1) speed differentials; and 2) lane changes across traffic and truck vehicle classes. The differences in speed often result in rear-end crashes, run-off-the-road crashes, and crashes in opposing lanes. With many fleets installing speed limiters on trucks to reduce crash likelihood and severity, and lower insurance and other operational costs, the proscribed speed differentials between vehicle classes may create additional hazards. Additionally, increased lane changes across traffic may be induced not only by speed differentials between vehicle classes, but also left-lane restrictions for large trucks as passenger vehicles look to avoid slower traffic in the right lane.

There are diverse expectations with the implementation of speed limiters on trucks. According to OOIDA President Todd Spencer, “The physics is straightforward – limiting trucks to speeds below the flow of traffic increases interactions between vehicles and leads to more crashes.” The same article in LANDLINE magazine suggests speed limiters (SLs) on large trucks have been proven to create unnecessary congestion and dangerous speed differentials between cars and trucks [2].

Proponents of speed limiters for large trucks suggest the lower speeds help keep trucks from slowing down the faster traffic streams, thus reducing conflicts and crashes. A 2012 research effort by USDOT found that [3]: ‘The positive findings in this study were consistent with the bulk of the literature on this topic indicating significant safety benefits associated with speed reduction which can be achieved through the implementation of SLs. Domain research on the potential downside of speed deviations among vehicles that could occur due to the interaction of SL equipped vehicles and those without SLs seems to be far outweighed by the significant safety benefits associated with a reduction in absolute speed afforded by SLs.’

Like speed limiters on large trucks, right lane limitations are also intended to reduce conflict by keeping large trucks in the right lane to allow for faster traffic in the left or passing lane. In congested areas, drivers may be impacted by a barrier or curtain effect of multiple trucks blocking exits or entrances to the facility due to their presence in the right lane. The limitations may also result in additional lane changes and increased potential conflicts for passenger vehicles attempting to avoid right lane slowdowns. According to a 2009 study examining the safety issues with right lane truck restrictions, the impact of the regulation differed based on the traffic volume on the facility. Roadway sections with less than 10,000 vehicles per day had fewer crashes than statistically expected. However, those sections with more than 10,000 vehicles per day exhibited statistically significant accident rates that were greater than expected [4].

Objectives

Implementation of speed limitations for large trucks has been approached in two ways. First, federal legislation enacting a 65- or 68-mile-per-hour truck speed limit has been proposed several times over the last 25 years. Second, absent legal requirements, companies with larger fleets have independently adopted varying levels of speed restrictions for safety and cost savings when operating in certain regions. Right lane restrictions are common in many states, and the experience and data has demonstrated the impact of a lane restriction is dependent upon traffic volume. Within the MAASTO region, Indiana and Michigan follow lower truck speed limits (versus other vehicles) on freeways statewide, with both states using 65 mph limits for trucks versus 70 mph or higher for cars. Indiana, Michigan, and Missouri also follow truck-specific right-lane restrictions in varying forms.

The purpose of this research is to better understand the relationship between these restrictions and safety/crashes on major freight corridors across the MAASTO region.

The following lists the objectives of this study:

- Conduct literature review of safety concerns in truck operations on multistate freight corridors with a focus on the impact of differing speed limitations and right lane restrictions.
- Review literature of industry, driver, and stakeholder perspectives on the efficacy of speed limiters and right lane restrictions.
- Provide a summary of current maximum truck speeds and right lane laws on Interstates, Toll Highways, and other divided highways in the ten MAASTO states.
- Provide a summary of most recent public data on truck crashes by type, facility, and cause for each MAASTO state.
- Determine the top 5 corridors in the MAASTO region as nominated by the technical representatives and provide a summary of truck crashes by type and cause where data is available.
- Provide a summary of MAASTO state safety professionals perspective on their experiences with speed differentials across vehicle classes and right lane restrictions.
- Based on findings, identify best practice recommendations for states to mitigate statistically significant crashes.

Provide a technical report documenting the project and findings.

Organization of the Report

The report is organized as follows:

- Chapter 2 presents an overview of existing truck regulations in the MAASTO states.
- Chapter 3 explores the arguments in favor of and against limiting truck maximum speeds, a synopsis of relevant past studies, and major voices for and against speed regulations for trucks.
- Chapter 4 explores the arguments in favor of and against truck lane restrictions, a synopsis of relevant past studies, and major voices for and against lane usage restrictions for trucks.
- Chapter 5 presents an overview of important crash-related data sources and analyzes leading causes of crashes and potential impact of speed and lane regulations on safety in the MAASTO region.
- Chapter 6 presents crash and safety analysis focused on five important freight corridors in the MAASTO region.
- Chapter 7 presents inputs from state traffic safety professionals.
- Chapter 8 summarizes the findings of this study and provides concluding remarks on potential impact of truck regulations on safety in the MAASTO region.

2. CURRENT TRUCK REGULATIONS IN MAASTO STATES

Truck speed limits

Speed limits on public roadways across the U.S., including those applicable to trucks, are established at the state level through state statutes and transportation codes. Maximum speed limits are typically established statewide, based on roadway class, and sometimes by vehicle type. Posted speed limits respect these statewide maximum speed limits but also consider other traffic engineering and safety considerations.

As of writing this report, 42 of the 50 U.S. states follow universal maximum speed limits for all vehicles, including trucks, on all major road classifications. Eight states (Arkansas, California, Idaho, Indiana, Michigan, Montana, Oregon, and Washington) have a reduced maximum speed allowance for trucks, typically for rural stretches of Interstates [5], [6]. Table 1 shows the corresponding speed limits for passenger vehicles and for trucks in states with differential maximum speed limits. In addition, the Illinois law (Illinois Vehicle Code 625 ILCS 5/11 – 601) that sets maximum speed limits for the state allows certain counties to adopt stricter maximum speed ordinances with a lower speed limit for heavy vehicles.

State	Speed Limit - Cars	Speed Limit - Trucks
Arkansas	75	70
California	70	55
Idaho	75	70
Indiana	70	65
Michigan	70	65
Montana	80	70
Oregon	65	55
Washington	70	60

Table 1: States with differential maximum speed limits for passenger vehicles and trucks (Source: [5]).

MAASTO States

Within the MAASTO states, Indiana and Michigan follow differential maximum speed limits at a statewide level, and Illinois allows certain counties to set differential maximum speed limits for trucks and other vehicles. Table 2 shows a summary of maximum speed limits for cars and trucks on rural Interstates, urban Interstates, non-Interstate limited access roads, and other roads by state for the ten MAASTO states. Figure 1 graphically displays maximum speed limits on Interstates in MAASTO states.

State	Rural Interstates		Urban Interstates	Other Limited Access Roads	Other Roads
	Cars	Trucks	All Vehicles	All Vehicles	All Vehicles
Illinois*	**70**		55	65	55
Indiana	**70**	**65**	55	60	55
Iowa	70		55	70	65
Kansas	75		75	75	65
Kentucky	65/70		65	65	55
Michigan	**70/75**	**65**	70	70	55
Minnesota	70		65	65	60
Missouri	70		60	70	65
Ohio	70		65	70	55
Wisconsin	70		70	70	55

Table 2: Maximum Speed Limits in MAASTO States (Source: [5]).

Indiana

Indiana Code § 9-21-5-2 sets maximum speed limits for roadways in the state by roadway type [7]. The maximum speed limits are set at 70 mph for rural interstates, 60 mph on designated highways with at least four lanes and with a physical barrier or dividing section between roadways moving opposite directions, 65 mph on designated INDOT freeways, and 55 mph on urban Interstates and other major roadways. Indiana also follows a differential maximum speed limit for trucks within the same code, restricting large vehicles (greater than 26,000 lbs. gross weight) to a speed of 65 mph on rural Interstates.

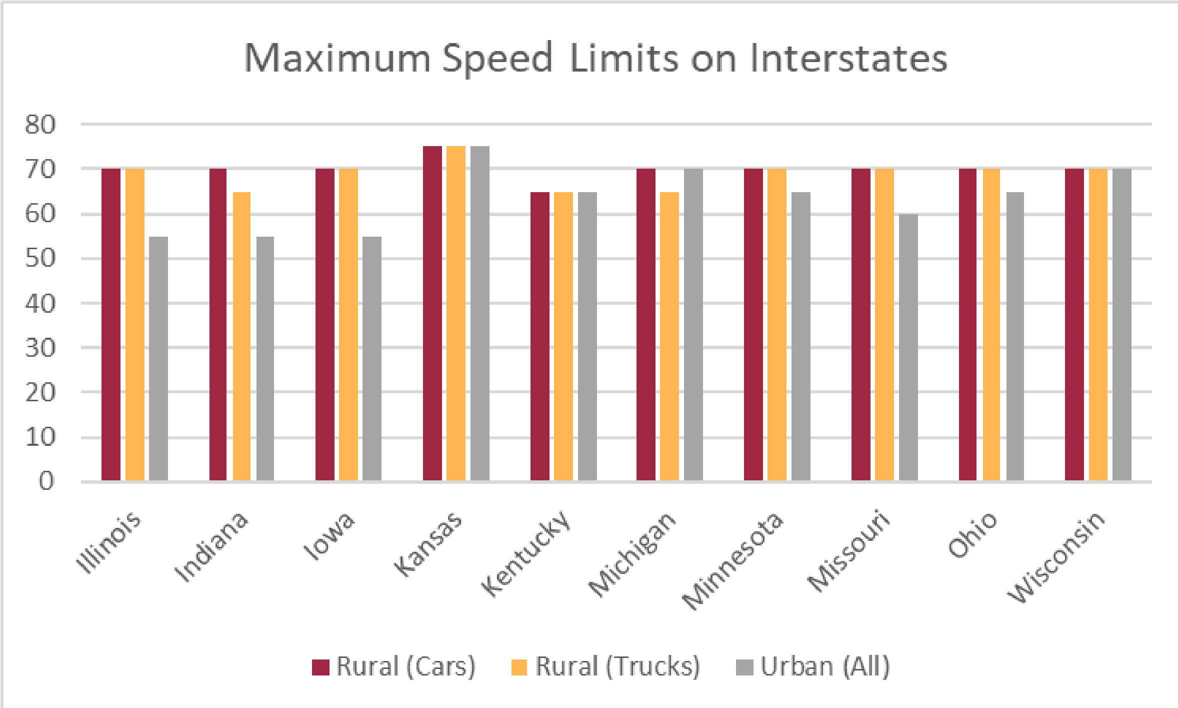

Figure 1: Maximum speed limits on Interstates in MAASTO states (Source: MAFC, using data from IIHS [5]).

Michigan

Michigan Vehicle Code MCL 257.627 states that when the posted speed limit is greater than 65 mph, an individual operating a truck with a gross weight of 10,000 lbs. or more, truck-tractor, or a truck-tractor with a semi-trailer or trailer shall not exceed a speed of 65 mph on any limited access or state highway [8]. For contrast, the maximum speed limits on urban interstates in Michigan are typically set to 70 mph with a few designated Interstates allowing a maximum speed of 75 mph. Figure 2 shows an example of a differential speed limit sign used in Michigan.

Illinois

Illinois Vehicle Code 625 ILCS 5/11 – 601 sets the maximum speed limit at 70 mph for all rural Interstates, 65 mph for designated limited access highways with at least 4 lanes of traffic and with a separation between roadways moving in opposite directions, and 55 mph for all other roads [9]. These are applicable to all vehicles, including trucks.

Within the same code, the counties of Cook, DuPage, Kane, Lake, Madison, McHenry, St. Clair and Will are allowed to adopt ordinances setting a maximum speed limit lower that the limits mentioned above. The counties of Cook, DuPage, Kane, Lake, McHenry, and Will currently have ordinances that set the maximum speed limit for heavy vehicles (gross weight greater than 8,000 pounds) lower than those for other vehicles at 60 mph for rural Interstate highways and 55 mph for other roads.

Figure 2: A differential speed limit sign in Michigan (photo credit: Fox 17).

Truck lane restrictions

While the use of left lanes by trucks is typically not prohibited, most states regulate the use of left lanes for either all vehicle classes, or specifically for trucks [10].

MAASTO States

State	Lane Regulations	Applicability	Fines	Code
Illinois	Avoid left lane	All Vehicles	Up to $1000	§625-5/11-701(d) & (e)
Indiana	Must use far right (or right two if 3+ total lanes)	Trucks	Up to $500	§9-21-8-12 et seq.; 34-28-5-4
Iowa	Right lane only	All Vehicles	$100	§321-297(2)
Kansas	Right lane only in rural. Left restricted if 3+ lanes.	All Vehicles	$75	§8-1522(c); 8-2118
Kentucky	Left lane restricted	All Vehicles	$20 - $100	§189.340(7); 189.990(1)
Michigan	Right two lanes only for 3+ lane highways	Trucks	Up to $250	§257.634(3); 257.907(3)
Minnesota	Slow vehicles on right only	All Vehicles	Up to $300	§169.18(10); 169.89
Missouri	No left lane in urban 3+ lane roadways	Trucks	By location	§304.015(7-9)
Ohio	Slow vehicles on right	All Vehicles	Varies	§4511.25(B)
Wisconsin	Keep right on 3+ lane and when driving slow	All Vehicles	$30 - $300	§346.05; 346.17(2)

Table 3: Lane use regulations in the MAASTO states (source: [10]).

Table 3 shows the lane usage regulations and corresponding codes for each MAASTO state. Lane regulations within the region vary by state, with some states specifically requiring vehicles to avoid left lanes on multi-lane highways except for passing, and other states requiring slow vehicles to stay on right lane(s) only.

Lane usage is codified as requiring vehicles to use right lane(s) only (Figure 3a) for six states (Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin), and as left lane(s) restricted from usage (Figure 3b) for four states (Illinois, Kansas, Kentucky, and Missouri). Kansas's laws distinguish between rural and urban roadways, with the lane restrictions only applying to highways located outside the corporate limits of any city.

Indiana, Michigan, and Missouri are the only states in the region that codify lane regulations that differentiate between trucks and cars.

MUTCD sign R4-5 | MUTCD sign R4-3 | MUTCD sign R4-16

a. Right only | **b. Keep right / left lane restricted**

Figure 3: MUTCD signs most used for lane restrictions.

Indiana

Indiana Code § 9-21-8-12 sets lane use restrictions for trucks, stating that trucks may not be operated in any lane other than the far-right lane except when passing a slower vehicle, entering or leaving a highway, or where a special safety hazard exists requiring the use of an alternate lane. Indiana Code § 9-21-8-12 further states that the regulation is relaxed to allow use of the two far right lanes for highways consisting of at least three lanes in the direction of travel.

Michigan

Michigan Vehicle Code MCL 257.634 sets lane regulations for the state. The code specifically mentions that trucks with a gross weight over 10,000 pounds, truck tractors, and trailer / semitrailer combination trucks shall be operated only in either of the two lanes farthest to the right, except when approaching and making a left turn, or where a special safety hazard requires the use of an alternate lane.

Missouri

Missouri Code §304.015-7 notes that all trucks registered for a gross weight more than 48,000 pounds shall not be driven in the far-left lane on all urban Interstate highways, freeways, and expressways with three or more lanes of traffic in the direction of travel.

3. SPEED RESTRICTIONS – PERSPECTIVES

Truck speed restrictions are discussed primarily through two forms of implementation: differential speed limits and speed governors or limiters.

Differential Speed Limits (DSL) refers to a regulatory application where a lower maximum speed is posted for trucks than for passenger vehicles. This contrasts with the more frequent scenario where states institute a single maximum speed limit that applies to all vehicle classes, referred to as Universal Speed Limits (USL). DSL is in practice in several locations within the U.S., typically applied along rural interstate roadways and usually setting a truck speed limit that is 5 mph – 10 mph lower than the posted speed limit for passenger vehicles.

The other truck speed restriction mechanisms are Truck Speed Governors. These are electronic speed limiter devices built into truck throttle control system that electronically and/or physically prevent a vehicle from exceeding a preset speed limit.

Considerations and Factors

The primary argument in favor of reduced truck speeds is centered at the reasoning that lower speeds result in lower kinetic energy of a heavy moving vehicle, which allows for shorter stopping distances. Kinetic energy of trucks is relevant, due to their heavy weights, in contributing to the severity of accidents when they do happen. Larger kinetic energy translates to stronger impacts and increases potential for damage and injury. Reduced speeds are extremely effective at reducing the kinetic energy of the vehicle (energy is proportional to the square of velocity).

$$E_k = \frac{1}{2}mv^2$$

Similarly, assuming comparable braking (deceleration rate), the stopping distance for a slower moving vehicle is much smaller. A shorter stopping distance is expected to reduce the likelihood of accidents involving trucks rear-ending a vehicle in front of it.

$$d = v * t_{react} + v^2/2b$$

Secondary benefits associated with lower truck speed limits include reduced pavement and structure wear and tear, and potentially improved fuel economy for trucks.

The primary argument against DSL is that it creates increased interactions (overtaking, lane changing etc.) between passenger vehicles and slower moving trucks due to higher variance in speed. These can increase likelihood of rear-end and sideswipe collisions.

In addition, lower truck speed limits can create bottlenecks around their slower moving vehicles and can lead to artificially created congestion in right lanes, increase driver impatience, potentially cause increased aggression in driving behavior, and lead to increased emissions due to the moving bottlenecks.

Studies

FHWA Study, 2005

An FHWA study completed in 2004 [11] was an early effort to assess the safety impacts of differential speed limits on rural Interstate highways compared to universal speed limits. The study was conducted by the Virginia Transportation Research Center. While researchers had explored the safety impact of differential speed limits in previous years, they had been severely limited in data availability. This study analyzed speed and crash data from nine states representing the four policy groups with regards to DSL or USL adoption during the 1990s. This included three states where USL was maintained through the decade (Arizona, Iowa, and North Carolina), three states where DSL was maintained through the decade (Illinois, Indiana, and Washington), two states that switched from USL to DSL (Arkansas, and Idaho), and one state that switched from DSL to USL in the 1990s (Virginia). The study noted that the data analysis could not isolate or measure the effect of USL/DSL changes. While the computed ratio of actual crashes to predicted crashes if a switch had not been implemented showed an increase in crashes in Virginia (switched from DSL to USL change) compared to Arkansas (switched from USL to DSL), it was lower than for Idaho (also switched from USL to DSL). As a result, the study concluded that no consistent safety effects of DSL, as opposed to USL, were observed within the scope of the study.

University of Arkansas, 2005

University of Arkansas performed a cost / benefit analysis of large truck speed limit differentials on rural interstate highways for USDOT in 2005 [12]. The study used information from past studies, empirical speed and safety data from four highways, and survey results collected for the study to perform cost / benefit analysis for DSL. On the impact of DSL on safety, the researchers concluded that there is not enough evidence to suggest that DSL implementation reduces crash rates long term. They did, however, conclude that accident severity is impacted by speeds and lower truck speeds could potentially reduce number of fatalities even if crash rates remain unaffected. Interestingly, the study noted that a majority of their survey responders believed that DSL and speed limiters can increase driver fatigue and increases wage expenses for drivers due to the longer total transit time.

FMCSA, 2008

An FMCSA conducted study from 2008 considered the impact of speed limiters for trucks and buses using a range of data including surveys sent to truck and charter / intercity bus carriers [13].

The study reported that 56% of survey respondents indicated that speed limiters were successful in reducing crashes, with as many as 96% indicating that speed limiters did not negatively impact safety or productivity. The study also noted that 44% of respondents believed speed limiters were effective at reducing tire wear and 76% believed limiters improved fuel economy. However, the responders also strongly believed that a side effect of speed limiter usage was drivers would drive faster in zones marked below the speed limiter maximum set speed to compensate for slower travel along highway segments where the limiter was active.

Other Studies

The Louisiana Transportation Research Center developed a technical report in 2017 synthesizing and summarizing literature on implications of DSL on safety [14]. This is a useful report for anyone looking for a list of studies and their findings on the impact of DSL. The technical report shows that while there have been many studies on the subject, the conclusions have largely varied. Most studies have been inconclusive in determining whether DSL has an impact on crash frequency and severity, with some studies finding that DSL could reduce crashes as well as crash severity. The conclusions drawn on the impact on speed and speed variance have been mixed with multiple studies finding better conditions with USLs and others finding improvements with DSLs.

Speed limiters were implemented in Ontario, Canada in 2009, mandating large trucks (>26,000 pounds) to use speed limiters set to a maximum of 65 mph, with older vehicles and buses being exempt. Studies by the Road Safety Research Office of Ontario Ministry of Transportation found that in a two-year period post implementation, the number of at-fault speed collisions relative to at-fault driver actions reduced by as much as 73% for large truck drivers, and 30% for other drivers. The study also found no evidence of change in proportion of large truck drivers being rear-ended either by trucks or by other vehicles.

Stakeholder Perspectives

OOIDA

One of the strongest detractors for speed limiters for trucks has been the Owner-Operator Independent Drivers Association (OOIDA) [15], [16]. OOIDA is a non-profit organization representing interests of more than 150,000 owner-operators and independent truck drivers across the country. OOIDA and its research arm, the OOIDA Foundation (OOFI) voiced strong opposition to speed limiter regulations that were being proposed in 2016 by NHTSA and FMCSA. The group also strongly supported and cheered the 2025 Deregulating Restrictions on Interstate Vehicles and Eighteen-Wheelers (DRIVE) Act [17], [18], [19], [20].

OOIDA’s chief arguments in opposition to speed limiters and DSL can be summarized as:

- The safety impact of speed limiters and DSLs are not significant, and studies have been inconclusive in finding a positive impact on safety.
- DSLs and speed limiters result in creating a higher speed variance between trucks and cars, thus creating more turbulence in overall traffic flow. This can lead to more truck-car interactions that increase the number of lane changes and sudden braking, thus increasing truck-car crash likelihoods.

- Speed limiters are too rudimentary as a safety tool as risky driving speeds are highly related to driving conditions and often occur at speeds much lower than a speed limiters or DSL truck speed.
- It would be more beneficial to discourage unsafe driving through improved driver training efforts, apprenticeship programs, better enforcement of existing speed laws, and discouraging driver compensation based on miles driven or loads hauled.

American Trucking Association

The American Trucking Association has a moderate stance on speed limiters, showing support for implementation of speed limiters but strongly opposing a limiter set at speeds under 65 mph [21], [22]. The ATA's official position prior to 2019 was to support speed limiters set to 65 mph universally. This was updated in 2019 based on technological advancements, and ATA's position formally was updated to support 70 mph limiters for trucks equipped with Automatic Emergency Braking and Adaptive Cruise Control, and 65 mph limiters for trucks not equipped with the above safety features. ATA's position is determined collectively by its member organizations (made up of 120 small, medium, and large carriers).

Safety Advocacy Groups

Road Safe America and Institute for Safer Trucking

The Institute for Safer Trucking, a nonprofit organization committed to reducing crashes, injuries, and fatalities involving trucks, and Road Safe America, a nonprofit organization promoting road safety founded by the parents of Cullum Owings, are a collective voice championing truck safety [23]. Cullum Owings lost his life when a speeding tractor trailer crashed into his vehicle, inattentive to traffic ahead that had slowed to a crawl. The speed limiter bill introduced in Congress in 2021 was named after Cullum. Road Safe America and The Institute for Safer Trucking are leading voices in support of speed limiters, listing federal adoption of speed limiters as their top priority.

Truck Safety Coalition

The Truck Safety Coalition (TSC) is a partnership between Citizens for Reliable and Safe Highways (CRASH, or The CRASH Foundation), and Parents Against Tired Truckers (PATT). The TSC is a coalition dedicated to reducing number of deaths and injuries caused by truck-related crashes. The TSC is a vocal supporter of speed limiters [24].

Trucking Associations

The Trucking Alliance

The Trucking Alliance, also known as The Alliance for Driver Safety and Security, is a nonpartisan coalition of freight, logistics, and supporting businesses [25]. They are a restricted membership coalition of ten freight transportation companies, collectively employing more than 103,000 employees, operating 72,000 trucks, and 348,000 trailers and shipping containers. The trucking alliance is an advocacy group for increasing safety through legislation, regulations, training and technology. The Trucking Alliance is a strong proponent for speed limiters and has openly opposed the DRIVE Act [26].

Truckload Carriers Association

The Truckload Carriers Association (TCA) is a trade association focused on the truckload industry, representing dry van, refrigerated, flatbed, tanker, and intermodal container carriers operating throughout North America [27]. TCA represents operators of over 220,000 trucks, collectively producing revenue of over $40 billion in annual truckload revenue, roughly 78% of freight market share by revenue. TCA announced support for truck limiter legislation in 2019 when the bill was introduced [28], stating that speed limiters will positively impact safety and that most of TCA's membership have already adopted speed limiters in addition to other safety technologies.

Position on truck speed restrictions		
Opponents	**Proponents**	**Conditional Support**
OOIDA	Road Safe America	ATA
	Truck Safety Coalition	
	The Trucking Alliance	
	TCA	

Table 4: Representative sample of actors and entities in support of, or opposed to implementation of truck speed limiters.

4. LANE RESTRICTIONS – PERSPECTIVES

Truck lane restrictions (TLRs) are lane usage rules specifically designed for trucks. These typically exist in the form of left-lane prohibition or right lane only usage laws and can apply to trucks either by vehicle and axle configuration or by gross weight. Truck lane restrictions can also be applied specific to a location, time-of-day, or for work zones. For the purposes of this study, only statewide universal truck lane restrictions are considered.

Considerations and Factors

Proponents of truck lane restriction laws believe that TLRs improve traffic flow by segregating slower moving trucks from faster moving passenger vehicles and reducing interactions between vehicles with varying speeds. Further, TLRs are believed by their proponents to also improve safety by reducing interactions and lane changes involving trucks and passenger vehicles, thus also reducing risk of collisions. Larger blind spots and longer braking distances for trucks are believed to be key safety concerns that lead to truck-passenger vehicle collisions, especially during lane-changing interactions.

TLR supporters also argue that lane restrictions help in better managing pavement wear and tear by restricting wear and tear from trucks to right lanes. This is debatable, as opponents argue concentrating trucks onto right lanes would accelerate pavement damage in those lanes.

Primary arguments against TLRs are that such lane restrictions can create a barrier effect through forced separation between trucks and other vehicles. These barriers can lead to more dangerous interactions between trucks and other vehicles, such as during merging and diverging maneuvers (such as on- and off-ramps) and during lane changing. The barrier effect can thus be detrimental to roadway safety and can potentially increase both crash rates and fatality rates, exacerbated by potential speed differentials between vehicle types.

Another key consideration in opposition to TLRs is that restricting trucks to right lanes can constrain roadway capacity and thus artificially create congestion in locations with high truck volumes.

Studies

Virginia Transportation Research Council, 2009

The Virginia Transportation Research Council investigated the impact of truck lane restrictions in Virginia [4]. The study specifically focused on assessing the impact of two Virginia lane restriction laws. The first law restricts trucks from traveling in the leftmost lane of Interstates with three or more lanes in each direction, while the second restricts trucks from traveling in the left lane of two-lane directional Interstate segments when their speed is below the posted speed limit. The study found that Virginia truck lane restrictions had mixed impacts on safety. While safety was enhanced on low-volume roads with AADT lower than 10,000 vehicles per day per lane (reducing crashes by 23%), it was degraded on high-volume roads (crashes 27% higher than expected).

Texas A&M Paper, 2019

Researchers from Texas A&M investigated the safety efficacy of truck lane restrictions in Texas urban corridors [29]. The study evaluated TLRs implemented at 16 locations in the Dallas-Fort Worth area that prohibited semi-trucks from using the leftmost freeway lane except in passing or emergency maneuvers. The study found that the TLRs had an overall positive safety impact, with lower rates of large trucks involved fatal and injury crashes on six-lane urban roadways. Ten of the 16 sites studied showed a reduction in fatal and injury-causing crashes involving large trucks. The reported improvement was as high as a 60% reduction on one of the sections studied, with two other sections also showing 56% reduction in such crashes.

Stakeholder Perspectives

OOIDA

Like its stance on speed limiters, OOIDA strongly opposes all restrictive truck lane policies [30]. This includes left-lane bans. OOIDA's opinion about truck lane restrictions is that lane restrictions ultimately decrease safety by creating barrier effects that lead to dangerous merging, diverging, and lane changing. Citing multiple studies that found safety might in fact be compromised with TLRs, OOIDA believes that crash and fatality rates might increase when TLRs are imposed and when lane usage permissions are differentiated by vehicle class. In addition to questioning the safety benefits of TLRs, OOIDA also believes TLRs lead to adverse impacts on the pavement.

State DOTs

Multiple State DOTs and State Patrol / Law Enforcement agencies advocate for lane restrictions to improve highway safety [31]. They believe that TLRs can promote safety traffic flow and have explored implementing various TLRs by introducing state left lane ban bills. Specifically, Arizona, New Jersey, New York, and Michigan are all considering bills to restrict use of left lanes by trucks. While Michigan law already requires large trucks (>10,000 pounds) to stay in the two right lanes, lawmakers believe the rule needs an update to clarify enforcement of the lane restriction and to clearly ban large trucks from using the furthest left lane on freeways with three or more lanes in the direction of travel.

5. TRUCK CRASH DATA ANALYSIS

In this section, we first introduce the data sources used for safety analysis performed in the study. This is followed by a summary discussion of how data from the various sources were aggregated. Finally, the section presents an analysis of truck safety data for the MAASTO region with a focus on CMV-involved crashes on Interstate roadways.

Data Sources

This study primarily considers four sets of safety data, obtained through a combination of sources including the National Highway Traffic Safety Administration (NHTSA), the Federal Motor Carrier Safety Administration (FMCSA), and State DOT crash reporting sources. This subsection introduces the main databases used for safety analysis through the rest of the report.

Fatality Analysis Reporting System (FARS) - NHTSA

NHTSA created the Fatality Analysis Reporting System (FARS) as a nationwide census for collecting and reporting yearly data on fatal injuries suffered in motor vehicle traffic crashes [32]. Operational since 1975, FARS provides a tool for measuring highway safety, and for providing an objective basis to evaluate the effectiveness of motor vehicle safety standards and highway safety programs. Crashes involving motor vehicles operating on public roadways are included in the FARS database if they result in the death of a person within 30 days of the crash [33]. FARS data is collected through cooperative agreements between NHTSA and each of the 50 states, the District of Columbia, and Puerto Rico.

The FARS database is organized through thirty data files that cover coded and descriptive information (over 140 data elements) covering various aspects including crash characteristics, vehicles involved in the crash, all people involved in the crash including motorists and non-motorists, factors affecting the crash, events leading to the crash, and environmental conditions. Information across the datafiles is linked through key data element IDs such as event number, vehicle number, and person number. Data collected within FARS does not include any personal identifying information such as names, addresses, or social security numbers.

The FARS dataset, while limited to accidents that result in fatalities, is an extremely useful tool for safety analysis. This is primarily due to the dataset being designed as a census of all fatal motorway accidents (as opposed to sampling), and due to reliably accurate geospatial data recording. While the database is designed to also record information on sequential events that led up to the crash, the records do not identify at-fault drivers or vehicles leading to the crash. However, there are records (though not always available) of vehicle speeds, factors that may have impaired drivers, and if any of the drivers involved were charged with violations, which can all be useful in safety analyses.

Motor Carrier Management Information System (MCMIS) – FMCSA

The Motor Carrier Management Information System (MCMIS) is an FMCSA database for tracking safety data specific to commercial motor carriers (including trucks and buses) [34]. This includes all motor carriers with USDOT numbers. The database contains a census of all crashes across the nation that resulted in either a tow-away, injury, or fatality. The MCMIS data does not include any driver data due to privacy concerns.

Each crash in the MCMIS is recorded through 59 codified fields covering information on location of crash, vehicle classification and GVWR, road surface, weather, and visibility conditions, description of the crash, and resulting towing, injuries, and fatalities. While being a census record of crashes, the MCMIS carries fewer information fields compared to CRSS and FARS, and has limited geocoding precision.

Crash Report Sampling System (CRSS) – NHTSA

In addition to FARS, NHTSA also maintains the Crash Report Sampling System (CRSS) [35]. CRSS is a repository consisting of samples of police-reported crashes involving motor vehicles, pedestrians, and cyclists, ranging from property-damage-only incidents to incidents resulting in fatalities [36]. Data for the CRSS is obtained from a nationally representative probability sample.

Police crash reports are selected from 60 areas across the country that are representative of geographies, populations, miles driven, and crash distributions in the U.S. Randomly sampled (by CRSS samplers) crash reports are used to populate the database. The CRSS report sample is compiled in multiple stages to produce a nationally representative probability sample. This involves a process of grouping U.S. counties into sampling units based on geography and demographic adjacencies. The sampling unit is stratified into tiers by census regions, vehicle miles traveled, number of crashes, and road miles using a probability proportional sampling method. For each stratum, a systematic sampling method is then used to select the police crash report sample. The sampling is done using a target sample percentage rate for each of nine crash sampling stratification defined in CRSS (such as: crashes with killed or injured pedestrians, crashes with killed or injured motorcycle or moped occupants, crashes involving medium or heavy truck or bus, and passenger vehicle crashes with no injured occupant). The final reported sample is made up of roughly 50,000 police crash reports with each record reported along with a sampling rate that can be used to estimate total population of crashes from reported samples. Only data reported in the sampled crash reports are used in CRSS. Data on each crash includes approximately 120 coded data elements made available through a total of 28 data files. Data collected within CRSS does not include any personal identifying information such as names, addresses, or social security numbers.

Highway Safety Information System

The Highway Safety Information System (HSIS) is a linked multistate database of state crash records, roadway inventory, and traffic volumes [37]. The HSIS is maintained by FHWA and retains data from a selection of participating states that are deemed to have high levels of quality and detail in their data collection processes. This currently includes three MAASTO states (Illinois, Minnesota, and Ohio), and four other states (California, Maine, North Carolina, and Washington). Michigan and Utah have also been included in the past. Raw data for the HSIS is collected on an annual basis from the participating State DOTs, converted into a common format, and analyzed for anomalies that are documented when found.

The HSIS, where available, provides a comprehensive source for all crashes (including non-fatal crashes, and occasionally near-crashes) that can be integrated directly with roadway inventory and traffic volume data, thus providing a more holistic source compared to other safety databases.

State	Source	Notes / Owner Agency
Illinois	Illinois HSIS https://highways.dot.gov/sites/fhwa.dot.gov/files/FHWA-HRT-24-114.pdf	HSIS
Indiana*	https://www.in.gov/cji/research/crash-statistics/#CrashDataRequestsKentucky	Indiana Criminal Justice Institute
Iowa	Iowa Crash Analysis Tool https://icat.iowadot.gov/	Iowa DOT
Kansas	https://www.ksdot.gov/about/our-organization/divisions/transportation-safety/safety-data https://www.kansas.gov/khp-crashlogs/search.do	Kansas DOT
Kentucky	Kentucky Traffic Safety Data Services https://ktsds.ktc.uky.edu/	Kentucky Transportation Center
Michigan	Michigan Traffic Crash Analysis Tool https://www.michigan.gov/msp/divisions/cjic/traffic-crash-reporting-unit/michigan-traffic-crash-analysis-tool	Michigan State Police
Minnesota*	Minnesota HSIS https://www.dot.mn.gov/trafficeng/safety/crashdata.html	HSIS
Missouri	Missouri Stars_Crashes MapServer mshp.dps.missouri.gov/arcgis/rest/services/STARS_CRASHES/MapServer	Missouri State Highway Patrol
Ohio	Ohio HSIS https://highways.dot.gov/media/32351	HSIS
Wisconsin	Wisconsin DT4000 Crash Data https://transportal.cee.wisc.edu/services/crash-data/	WisTransPortal

Table 5: State crash reporting data sources for MAASTO states (compiled: MAFC).

State Crash Report Databases

In addition to the MAASTO states covered under HSIS, state crash report data was also obtained from six additional MAASTO states (Iowa, Kansas, Kentucky, Michigan, Missouri, and Wisconsin). These states maintain crash reporting data in a very similar way to the HSIS guidelines, though the precise formatting and quality differs by state. Table 5 summarizes the state crash reporting data sources for each of the ten MAASTO state (including HSIS sources).

Data Aggregation Across Sources

The FARS, MCMIS, and CRSS systems each have strengths and shortcomings to be aware of when using them for analysis, ranging from the completeness of crash records (census vs. sampling) to details on factors and events leading to the accident and precision of geolocation fields. To be able to integrate sources with each other, data validation checks were performed on the three databases for the MAASTO region, checking to make sure the number of reported crashes and fatalities are within reasonable levels of consistency between the sources. For these analyses, FARS data was considered the most reliable source due to its high quality in reporting. Figure 4 shows results from one such cross-validation process, comparing reported fatal crashes for 2023 by state from the FARS and MCMIS systems. Similarly, Figure 5 shows results from a cross-validation between FARS and MCMIS data using vehicle-configuration as the compared field.

A rule-based record linkage was also developed to connect individual FARS fatal large-truck crashes to MCMIS records using (1) state, (2) crash date and minute-level time proximity, and (3) normalized route tokens extracted from roadway-name fields and LOCATION text. Under the applied structure, 3,998 FARS fatal large-truck crashes were linked to MCMIS while 793 remained unmatched.

Cross-validation between FARS and CRSS was more challenging due to the nature of the sampling process used for CRSS data and the differences in geographical reporting. Figure 6 shows comparisons between CRSS and FARS reported manner of collision for fatal crashes in the region. Specifically, the largest discrepancy is observed between the fraction of crashes reported as same direction sideswipes and as front-to-front crashes in FARS and in CRSS. Manner of collision is used to classify the manner in which two (or more) motor vehicles first came in contact leading to the collision. The field is classified as “Not a collision with a Motor Vehicle In-Transport” for cases where the collision was either between a moving vehicle and a stationary vehicle, or between a moving vehicle and a stationary object (such as barriers). Other classifications used are: “Front-to-rear” for rear-end crashes, “Front-to-front” for head-on collisions, “Angle” for front-to-side collisions or angle swipes, “Sideswipe” for grazing / side-to-side collisions (further distinguished as “Same” or “Opposite” direction based on approach directions for the vehicles involved), and an “Other” category when manner of collision was not reported.

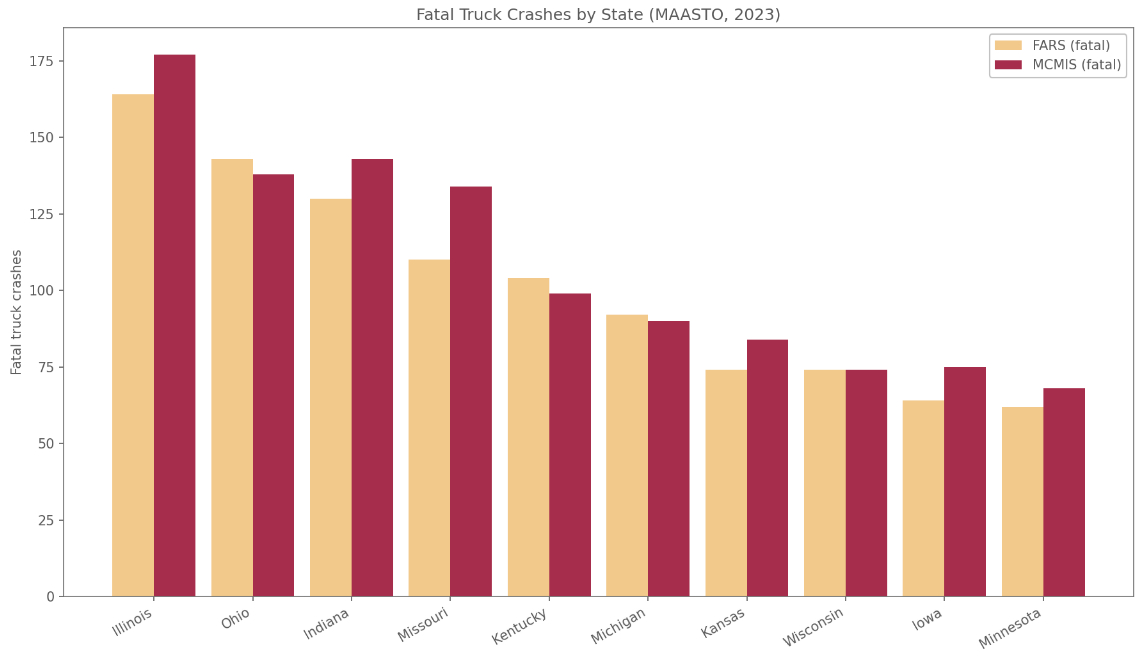

Figure 4: Cross validation of FARS and MCMIS data for the region using number of fatal crashes (Source: MAFC using FARS [32], and MCMIS [34] data).

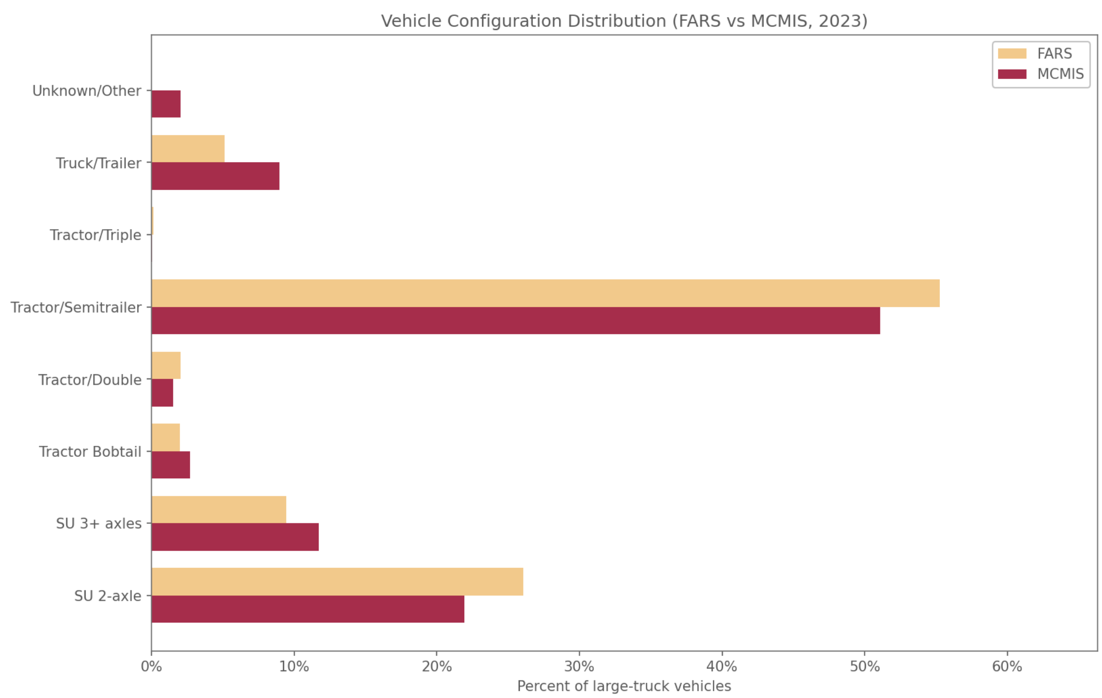

Figure 5: Cross validation of FARS and MCMIS data for the region using vehicle configuration distribution for CMV-involved fatal crashes (Source: MAFC using FARS [32], and MCMIS [34] data).

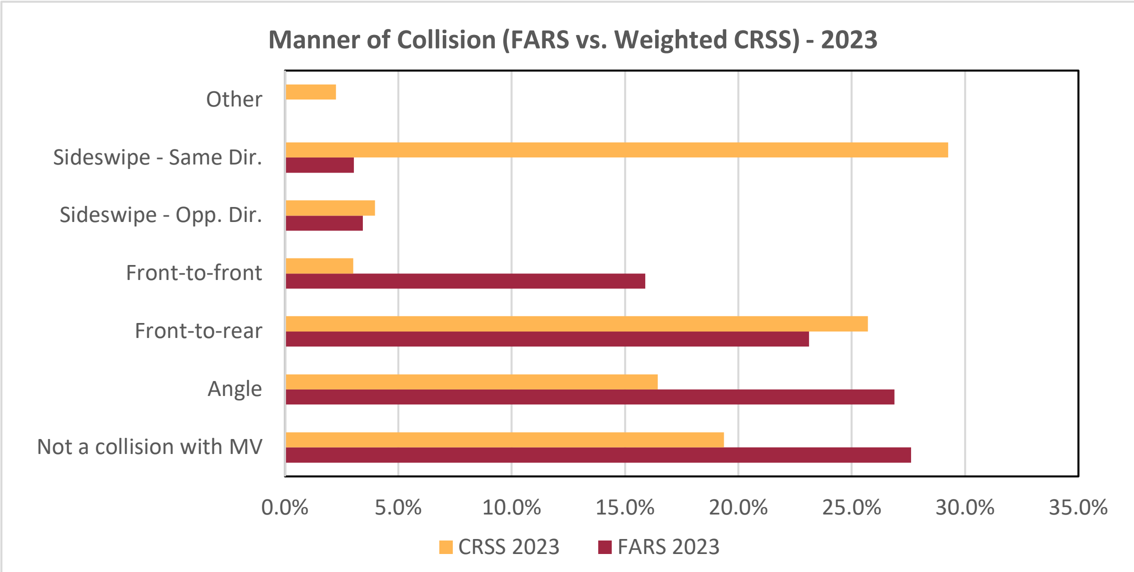

Figure 6: Cross validation of FARS and CRSS data for the region using manner of collision (Source: MAFC using FARS [32], and CRSS [35] data).

CMV Related Accidents – MAASTO Focus

This subsection presents an analysis of CMV related crashes in the MAASTO region. For a substantial portion of the analysis, data from a six-year period (2018 to 2023) is used. 2023 was the most recent available year for safety data being available in the FARS and CRSS systems. The starting year was chosen as 2018 to capture pre-COVID patterns and be able to identify and isolate any pandemic related trends if observed. Further, prior years (2017 and earlier) also had considerable differences in FARS and CRSS data reporting formats (such as differences in reported fields and field coding).

Figure 7 shows the trend of fatalities resulting from incidents and crashes involving CMVs on MAASTO interstates over the past six years (from 2018 to 2023) by state. The figure shows an almost consistent increasing trend in number of fatalities across the region over the years, although it is not clear as a trend in some states. This is not unexpected, as truck volumes and truck vehicle miles traveled have also increased over the last six years. Interestingly, when compared with 2022, 2023 reported a significant decline in fatalities associated with CMVs. Over the six-year period studied, 2022 had the highest number of CMV-involved fatalities.

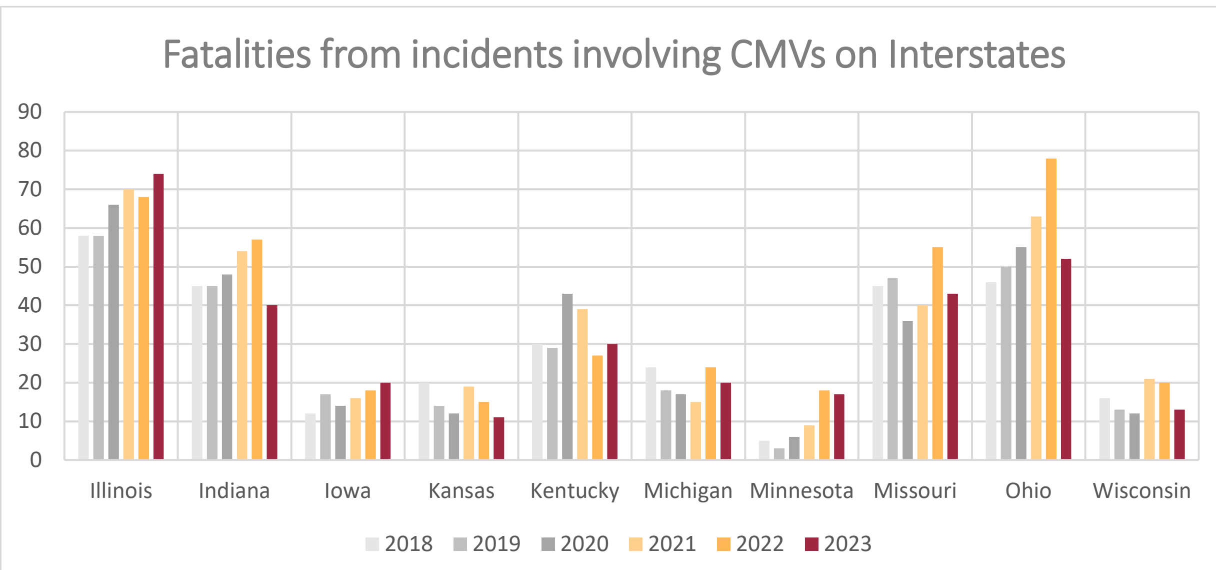

Figure 7: Fatalities from crashes involving CMVs on Interstates in the MAASTO region (source: MAFC using FARS data [32]).

In order to better understand truck safety trends independent of increases in truck volumes, the number of fatalities were normalized by total annual truck vehicle miles traveled for each state. This created a data set of CMV-related fatality rates per billion truck miles. Truck vehicle miles traveled were sourced from FHWA's annual Highway Statistics Series reports [38] for each MAASTO state. Figure 8 shows fatalities normalized by truck miles traveled, reporting number of fatalities per billion truck miles for each state for the period 2018-2023.

The figure shows that Minnesota and Wisconsin have the lowest normalized fatality rates in the region, with Illinois, Ohio, and Kentucky reporting the highest average fatality rates in the region.

The annual trends observed are not as clear as for total number of fatalities discussed earlier. While an increasing trend can be seen for a few states such as Minnesota and Ohio, and a rate spinke in Kentucky in 2020 and 2021, other states such as Indiana and Kansas show a decreasing trend of fatalities per billion truck VMTs. For most states in the region however, no specific annual trend can be observed, with fatality rates remaining largely stable over the six year period.

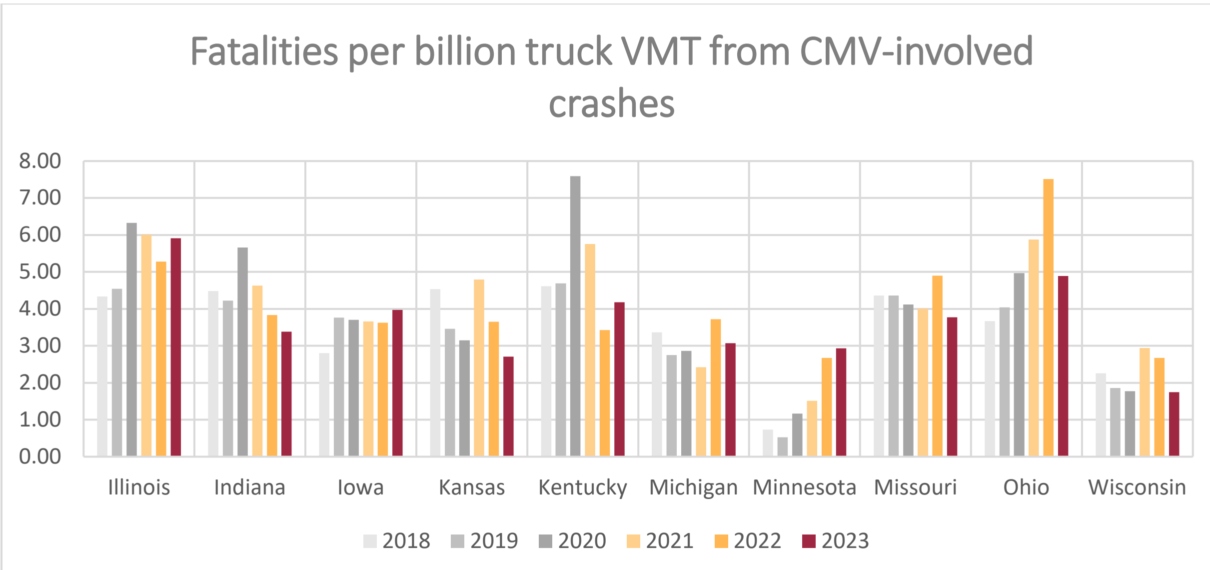

Figure 8: Fatalities from crashes involving CMVs on MAASTO Interstates normalized by truck VMT (source: MAFC using FARS data [32] on crashes and VMT data from [38]).

Figure 9 and Figure 10 map fatal crashes on MAASTO Interstates over the study period where at least one CMV was involved. Figure 9 shows crashes by year, and documents that fatal crashes are distributed across almost the entirety of Interstate Highways in the region. The heatmap in Figure 10 shows where fatal CMV-involved crashes are concentrated in the MAASTO region, given a better indication that these crashes have strong concentrations near major metropolitan areas in the region. The greatest concentration is in the Chicago area, with Louisville, Kansas City, St. Louis, Columbus, Indianapolis, and Cincinnati also displaying concentrated volumes of fatal CMV-related crashes.

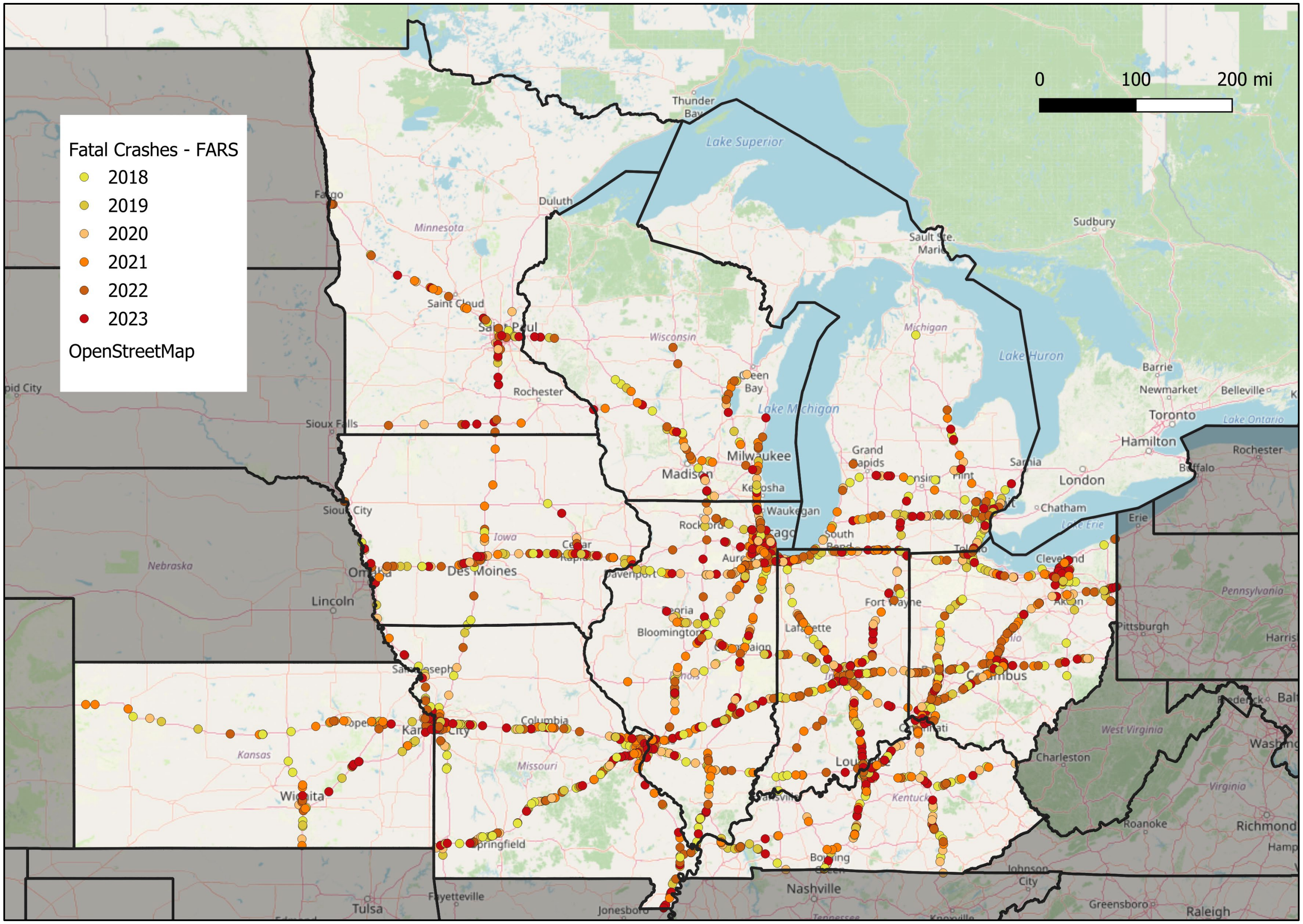

Figure 9: Fatal crashes involving CMVs on MAASTO Interstates by year (source: MAFC using FARS data [32]).

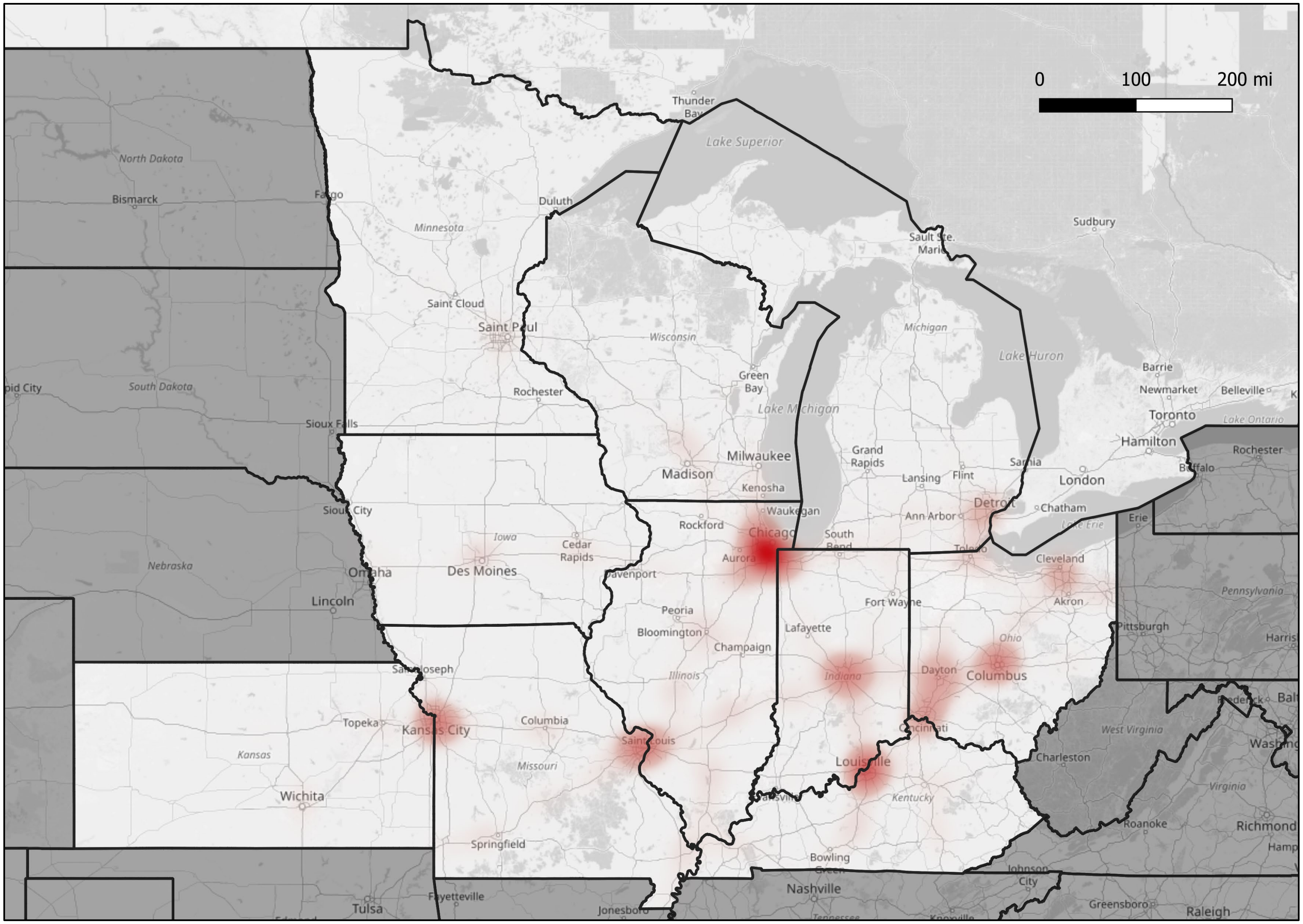

Figure 10: Heatmap of fatal crashes involving CMVs on MAASTO Interstates, 2018-2023 (source: MAFC using FARS data [32]).

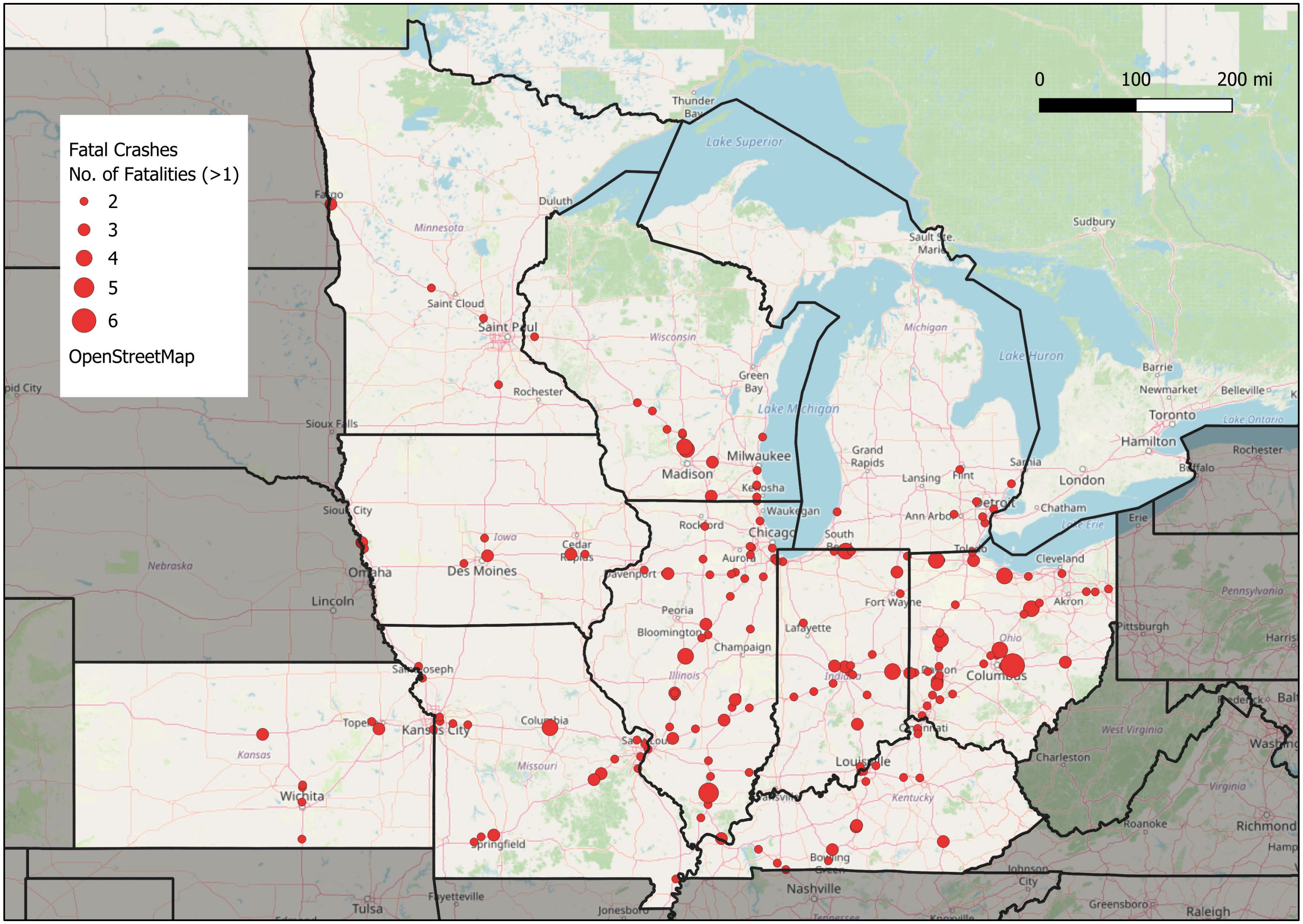

Figure 11: Number of fatalities (for instances with >1 fatality) due to CMV-involved crashes on MAASTO Interstates, 2018-2023 (source: MAFC using FARS data [32]).

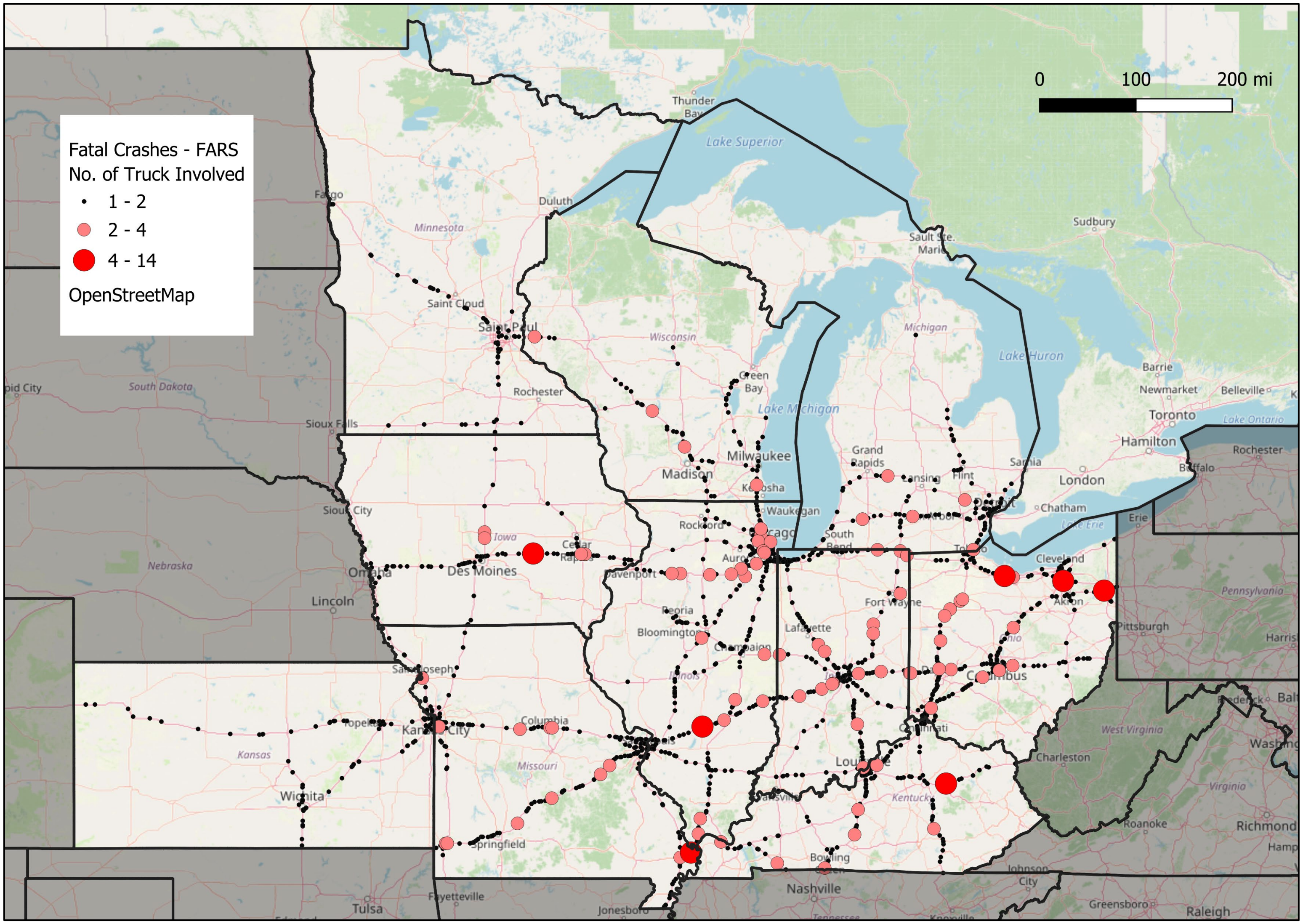

Figure 12: Fatal crashes involving CMVs on MAASTO Interstates showing number of trucks involved in crash, 2018-2023 (source: MAFC using FARS data [32]).

Figure 11 maps fatal crashes on MAASTO Interstates that involved trucks with more than one fatality, showing the number of fatalities resulting from the crash[1]. Illinois and Ohio, the two states with the highest fatal crash rates, also have higher number of fatal crashes that led to multiple fatalities (11% for each of the two states). Interestingly, while Wisconsin has one of the lowest fatal crash rates (second lowest after normalization by truck VMT), as many as 17% of the fatal CMV-involved crashes resulted in multiple fatalities.

Figure 12 maps fatal crashes on MAASTO Interstates that involved trucks by number of trucks involved in the crash (as reported in FARS). In addition, Table 6 shows fatal accidents by both number of trucks and number of cars involved in crashes. More than 81% of fatal crashes involved a single truck (1387 out of 1712), with more than half of these also involving a single passenger vehicle, and roughly one sixth involving more than two passenger vehicles, with the remaining 418 crashes involving only the single truck and no other vehicle.

No. of trucks involved	Number of passenger cars involved						
	0	1	2	3	4	5+	Total
1	418	728	144	54	18	25	**1387**
2	100	82	25	10	4	9	**230**
3	21	22	12	7	5	3	**70**
4	7	4	4	0	2	1	**18**
5+	1	1	0	0	0	5	**7**
Total	**547**	**837**	**185**	**71**	**29**	**43**	**1712**

Table 6: Fatal crashes by number of trucks and passenger vehicles involved in crash, MAASTO Interstates, 2018-2023 (source: MAFC using FARS data [32]).

The three crashes involving the greatest number of vehicles all happened in Ohio. The first, an incident in Erie County, Ohio on December 23rd, 2022, occurred when heavy crosswinds in combination with winter weather driving conditions caused a semi-truck to jackknife, ending up in a 50-vehicle pileup (including 12 trucks) on the Ohio Turnpike. The incident resulted in 4 deaths and 73 injuries. Two separate incidents, both on November 12th, 2019, in Mahoning and Summit Counties, OH respectively both resulted in more than 15 vehicles involved in the crashes with 1 fatality reported in each case. Winter weather in the form of sleet and snow was a factor in both cases, with the first crash being reported as an angle collision and the second as a front-to-rear collision.

[1] Reader can refer to Figure 7 for all crashes including those that resulted in a single death.

Driver Factors and Manner of Collision

This section presents an overview of distribution of crashes by accident type, and by factors contributing to the crash.

Figure 13 and Figure 14 show the distribution of crashes identified by the most frequent driver-related factors. Figure 13 includes all CMV-involved crashes as reported in CRSS, while Figure 14 includes only fatal CMV-involved crashes reported in FARS. Careless driving was the largest contributor to both sets of crash data (by a large magnitude). Comparing the graphs suggests that while careless driving causes the highest percentage of crashes, the data includes a large number of crashes that are minor in nature that do not cause death or severe injuries. Other major driver-related factors that were pertinent to fatal crashes include failure to yield right of way, improper lane usage, failure to obey traffic control, following incorrectly, and overcorrecting.

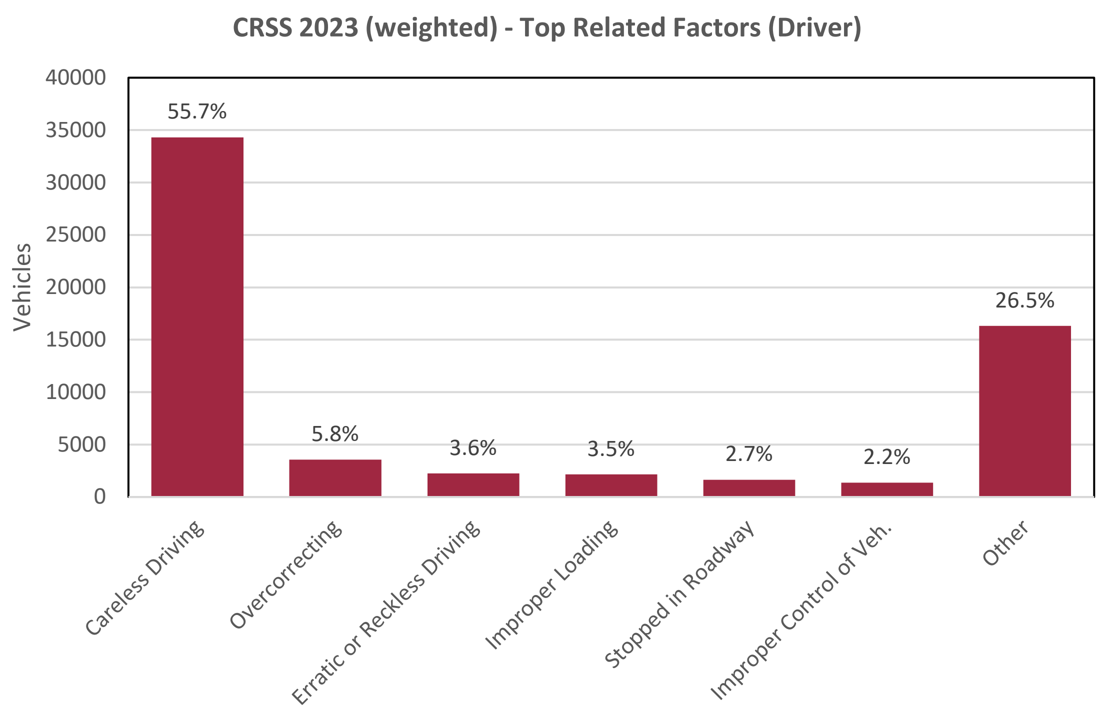

Figure 13: Top driver related factors leading to CMV-involved crashes, 2023 (source: MAFC using CRSS data [35]).

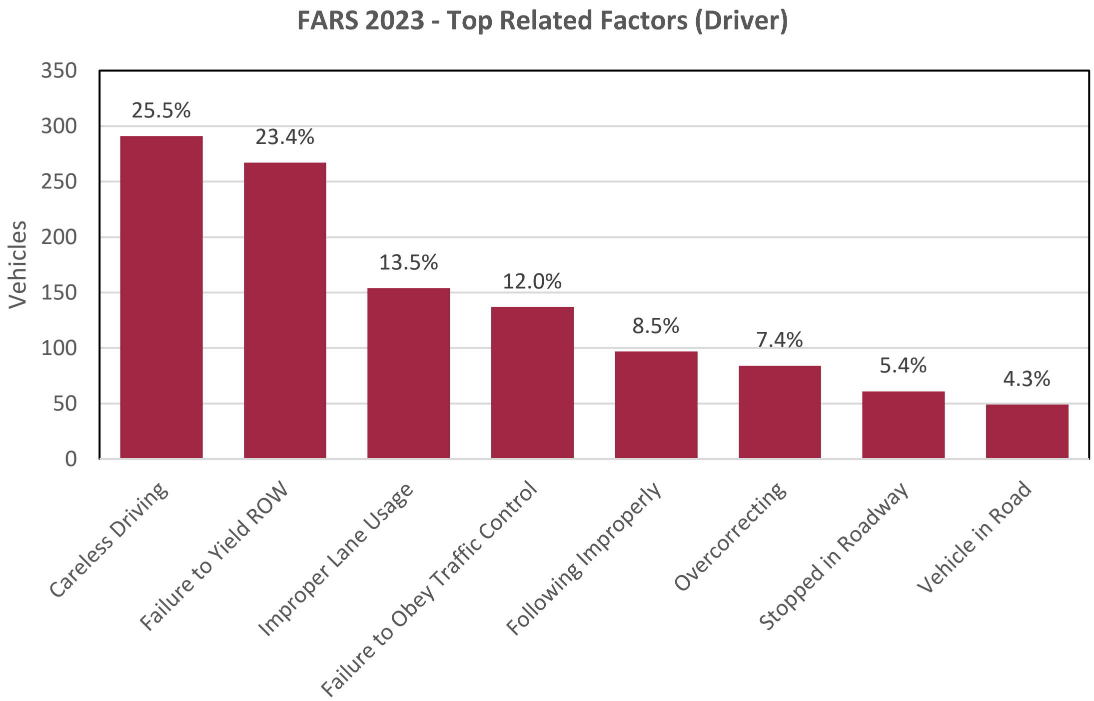

Figure 14: Top driver-related factors leading to fatal crashes involving CMVs, 2023 (source: MAFC using FARS data [32]).

Figure 15 shows distribution of crashes by manner of collision. Sideswipe collisions, rear-end collisions (front-to-rear), and angle collisions are the major crash types reported in the region with 29%, 26% and 16% share respectively of all reported CMV crashes. Another 26% of the reported crashes were not due to a collision between multiple vehicles but were either a collision with a barrier or obstruction, due to a vehicle running off the roadway, or for reasons that were unreported. Figure 16 shows the distribution of crashes by manner of collision for fatal crashes as reported in FARS. Compared to the manner of collision for all crashes (CRSS), the share of rear-end collisions is prevalent, with 39% of all studied fatal crashes being due to rear-end collisions. The share of angle and sideswipe crashes is lower, at 10% and 8% respectively. This would suggest that rear-end collisions are the most likely to lead to fatalities while sideswipe and angle collisions have lower fatality rates.

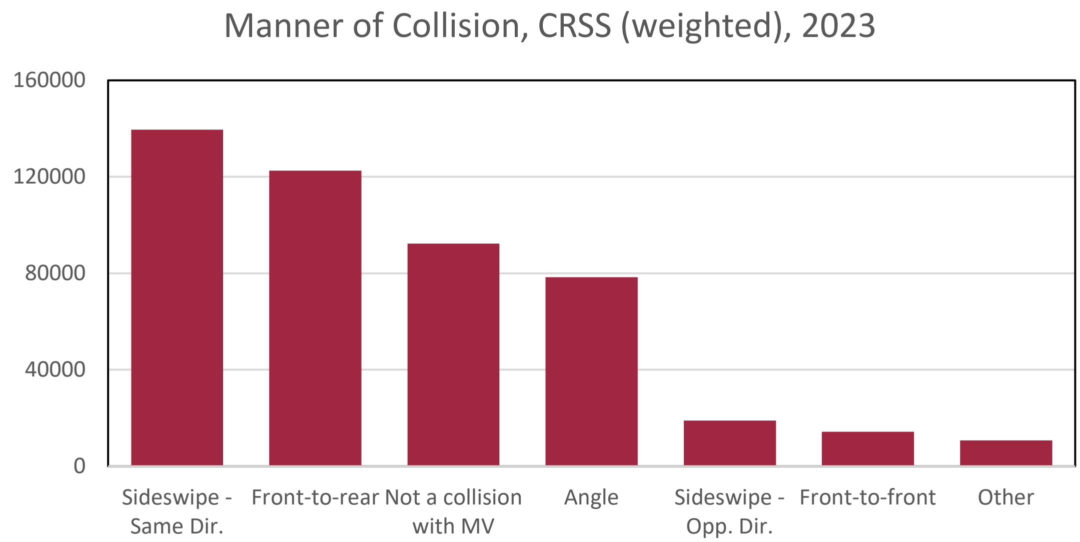

Figure 15: Distribution of crashes by manner of collision, 2023 (source: MAFC using CRSS data [35]).

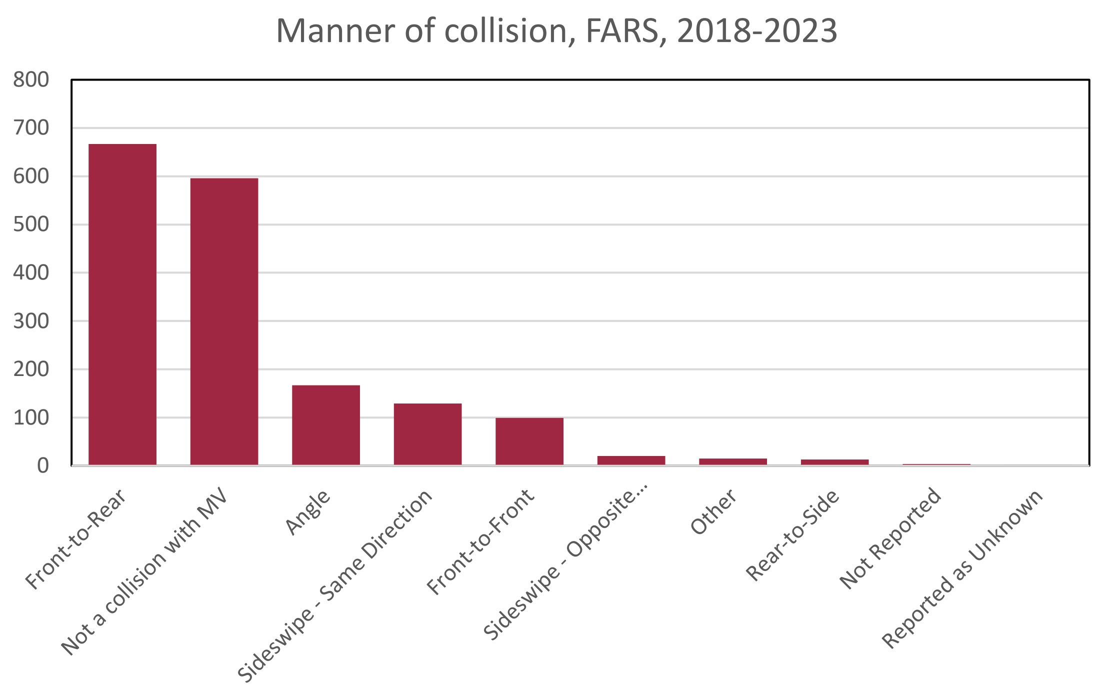

Figure 16: Distribution of fatal crashes by manner of collision, 2018-2023 (source: MAFC using FARS data [32]).

Policy Reflection

Figure 17 compares rate of fatal crashes (number of fatal crashes per billion VMT) for trucks against overall rate of fatal crashes. Each data point in the graph represents crash rate data for a given combination of MAASTO state and study year, encompassing a total of 60 data points over the six-year study period. States with DSL implementation (IL, IN, MI) are distinguished from other states. The graph suggests that states with DSL in the MAASTO region tend to have higher truck fatal crash rates compared to states with USL and equivalent overall fatal crash rates. However, the DSL states are three of the four states in the region with the highest number of fatal crashes overall, thus suggesting more complex causalities for observed behavior.

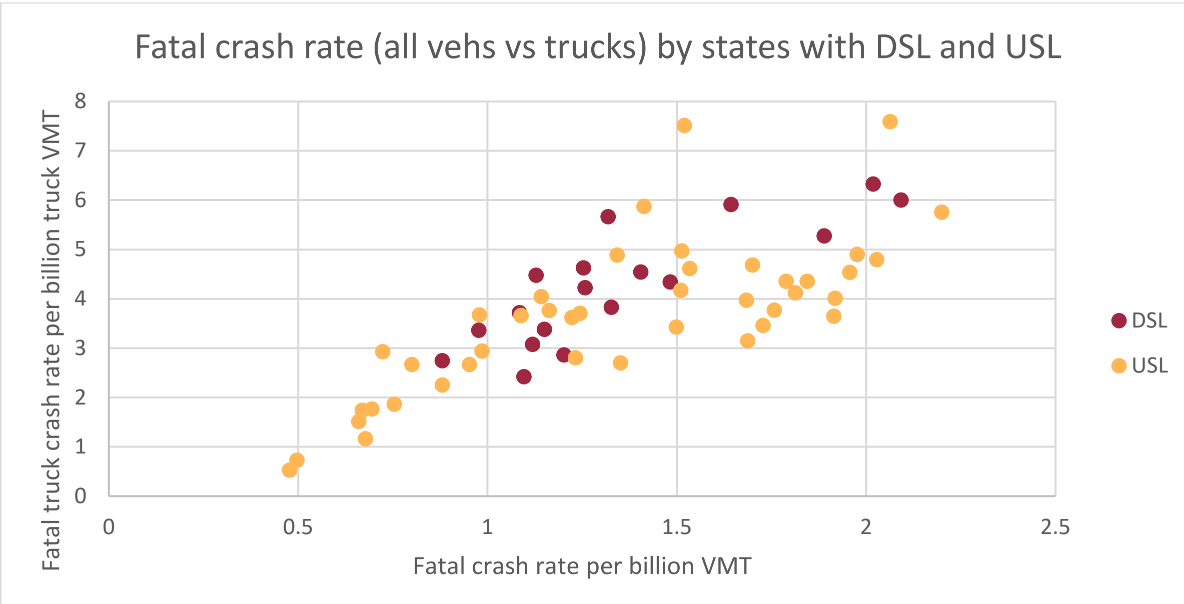

Figure 17: Fatal crash rate (fatal crashes per billion VMT) for trucks vs. all vehicles (source: MAFC using FARS data [32]).

Figure 18 shows a breakdown of all fatal crashes involving CMVs on MAASTO Interstates by manner of collision (rear-end, head-on, sideswipe, angle swipe etc.). The MAASTO states practicing DSL are separated to the left and the non-DSL states are to the right to compare collision types. While rear-end crashes are the most observed fatal crash type in most MAASTO states, and while rear-end crashes comprise the greatest share of fatal CMV in Illinois and Indiana (both DSL states), there is no statistically significant pattern that can observed for impact of DSL / USL on frequency of rear-end crashes. There is also no conclusive evidence of DSL impacting the frequency of any of the other collision types investigated.

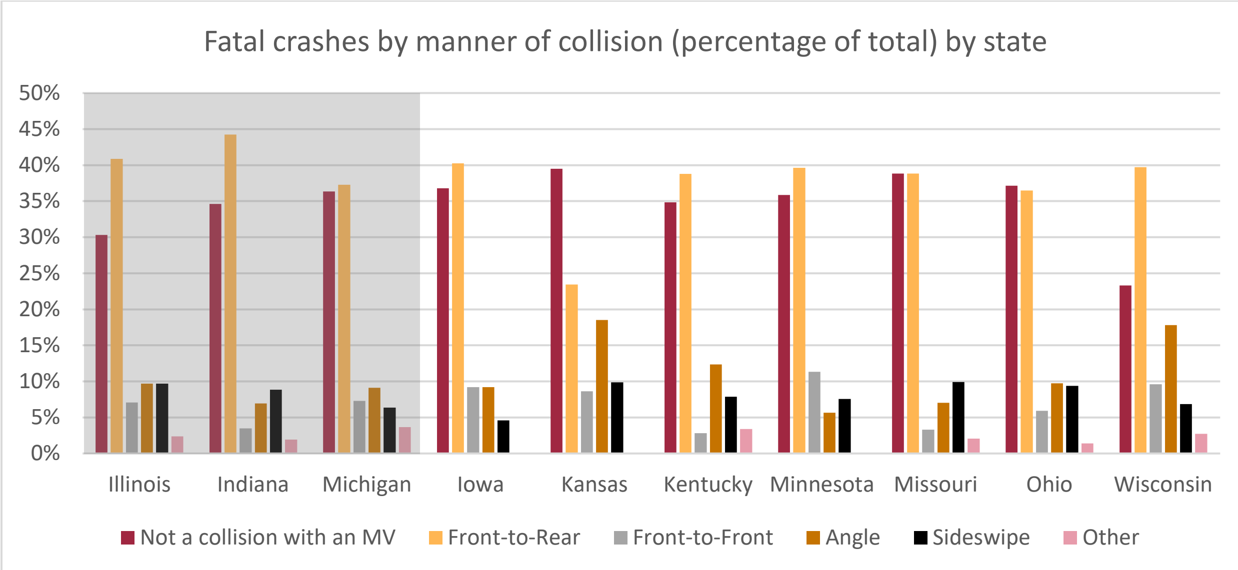

Figure 18: Fatal crashes involving CMVs by manner of collision relative to total number of fatal crashes in state (source: MAFC using FARS data [32]). States on the left (shaded gray) use DSL, states on the right (unshaded) use USL.

Figure 19 (A and B) plot crash rates from 2023 FARS data as well as from 2024 HSIS data (where available) to compare any potential impact of DSL policy by contrasting states with DSL to those without. Average crash rates observed in states with DSL (orange bar) are noticeably higher than average crash rates for the non-DSL states (grey bar) both observed from 2023 FARS crash rates as well as 2024 HSIS crash rates.

Conversely, as shown in Figure 20 (A and B), average crash rates observed in states with TLRs (orange bar) are lower than those observed in states without TLRs (grey bar) for both data sets. These findings would suggest that DSLs have an overall negative safety impact, while TLRs have an overall positive safety impact. It is important to note that while these patterns are observable when considering average across states by policy practiced, it is not clear evidence for causation, as the computed crash rates can vary between states practicing similar policies for both truck speed limits and lane restrictions.

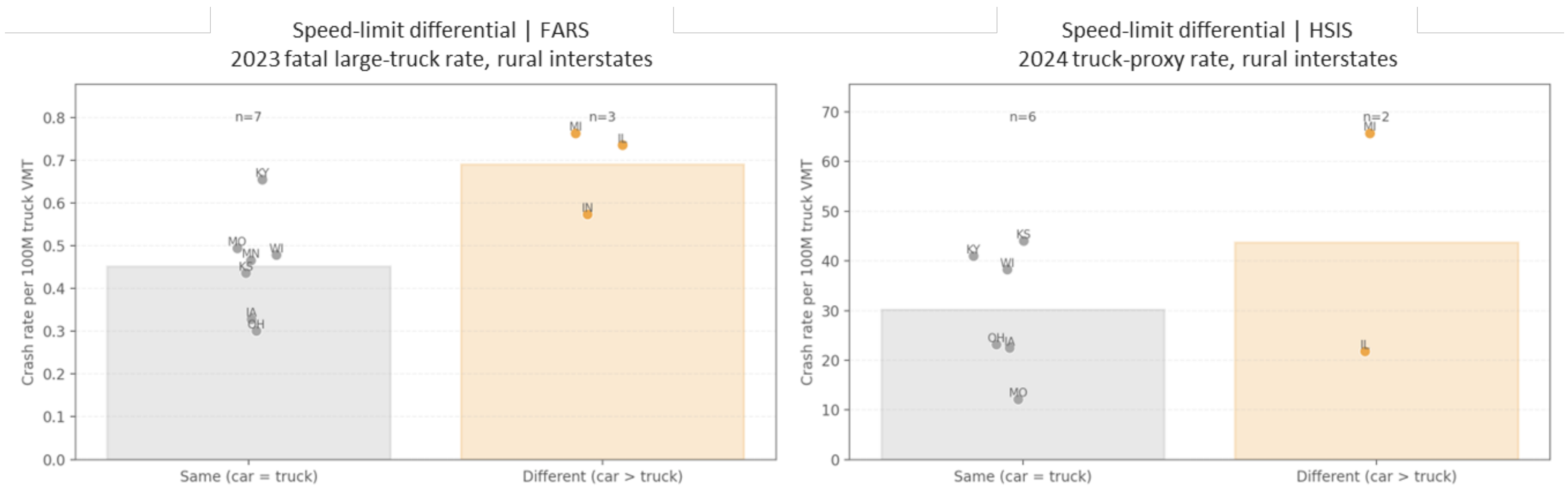

Figure 19: Policy comparison for DSL using truck crash rates (source: MAFC using FARS [32] and HSIS [37]).

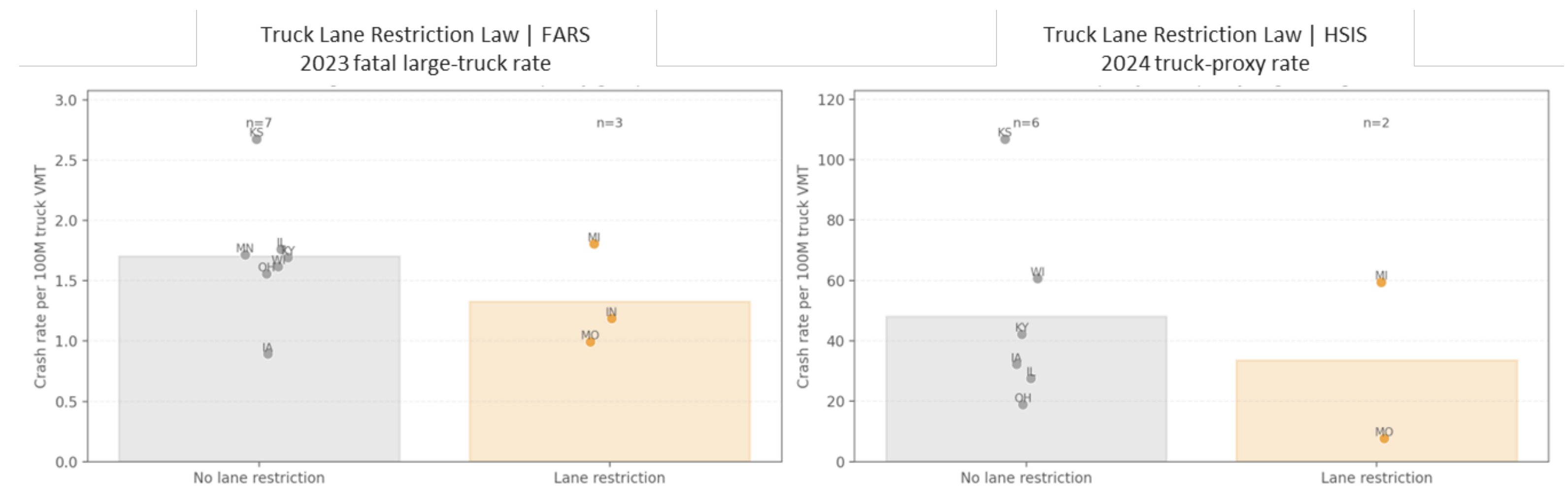

Figure 20: Policy comparison for TLR using truck crash rates (source: MAFC using FARS [32] and HSIS [37]).

Figure 21 investigates any relationship between the occurrence and type of rear-end crashes involving CMVs, and policy implementation using state crash data analysis for the MAASTO region. It is believed that DSL would help reduce crashes that involve trucks rear-ending other vehicles as the trucks are moving at a reduced speed and thus have better control at avoiding collisions with vehicles in front. However, DSL can also adversely affect the likelihood of trucks being rear-ended by faster moving passenger vehicles due to the speed variance. Investigation of state crash data shows that in states with DSL, trucks are more likely to be rear-ended by other vehicles (grey bar, 6 o’clock impact point for the truck), than rear-ending other vehicles (orange bar, 12 o’clock impact point for the truck). While the crash rates associated with trucks rear-ending other vehicles also increases for DSL states as compared to USL states, the increase is not statistically significant from the observed data. However, the crash rates associated with trucks being rear-ended by other vehicles increase substantially for DSL states compared to USL states. The figure also shows a comparison for TLR vs control states with no TLR. The analysis suggests that lane restrictions are also likely to increase the crash rates associated with trucks getting rear-ended by other vehicles.

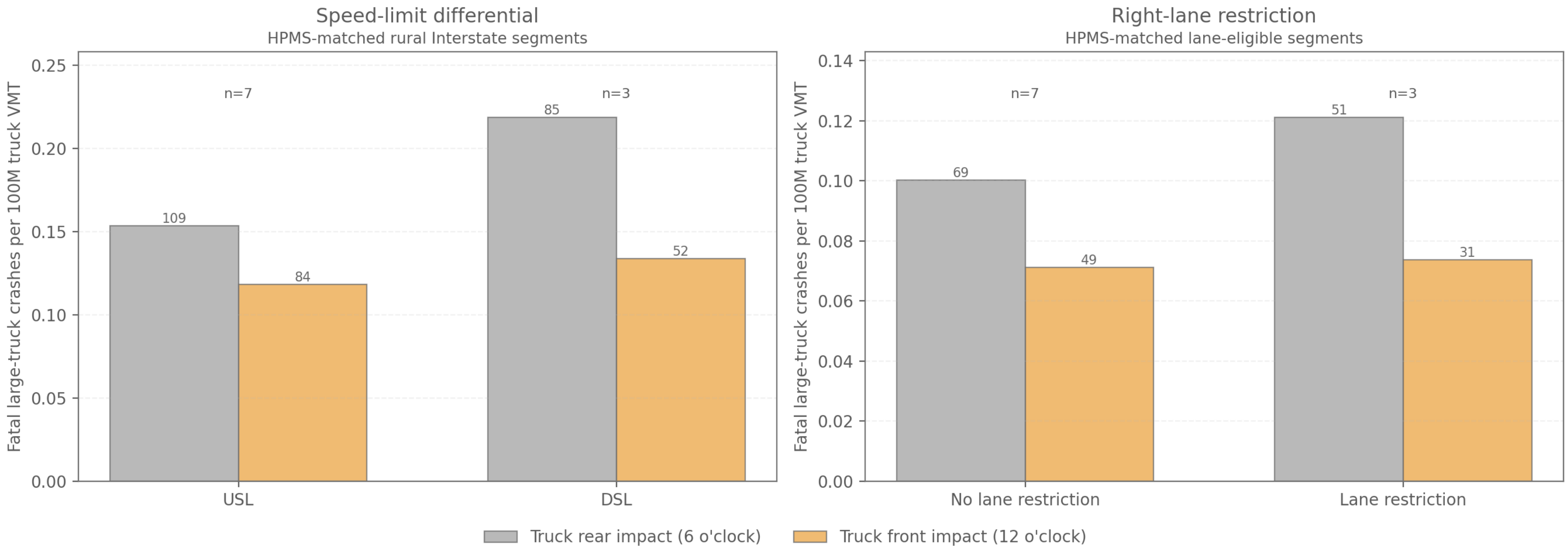

Figure 21: CMV-involved fatal rear-end collisions by impact point for truck, policy comparison, 2019-2023 (source: MAFC using HSIS [37]).

6. CORRIDOR ANALYSIS OF CRASHES

Corridor Selection

CMV-involved crashes and those crashes that led to fatalities were analyzed for the top corridors in the MAASTO region, as identified in an earlier MAFC study [39]. The results from this corridors analysis were presented to the MAFC Technical Committee for consideration.

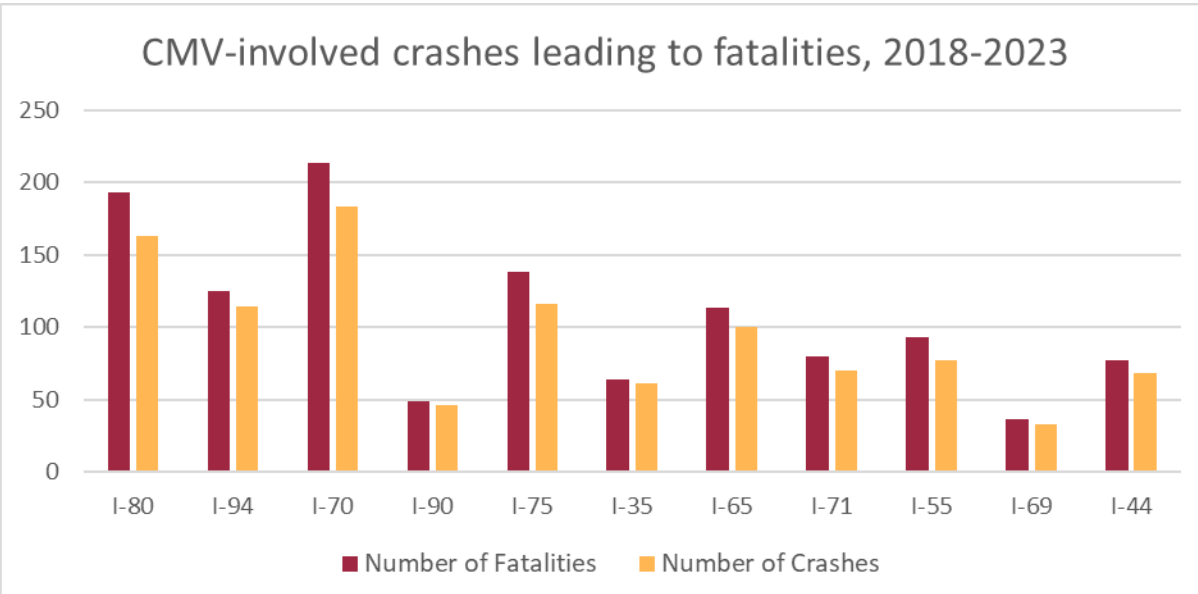

Figure 22: Fatal crashes involving CMVs for major freight corridors in MAASTO, 2018-2023 (source: MAFC using FARS data [32]).

The committee identified five corridors for case study based on the corridor's importance to freight movement in the region, history of CMV involving crashes for the corridor, and representation of corridors of importance for each MAASTO state.

The following five corridors were selected through a unanimous voting process for further look:

- I-70
- I-75
- I-80
- I-90
- I-94

I-80

One of the most important freight corridors for the region, the I-80 is a major transcontinental E-W corridor that crosses Iowa, Illinois, Indiana, and Ohio in the region, with a west coast terminus in the San Francisco Bay area of California, and an east coast terminus in New Jersey, across the Hudson River from New York City. For a large portion of its length in the region, the I-80 is a toll road between East Chicago, Indiana and Youngstown, Ohio. I-80 also runs concurrently with I-90 in parts of Indiana and Ohio.

I-80 crosses through two DSL states (Illinois and Indiana) and two USL states (Iowa and Ohio), and through one state with TLR (Indiana).

Figure 23 shows the annual trend of fatalities from crashes involving CMVs on I-80 by each MAASTO state. Fatal crashes on I-80 are well distributed across all four states. Analysis of total number of fatalities by year on I-80 does not reveal any correlation with truck policy in practice in the MAASTO states.

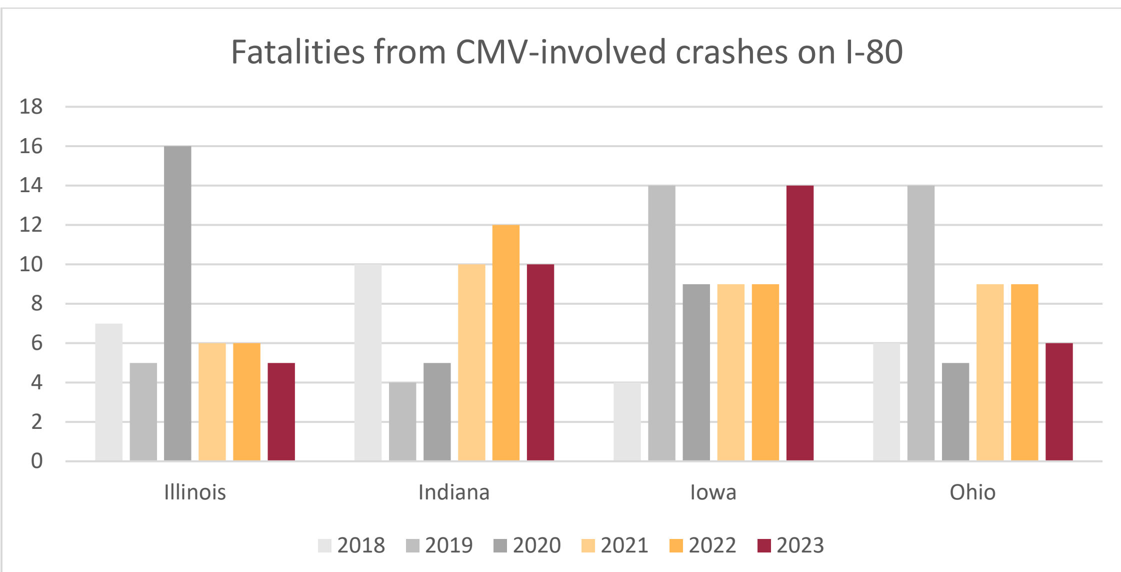

Figure 23: Fatalities from crashes involving CMVs on I-80 by MAASTO state and year, 2018-2023 (source: MAFC using FARS data [32]).

Figure 24 and Figure 25 show the distribution of fatal crashes on I-80 by location of crash relative to the roadway, and by manner of collision respectively. The trends observed are very consistent to those seen for the entire region as reported in the previous section, with a large majority of crashes happening on the roadway, and with rear-end collisions and collisions not involving other vehicles having the largest share of fatal crashes by manner of collision.

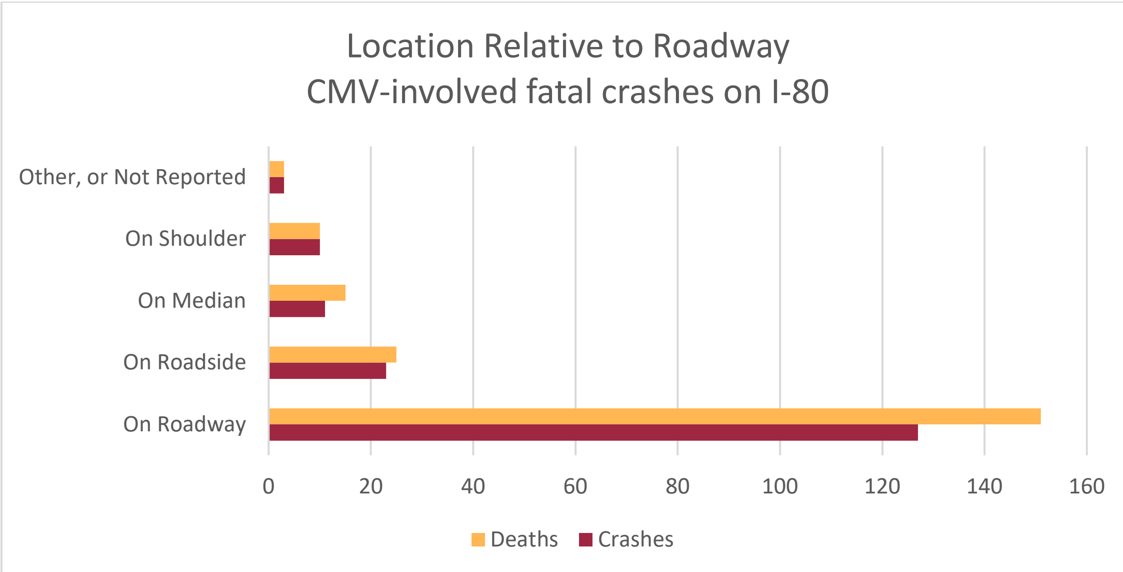

Figure 24: Location relative to roadway for fatal crashes involving CMVs on I-80 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

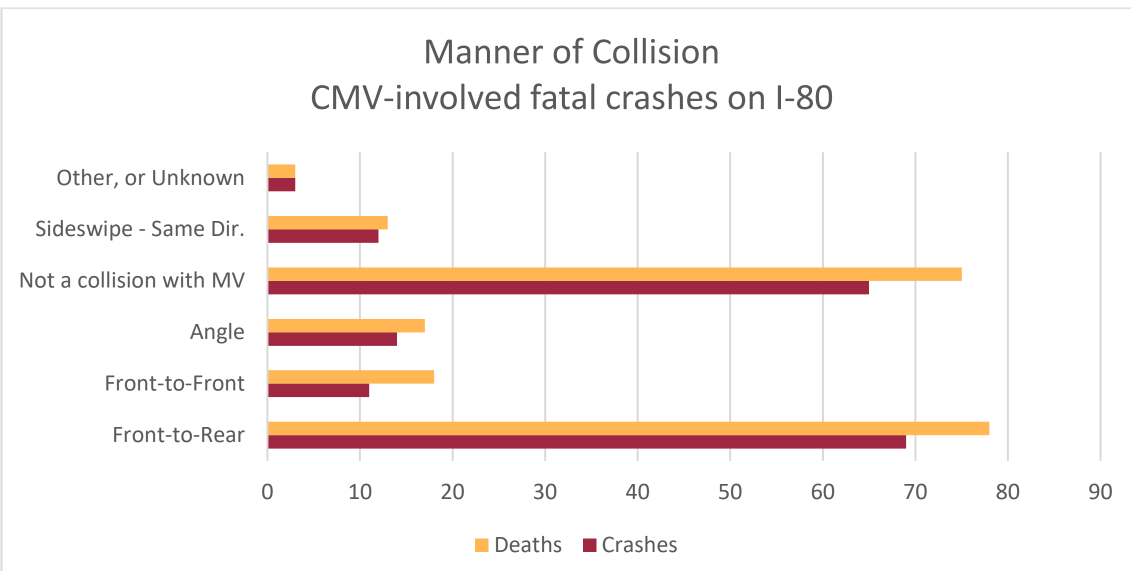

Figure 25: Manner of collision for fatal crashes involving CMVs on I-80 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

Figure 26 graphs the point of impact that contributed to a fatality, as identified in crash reports, separated into posted truck speed limit fields, for all fatal crashes on I-80 in 2023.

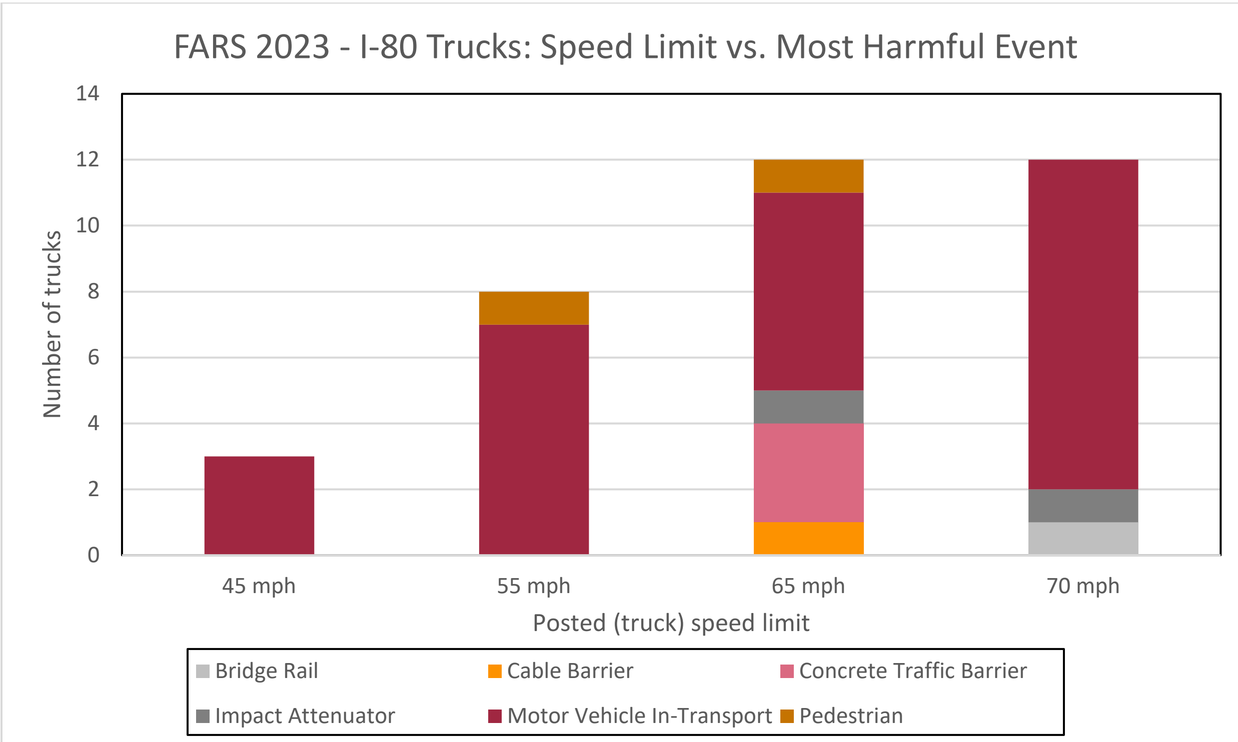

Figure 26: Fatal crashes involving CMVs on I-80 by posted truck speed limit and primary causal event leading to crash (source: MAFC using FARS data [32]).

Figure 27 presents a graph with policy comparison for I-80, comparing crash rate derived from HSIS for states practicing DSL against control states that do not implement that policy. The graph shows that for I-80, the crash rates are lower for the state practicing DSL (Illinois) compared to USL states, which is in contradiction to the results seen earlier assessing all Interstates in the region. Due to data unavailability, policy comparison for TLR could not be made.

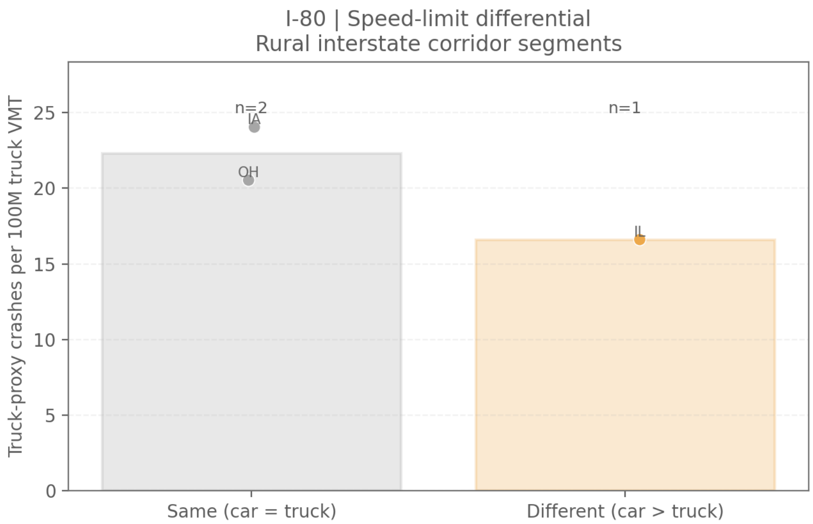

Figure 27: Policy comparison for DSL using truck crash rates for I-80 (source: MAFC, using HSIS [37]).

I-70

A major E-W interstate, the I-70 runs from I-15 in central Utah to I-695 near Baltimore, Maryland. In the MAASTO region, I-70 runs through the states of Kansas, Missouri, Illinois, Indiana, and Ohio. It is a critical freight corridor for multiple states in the region and one of the two most critical E-W corridors in the region by value of freight moved.

I-70 traverses through two of the three states in the region with DSL (Illinois and Indiana) as well as two of the three states in the region with TLRs (Indiana and Missouri).

Figure 28 shows the annual number of fatalities from crashes involving CMVs on I-70, by MAASTO state. Fatal crash numbers on I-70 are higher in Ohio and Missouri.

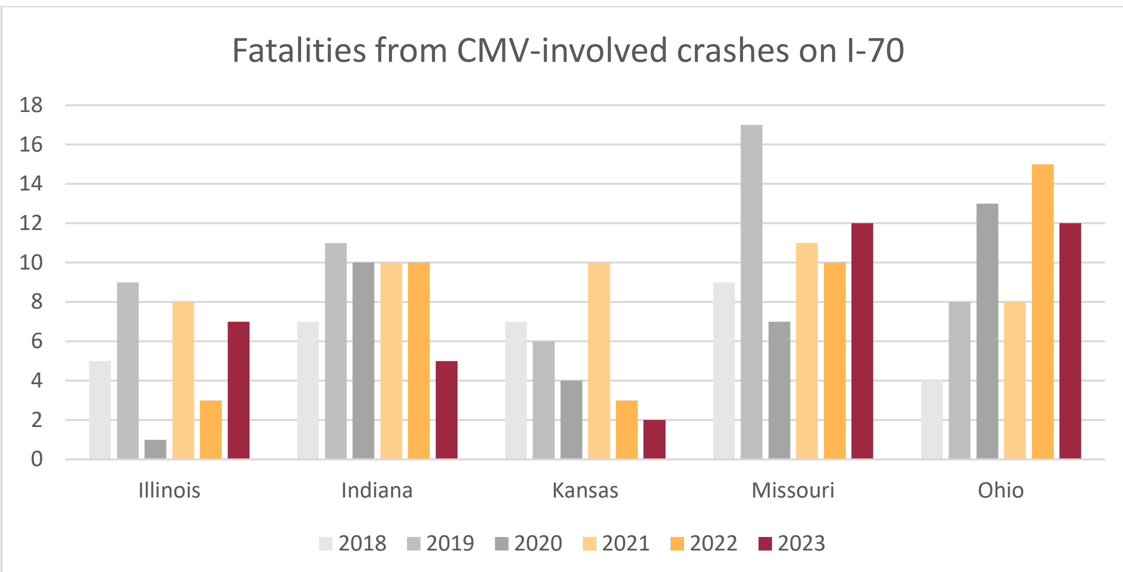

Figure 28: Fatalities from crashes involving CMVs on I-70 by MAASTO state and year, 2018-2023 (source: MAFC using FARS data [32]).

Figure 29 and Figure 30 show the distribution of fatal crashes on I-70 by location of crash relative to the roadway, and by manner of collision respectively. The trends observed are very consistent to those seen for the entire region as reported in the previous section, with a large majority of crashes happening on the roadway, and with rear-end collisions and collisions not involving another motor vehicle having the largest share of fatal crashes by manner of collision.

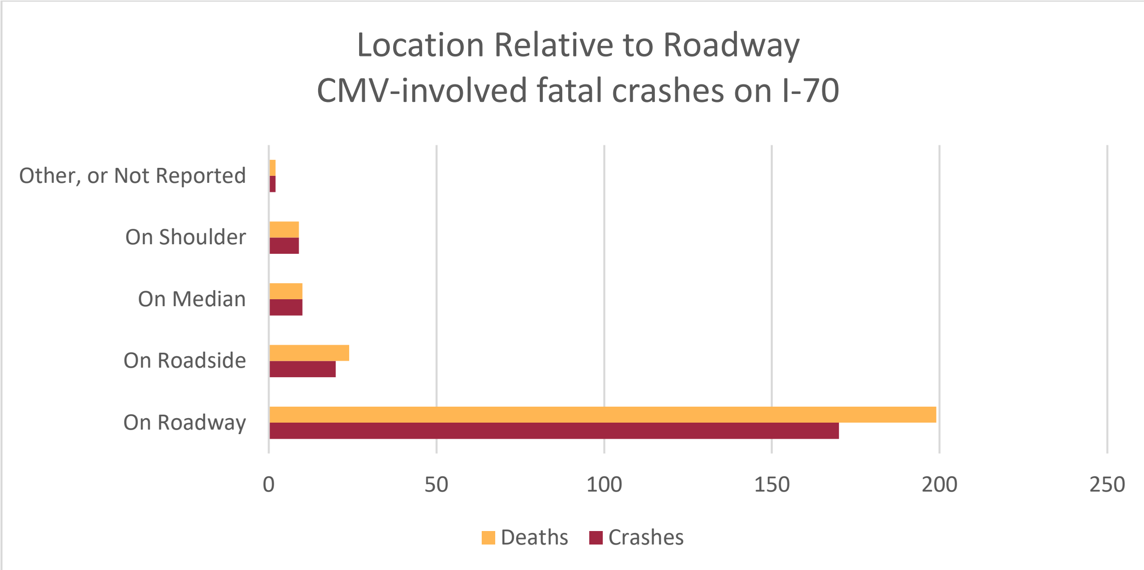

Figure 29: Location relative to roadway for fatal crashes involving CMVs on I-70 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

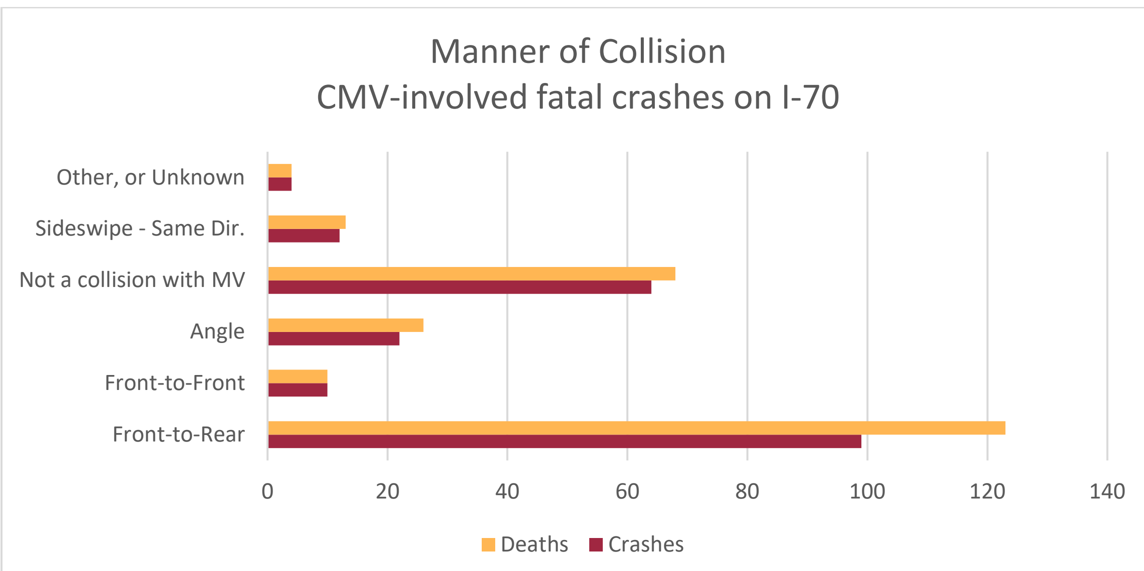

Figure 30: Manner of collision for fatal crashes involving CMVs on I-70 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

Figure 31 presents a graph with policy comparison for I-70, comparing crash rate derived from HSIS for states practicing DSL and TLR against control states that do not implement those policies. The results suggested that both DSL and TLR implementations on I-70 are correlated with reduced crash rates in the region compared to control states without policy implementation. Note however, that Indiana is not included in this figure as the HSIS data was not available for Indiana.

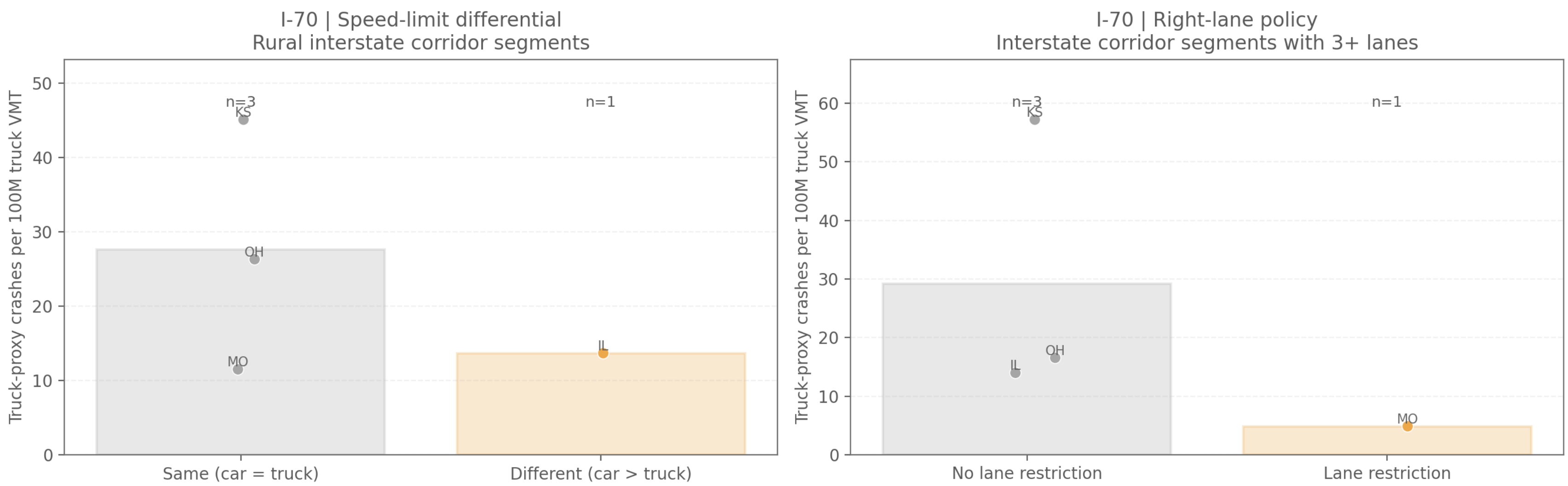

Figure 31: Policy comparison for DSL and TLR using truck crash rates for I-70 (source: MAFC using HSIS [37]).

I-75

I-75 is an important N-S corridor for the MAASTO region, running through the states of Michigan, Ohio, and Kentucky. The corridor includes an international border crossing at Sault Ste. Marie, Michigan, and connects the MAASTO region major southeastern metropolitan areas that include Atlanta, Tampa, and Miami.

Of the three MAASTO states that I-75 runs through, Michigan is the only state that practices both DSL and TLRs.

Figure 32 shows the annual trend of fatalities from crashes involving CMVs on I-75, by MAASTO state. Of the three states in the region that I-75 runs through, Ohio has the highest number of fatalities from CMV-involved crashes on the Interstate.

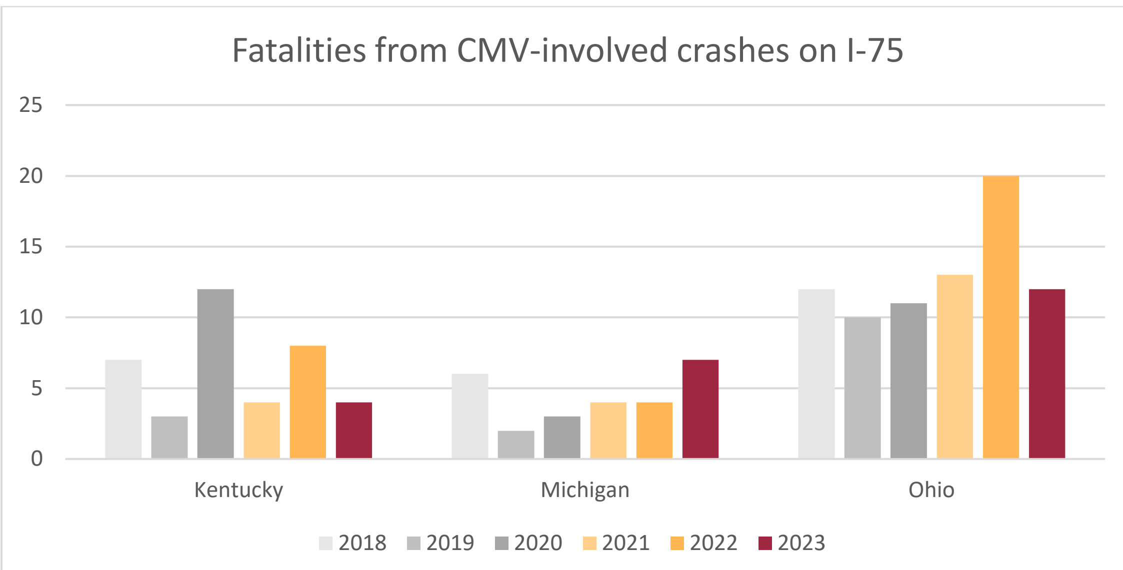

Figure 32: Fatalities from crashes involving CMVs on I-75 by MAASTO state and year, 2018-2023 (source: MAFC using FARS data [32]).

Figure 33 and Figure 34 show the distribution of fatal crashes on I-75 by location of crash relative to the roadway, and by manner of collision respectively. The trends observed are very consistent to those seen for the entire region as reported in the previous section, with a large majority of crashes happening on the roadway, and with rear-end collisions and collisions not involving another motor vehicle having the largest share of fatal crashes by manner of collision.

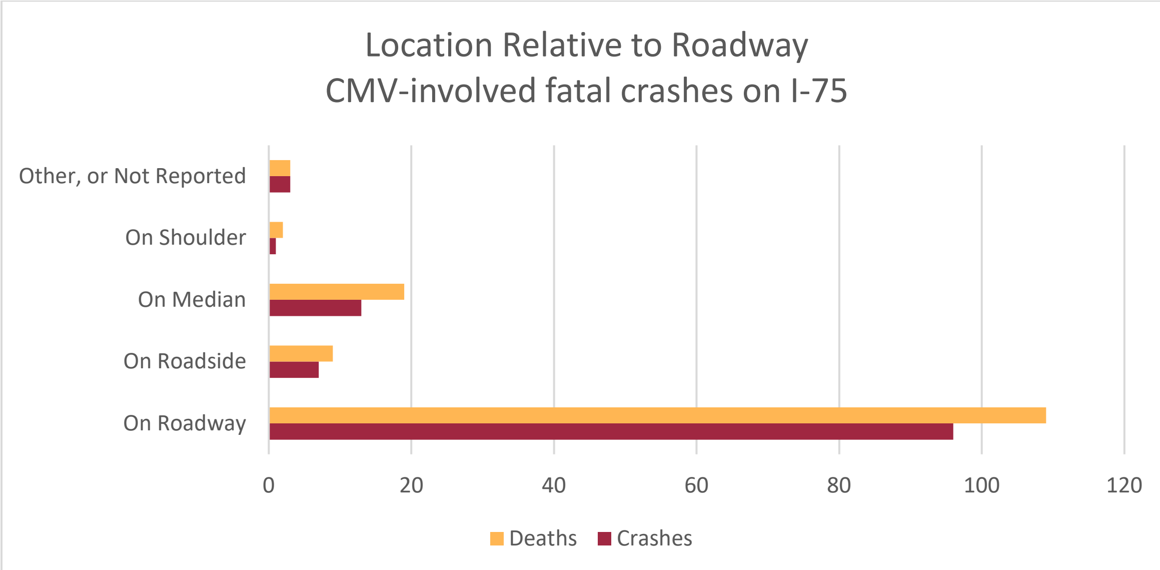

Figure 33: Location relative to roadway for fatal crashes involving CMVs on I-75 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

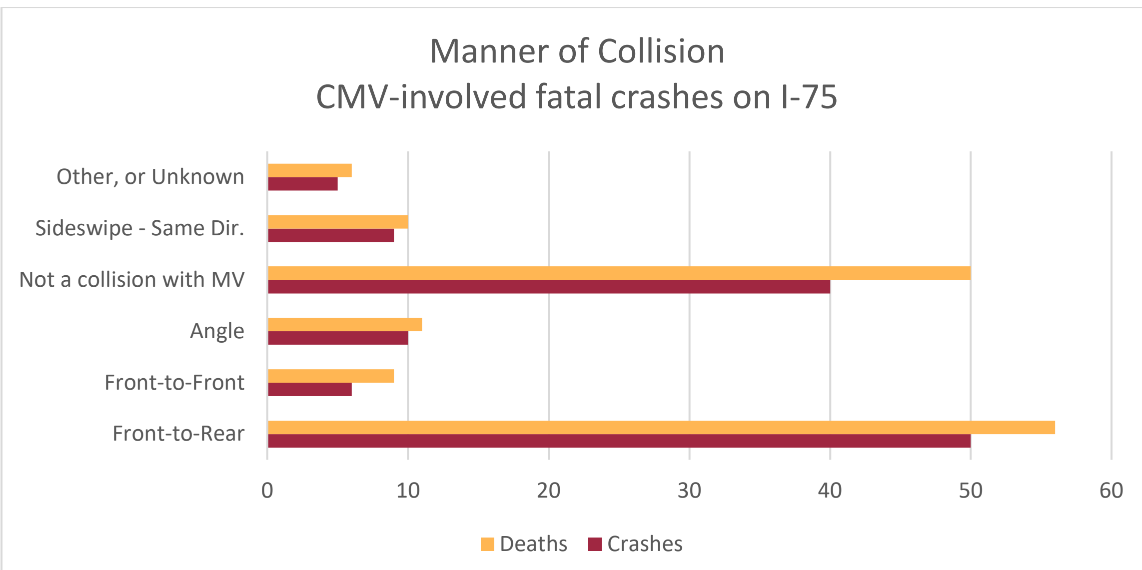

Figure 34: Manner of collision for fatal crashes involving CMVs on I-75 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

Figure 35 presents a graph with policy comparison for I-75, comparing crash rate derived from HSIS for states practicing DSL and TLR against control states that do not implement those policies. The observations from this analysis for I-75 are that both DSL and TLR are correlated to increase in number of crashes on I-75 compared to control states.

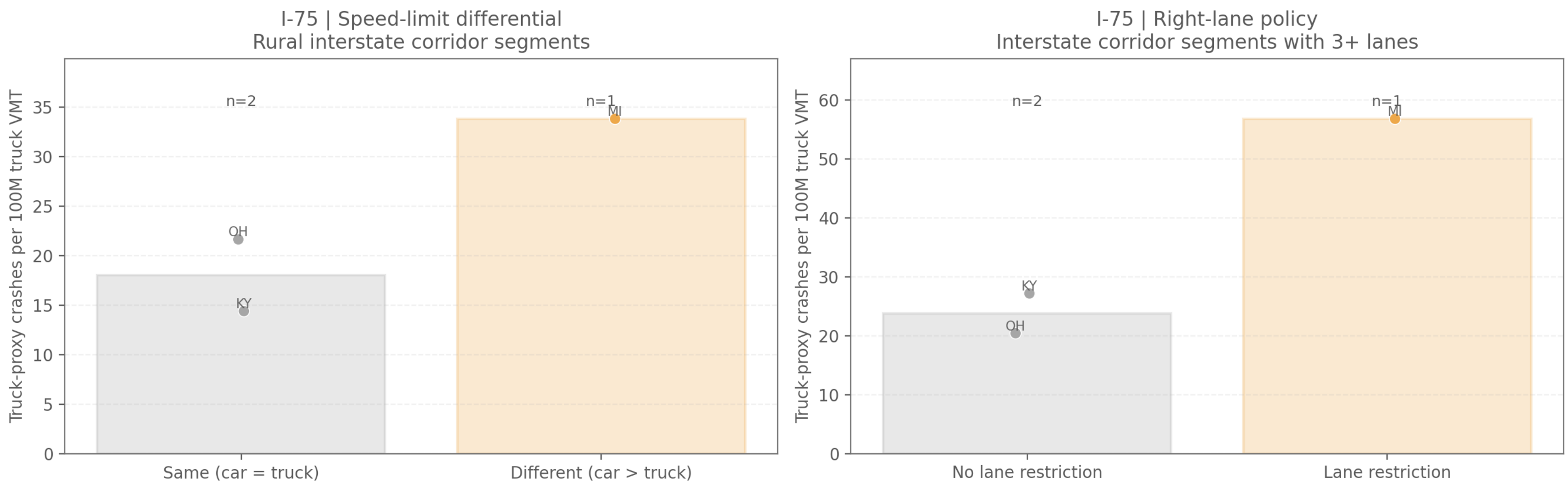

Figure 35: Policy comparison for DSL and TLR using truck crash rates for I-75 (source: MAFC using HSIS [37]).

I-90

I-90 is a major E-W freight corridor that spans across the northern tier of the U.S. between Boston and Seattle, through the states of Minnesota, Wisconsin, Illinois, Indiana, and Ohio. I-90 shares a large portion of its length with I-94 in Wisconsin, and the two Interstates are also concurrent for portions in Illinois. I-90 is also concurrent with I-80 from Lake Station, Indiana to the western suburbs of Cleveland. I-90 traverses through two of the three states in the region with DSL (Illinois and Indiana) and three states with USL. The Interstate also runs through one state with TLR (Illinois).

Figure 36 shows the annual trend of fatalities from crashes involving CMVs on I-90, by MAASTO state. A large percentage of fatalities due to crashes involving CMVs on I-90 were reported in Illinois and Ohio. Analysis of the total number of fatalities by year on I-90 does not reveal any correlation with truck policy in practice in the MAASTO states.

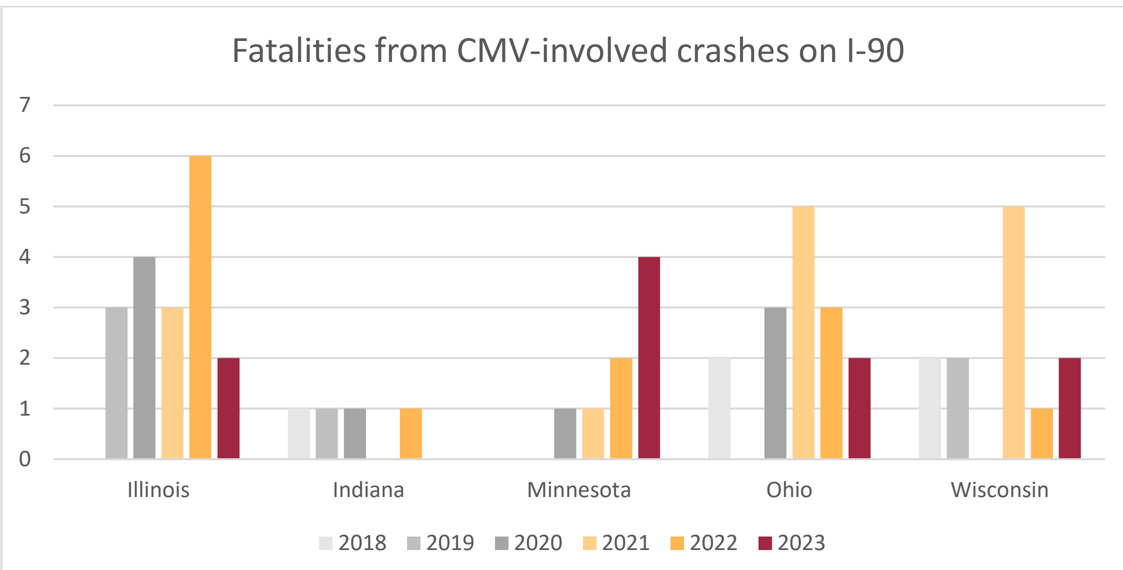

Figure 36: Fatalities from crashes involving CMVs on I-90 by MAASTO state and year, 2018-2023 (source: MAFC using FARS data [32]).

Figure 37 and Figure 38 show the distribution of fatal crashes on I-90 by location of crash relative to the roadway, and by manner of collision respectively. The trends observed are very consistent to those seen for the entire region as reported in the previous section, with a large majority of crashes happening on the roadway, and with rear-end collisions and collisions not involving other motor vehicles having the largest share of fatal crashes by manner of collision. Of note, there was an increased ratio of front-to-front fatal crashes on I-90 compared to regionwide observations. This could indicate CMVs crossing through median strips and entering traffic lanes heading in the opposite direction.

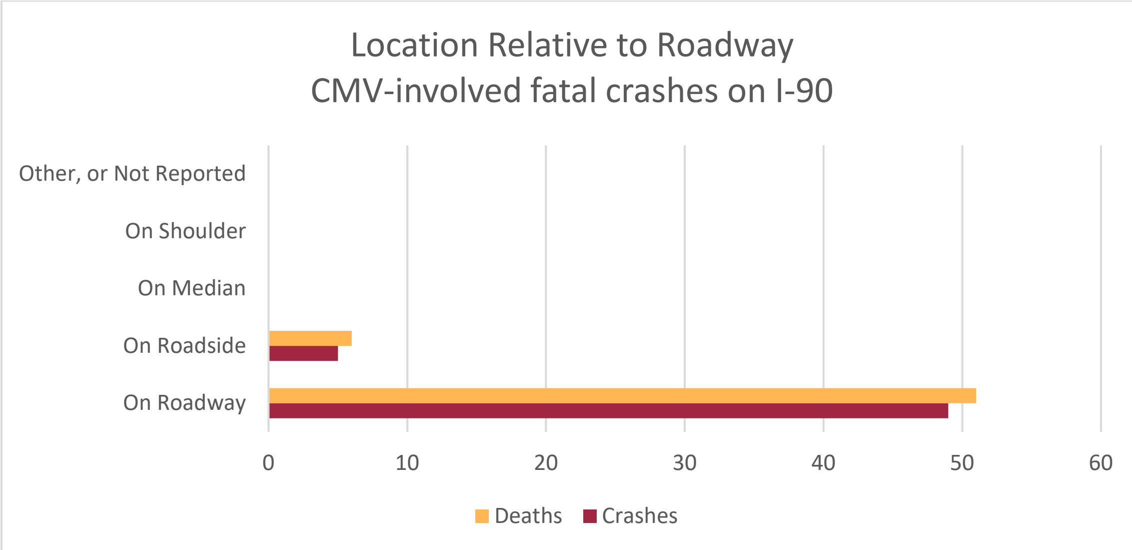

Figure 37: Location relative to roadway for fatal crashes involving CMVs on I-90 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

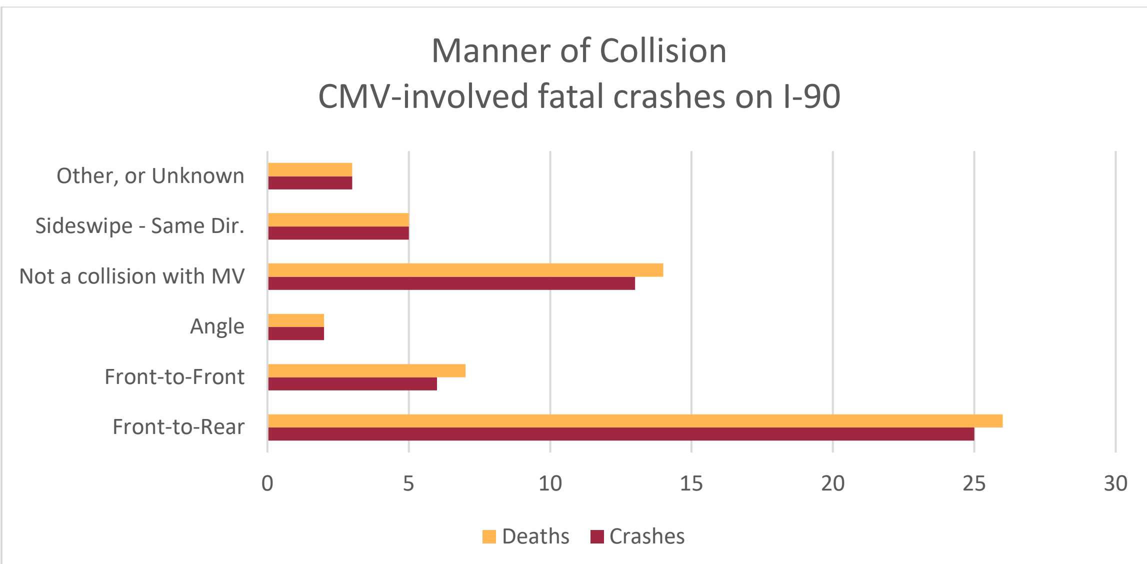

Figure 38: Manner of collision for fatal crashes involving CMVs on I-90 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

Figure 39 presents a graph with policy comparison for I-90, comparing crash rate derived from HSIS for states practicing DSL against control states that do not implement those policies. Note that data was only available for three of the five states that I-90 runs through in the region. Data from the three available states (Illinois, Indiana, and Wisconsin) shows that for I-90, the crash rates are substantially lower for the state practicing DSL (Illinois) compared to USL states (Indiana and Wisconsin). Due to data unavailability, policy comparison for TLR could not be made.

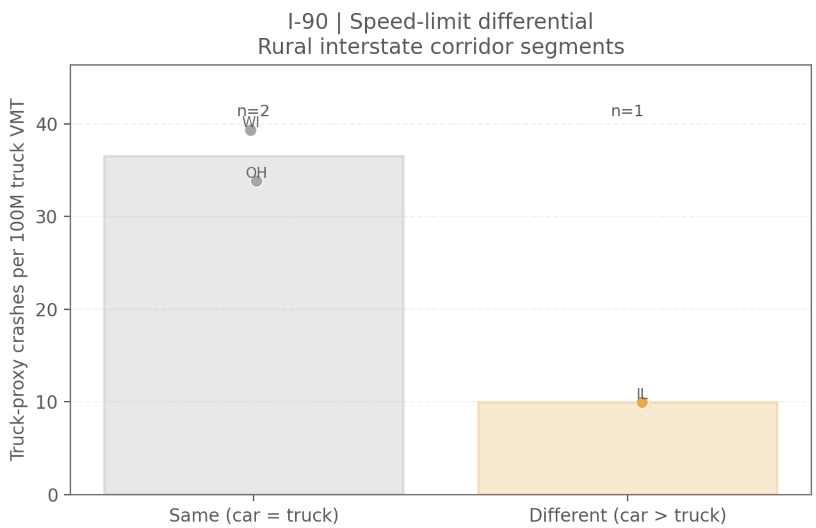

Figure 39: Policy comparison for DSL using truck crash rates for I-90 (source: MAFC using HSIS [37]).

I-94

Another major E-W interstate, the I-94 extends from I-90 near Billings, Montana to I-69 near Port Huron, Michigan and a Canadian border crossing to Ontario Highway 401 in Sarnia. In the MAASTO states, I-94 runs through Minnesota, Wisconsin, Illinois, Indiana, and Michigan. In Wisconsin, I-94 runs concurrent with I-90 for a large fraction of its roadway length. I-94 also runs concurrent with I-90 on Chicago's south side, and with I-80 from the south suburbs of Chicago to I-65 in Lake Station, Indiana.

I-94 traverses through all three states in the region with DSL (Illinois, Indiana, and Michigan), with the latter two also being two of the three states in the region with TLRs.

Figure 40 shows the annual volume of fatalities from crashes involving CMVs on I-94, by MAASTO state. The largest number of fatal crashes on I-94 were in Michigan (DSL state), with Indiana and Wisconsin reporting smaller numbers of fatalities. Considering the relatively high crash rate in one DSL and TLR state (Michigan) and the very low crash rates in another DSL and TLR state (Indiana), the impact of DSL on fatal crash rates for I-94 cannot be determined.

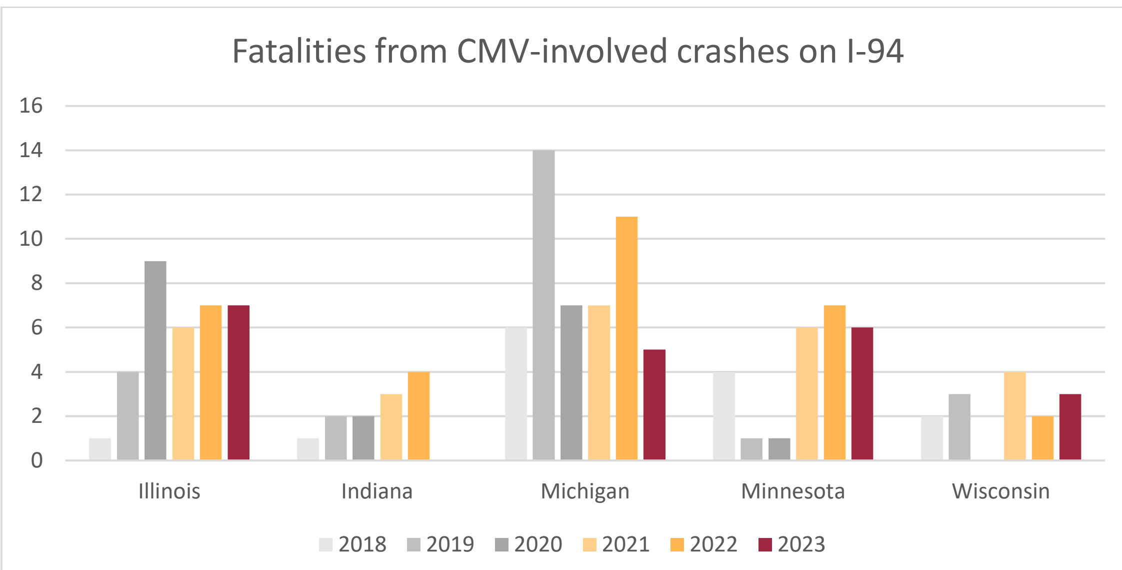

Figure 40: Fatalities from crashes involving CMVs on I-94 by MAASTO state and year, 2018-2023 (source: MAFC using FARS data [32]).

Figure 41 and Figure 42 show the distribution of fatal crashes on I-94 by location of crash relative to the roadway, and by manner of collision respectively. The trends observed are very consistent to those seen for the entire region as reported in the previous section, with a large majority of crashes happening on the roadway, and with rear-end collisions and collisions without additional motor vehicles having the largest share of fatal crashes by manner of collision.

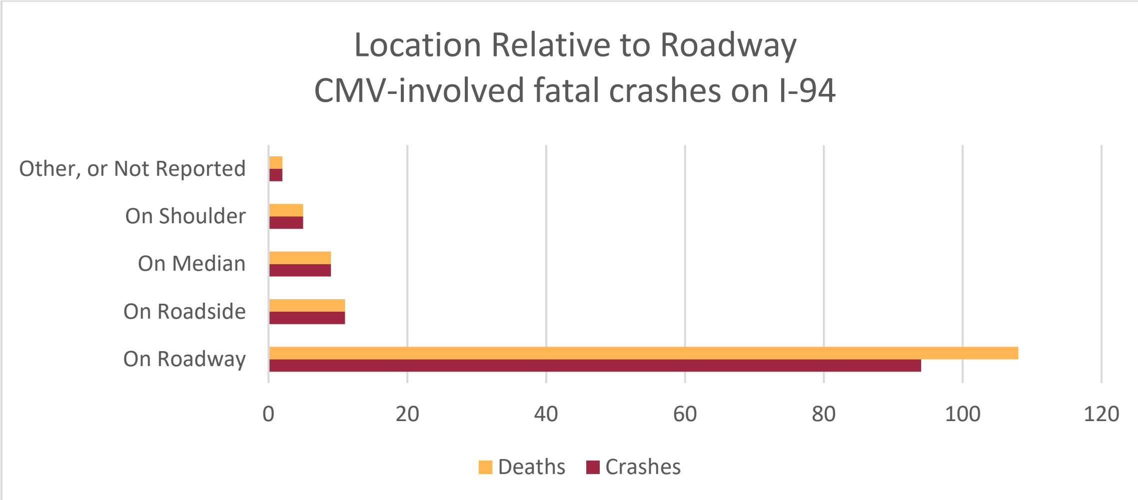

Figure 41: Location relative to roadway for fatal crashes involving CMVs on I-94 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

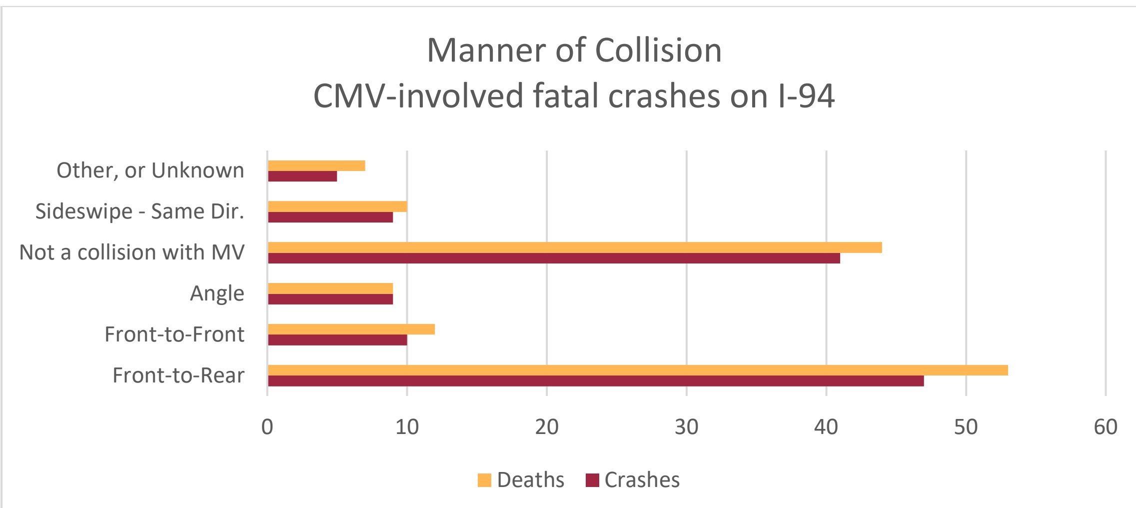

Figure 42: Manner of collision for fatal crashes involving CMVs on I-94 in MAASTO region, 2018-2023 (source: MAFC using FARS data [32]).

Figure 43 presents a graph with policy comparison for I-94, comparing crash rate derived from HSIS for states practicing DSL and TLR against control states that do not implement those policies. Due to unavailability of HSIS data for three of the five I-94 states, a conclusion cannot be drawn on the impact of DSL and TRL on fatal crash rates.

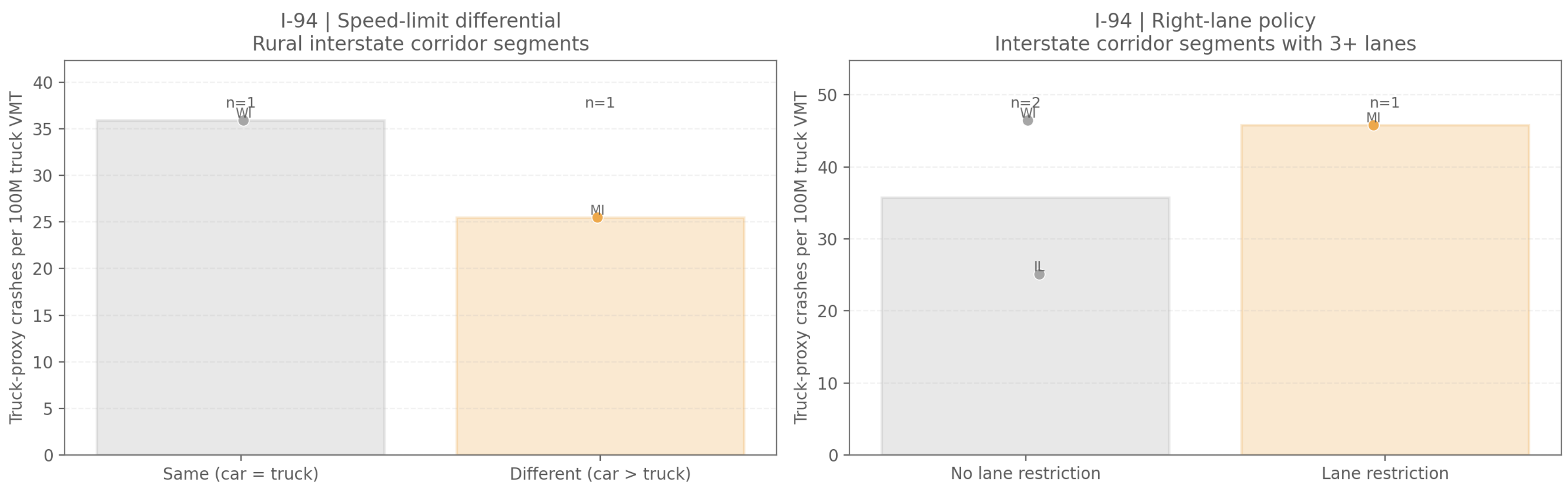

Figure 43: Policy comparison for DSL and TLR using truck crash rates for I-94 (source: MAFC using HSIS [37]).

7. STATE PROFESSIONALS' PERSPECTIVES

The study team reached out to MAFC technical committee members from the ten MAASTO states for state traffic safety personnel contacts in order to gather and summarize their perspectives and inputs on the issue of truck regulations as it pertains to safety. A short survey questionnaire was created to be sent out to safety professionals from four states the team was able to connect with. The questionnaire covered questions on the experts' overall impressions of speed limitations and truck lane restrictions, any previous research / implementation efforts by the state exploring truck speed limitations and lane restrictions, and best practices recommendations for mitigating CMV-involved crashes in the state. Figure 44 shows the contents of the survey questionnaire that was sent out to state traffic safety officers.

Mid America Freight Coalition project for the ten MAASTO States

Safety Implications of Truck Regulations:
Speed Limitations and Right Lane Only Operations

Questionnaire for State Safety Professionals

1. Do you see safety concerns with truck lane restrictions and speed limitations (in the form of differential speed limits between cars and CMVs, or speed governors equipped within trucks) for CMVs?

2. Has the state tried using differential speed limits or right-only lane restrictions for trucks, either on select corridors (I-70, I-75, I-80, I-90, I-94), or in the past?

3. Has the state done any studies on these types of truck regulations and their benefits / challenges?

4. Your experience with speed differentials between trucks (CMVs) and cars.

5. What are major safety issues from your / state's perspective with respect to right lane only regulations and speed restrictions for CMVs? How are the resulting highway environment and the interactions between trucks and other vehicles affected by these safety issues?

6. What are some best practices practiced by your state to mitigate CMV involved incidents for on these types of accidents:
   - Lane crossover:
   - Rear end (Stationary):
   - Accident on shoulder and ramps:
   - Differential Speed across vehicle types (passenger cars and CMVs):
   - Rear End:

7. Please share any additional comments / thoughts you would like to share with us.

Thank you for your time and for sharing your thoughts with us.

Figure 44: Survey questionnaire sent out to state traffic / CMV safety experts

Safety experts from three states (Michigan, Minnesota, and Wisconsin) responded to the survey. Full responses can be found in Appendix A. The following is a summary assessment of responses obtained from the responding states.

State sponsored studies on truck speed limitations and truck lane restrictions.

Based on the responses received, it was observed that MAASTO states have not undertaken specific studies in the past to evaluate impact of truck speed and lane restrictions on safety in the corresponding states. Responders did mention however that they are aware of, and have reviewed (in the past) research conducted in other states

Main concerns pertaining to truck speed and lane restrictions and its impact on safety.

The respondents had a mixed response to their impression of the efficacy of truck speed and lane restrictions. They identified the theoretical benefits of reduced truck speeds in potentially reducing the severity of accidents but noted the increase in traffic conflicts and interactions due to large speed variance. One respondent noted that truck speed limitations and truck lane restrictions are policies best studied as a pair, either restricting slower moving trucks to right lanes such that it minimizes interactions between the trucks and other vehicles or not implementing either restriction. This, however, would still not address the barrier effect for vehicles merging into a roadway with truck speed and lane restrictions in place.

Best practices to mitigate CMV involved incidents.

The respondents shared best practices used within the states for mitigating CMV-involved crashes and minimizing damage when crashes do happen. These best practices include a mix of physical installations that improve safety, such as barriers, rumble strips, and wide paved shoulders, as well as information and advisory systems to alert drivers of events and conditions downstream.

- **Medians, Guardrails, and Barriers**
  The use of median barriers, particularly (high tension) cable barriers, are considered a best practice for median safety and for lane crossover safety. These have been found to severely reduce head-on collisions (and opposite direction sideswipe collisions), particularly on high speed, high volume, divided highways. While all barriers help in mitigating head-on-collisions, cable barriers as especially efficient as they can absorb a vehicle's kinetic energy and reduce impact forces in case of a collision.

- **Wide medians and wide paved shoulders**
  Wide medians and wide paved shoulders are considered best practices for reducing lane departure crashes as well as for reducing secondary crashes and reducing severity of

crashes by providing emergency stopping space for vehicles involved in a collision. These features reduce the likelihood of head-on collisions (wide medians can create a separation of traffic) and collisions with fixed objects (such as barriers). They further provide enhanced recovery areas for departing vehicles (vehicles involved in a crash and responding vehicles).

- **Rumble Strips**
  Rumble strips are a lost-cost best practice that are highly effective at reducing lane-departure crashes. Shoulder rumble strips can reduce lane-departure and run-off-road crashes. Centerline rumble strips are a best practice that should be used for undivided highways to reduce the likelihood and severity of head-on collisions and opposite direction sideswipe collisions. Transverse rumble strips are a recommended best practice for work-zones and intersections that alert drivers to slow down.

- **Queue and stopped vehicles warning systems**
  Queue warning systems and stopped vehicle warning systems were identified as a best practice that can mitigate collisions with stopped or disabled vehicles. These are especially useful for Work Zones.

- **Message boards, signage, and 511 systems**
  Message boards, signages, and 511 traveler information systems were identified as best practices for overall roadway safety and for alerting drivers of crashes and accidents when they happen.

8. CONCLUDING REMARKS

This study investigates impacts of truck speed and lane regulations on safety for the MAASTO region, focusing on crashes and fatal crashes involving at least one CMV in the region. The safety analysis focuses primarily on Interstates (rural and urban), with five major freight corridors used as case studies.

MAASTO region has representation of truck speed regulations through three states using DSL, and of truck lane regulations with three states having truck specific lane-use laws. While a true controlled comparison of safety statistics for a singular roadway section comparing crashes with and without policy implementation is not possible, regionwide aggregates comparing crashes in states with and without policy implementation are provided. It should be noted that the policy implementation comparisons use roadway sections from different geographic locations, traffic volumes and geometric configuration and the results and findings should be interpreted accordingly.

Trucking associations such as OOIDA have suggested that truck regulations are not the correct method for addressing CMV related accidents. One perceived impression for drivers is that truck speed regulations or speed limiters are likely to incentivize drivers to drive more aggressively in roadway segments that are posted lower than the speed limiter limits to compensate for lost time. This could have an counterintuitive impact on safety by increasing crash rates in lower speed roadway segments. OOIDA believes that instead of truck regulations, it would be more fruitful to address driver compensation based on miles driven or loads hauled. This would alleviate demand on drivers to overspeed beyond conditions based safe speeds in order to meet strict shipper and receiver scheduling demands that lead to unsafe driving.

Key factors: Advantages and Disadvantages

A review of past studies, study of perspectives from various interested actors, and exploration of available data shows that both truck speed restrictions and truck lane restrictions are highly debated policies with a plethora of advantages supporting the policy, and shortcomings to give consideration to when assessing policy implementation.

Crash rates / severity and policy

Proponents of DSL argue that DSL reduces crash rates as drivers have better control over the vehicles and lower speeds can reduce stopping distances for large trucks, thus reducing crashes. Rear-end crashes where a truck rear-ends another vehicle are expected to reduce in particular due to the shorter stopping distances. Opponents of DSL however suggest that speed limiters can reduce truck maneuverability (such as a lengthened overtaking maneuver when trucks have to pass other trucks, and reduced capability to move out of way of merging vehicles). DSL can also increase the likelihood of faster moving passenger cars rear-ending slower moving trucks due to the speed variance introduced due to DSL.

An analysis of crash data in the MAASTO region found that crash rates in general are observed to be higher for states with DSL than for states with USL. For example, Illinois, a DSL state, have the highest overall number of CMV-involved fatalities within the region. The fatality rate for Illinois also remains high after normalizing number of fatalities by truck VMT. However, high fatality rates are also observed for Kentucky and Ohio, two USL states. Ohio also had the highest number of crashes involving more than five fatalities, as well as the highest number of multi truck crashes in the region. This suggests that no conclusive relationship between DSL implementation and crash rates can be derived directly from the data.

Proponents of DSL also argue that DSL can also reduce the severity of CMV-involved crashes when they do occur and thus reduce the likelihood of injuries and fatalities. Due to the heavy loads and high gross weights, trucks carry very high kinetic energy, especially at high speeds. Reducing truck speeds would greatly reduce energy and thus reduce the force of impact in case of crashes. However, the analysis performed comparing fatal crash rates to overall crash rates in DSL and USL states showed no statistically significant differences. This could once again by primarily due to Illinois registering high rates while other DSL states registering lower rates like with crash rates.

Number of interactions between traffic

A major argument against both truck speed and lane use restrictions is the resulting increase in traffic interactions. Truck speed limitations increase speed variance in overall roadway traffic. This would directly lead to increased number of traffic interactions between vehicles leading to an increase in discretionary lane changes (to pass slower moving vehicles), as well as more complex gap selections when faster moving vehicles wish to merge into roadways with slower trucks. Higher interactions have been known to be associated with adversely affecting safety. TLRs have a similar impact on traffic interactions as they can create barrier effects due to a ‘curtain’ of slower moving trucks that other vehicles have to navigate around and through (such as in merging).

Interestingly, speed limiters can potentially also reduce speed variability within trucks (as more aggressive truck drivers are also restricted to lower speeds matching with other trucks) which can decrease number of interactions between trucks and thus improve safety. This is an aspect that should be studied in further detail with focused research.

Number of crashes vs. crash rates

This study considered crash rates in the region measured in the form of either total number of crashes / fatal crashes or normalized by traffic volume in the form of crash rate per 100 million truck VMT. Across most results, Illinois registered high on crash rates which can be attributed to the disproportionately high traffic volumes in and around Chicago. While crash rate normalized by truck VMT is a better representation of safety than using total number of crashes, it is worth noting that crash likelihood does not necessarily scale linearly with traffic volume, and instead have a higher order interaction with traffic volume (higher volume not only results in more vehicles prone to crashes, but also more interactions for each vehicle, thus suggesting a second order relationship). This should be explored further in future studies on safety considerations.

Fuel usage, tire wear and tear, and pavement damage

A consideration that was brought in a few past studies reviewed was fuel usage and wear and tear of truck tires as well as of pavement. Lower vehicle speeds have been shown to reduce fuel consumption as well as reduce tire wear over time. This would apply to trucks under DSL / speed restrictions as well. Field tests have estimated up to 5% shaving in fuel consumption due to a 10mph reduction in truck speeds. Similarly, lane restrictions are expected to impact pavement wear and tear, reducing overall roadway pavement damage, but increasing pavement damage on truck lanes. However, most studies have found that the savings in fuel and damages is not substantial enough to be overall meaningful, and are offset by costs associated with increase travel times due to the reduced speeds.

Other Approaches

OOIDA maintains that while involvement of trucks in crashes and in fatal crashes is indeed a concern, truck speed and lane regulations are not the correct avenue for addressing these concerns. According to OOIDA, unsafe driving in the context of trucks is an issue related to tight shipper and receiver scheduling demands and driver compensation based on speed and time to deliver affecting driving behavior. While speed limitations might reduce truck speeds in high-speed rural interstate sections, unless driver compensation models and scheduling pressures are addressed and alleviated, unsafe driving would just shift to other roadways where speed limitations are not in place. This would not have an overall positive impact on safety but merely shift the location of unsafe roadway sections. Instead, federal and state agencies should implement oversight programs that encourage shippers to move to driver compensation models based on miles driven or loads hauled (via compensation and tax breaks to offset economic impact) and agencies should audit shippers and receivers scheduling demands where possible.

Unquantifiable / Intangibles

In addition to tangible factors and impacts that can be studied and evaluated using data, there are also intangible impacts of truck regulations. The most prominent intangible impact of speed and lane-use regulations would be driver (truck as well as neighboring vehicles) psyche. A driver in a passenger car following, and 'stuck behind', a slower moving truck (such as in a scenario with DSL but without TLR) could get impatient and get more erratic in driving behavior both while following, as well as after passing the slower moving truck. A truck driver limited by a speed limiter device can similarly decide to drive more aggressively (speeding) when they get to roadways with lower speed limits (under speed limiter setting). A truck driver might also get impatient if they get stuck having to follow a slower moving OSOW vehicle on roadways with right-lane-only TLR. Driver psyche can have a substantial impact on safety and can directly lead to crashes where they would have otherwise been avoided. These aspects are not quantifiable and thus have been ignored by most studies on the topic. An evaluation of such factors is, however, not impossible and can be achieved in a focused study of roadway sections with and without policy done over a larger duration of time.

Recommendations for MAASTO states

This study analyzes crash and safety data at a region-wide level, classifying roadway sections by policy implementations in place (primarily by state). A more controlled evaluation of the impact of truck speed and lane use restriction policies would require crash analysis obtained from either roadway sections where crash data is available under both regimes (with policy and without policy), or for a refined set of roadway sections that are similar and comparable in traffic usage volumes, driving behavior, and roadway geometry and only differ in policy implementation. This would require a more focused study. One possible avenue is for states to identify rural (multilane) interstate sections with known high crash rates and test DSL-TLR implementation specifically restricted to such regions.

MAASTO states should also work on harmonizing data formatting and storage for state crash data. While the study team was able to consolidate data from all states that supplied their crash reports, states should move towards standardizing their crash records. The HSIS system is a great initiative towards this goal and two MAASTO states are currently participants in the HSIS. Participation from the remaining eight states in HSIS would provide highly useful and streamlined access to state crash reports from all MAASTO states towards any future highway safety study.

The regionwide data analyzed in this study is ultimately inconclusive in determining whether DSL and TLR have a universally positive or negative impact on traffic safety, as policy implementation corresponds to increased crash and fatality rates in some states, and decreased rates in others, suggesting that other prominent factors are also affecting crash rates.

9. REFERENCES

[1] National Safety Council, "Large Trucks," [Online]. Available: https://injuryfacts.nsc.org/motor-vehicle/road-users/large-trucks/.

[2] Landline Media (OOIDA), "Thousands of truck drivers pushed back against speed limiters," [Online]. Available: https://landline.media/magazine/thousands-of-truck-drivers-pushed-back-against-speed-limiters/.

[3] U.S. Department of Transportation, "Research on the Safety Impacts of Speed Limiter Device Installations on Commercial Motor Vehicles: Phase II," 2012. [Online]. Available: https://www.govinfo.gov/content/pkg/GOVPUB-TD2_300-PURL-gpo27361/pdf/GOVPUB-TD2_300-PURL-gpo27361.pdf.

[4] M. Fontaine, L. Dougald and C. Bhamidipati, "Evaluation of truck lane restrictions in Virginia: Phase II," Virginia Transportation Research Council, 2009.

[5] Insurance Institute for Highway Safety, "Maximum Speed Limits," [Online]. Available: https://www.iihs.org/research-areas/speed/speed-limit-laws.

[6] Matrack, "US Speed Limits by State," [Online]. Available: https://matrackinc.com/us-speed-limits-by-state-guide/.

[7] Indiana State Government, "Indiana Code 9 Article 21 Traffic Regulations," [Online]. Available: in.gov/counties/monroe/files/1614261699_28004.pdf.

[8] Michigan State Legislature, "MCL - Section 257.627 - Michigan Vehicle Code," [Online]. Available: https://legislature.mi.gov/Laws/MCL?objectName=MCL-257-627.

[9] Illinois General Assembly, "625 ILCS 5/11-601," [Online]. Available: Illinois Vehicle Code 625 ILCS 5/11 – 601.

[10] FindLaw, "'No Trucks in the Left Lane' Laws by State," [Online]. Available: https://www.findlaw.com/injury/car-accidents/no-trucks-in-the-left-lane-laws-by-state.html.

[11] Virginia Transportation Research Council, FHWA, "The Safety Impacts of Differential Speed Limits on Rural Interstate Highways," 2004.

[12] S. L. Johnson and N. Pawar, "Cost/Benefit Evaluation of Large Truck-Automobile Speed Limit Differentials on Rural Interstate Highways," Mack-Blackwell Transportation Center, University of Arkansas, 2005.

[13] Transportation Research Board, "CTBSSP Synthesis 16: Safety Impacts of Speed Limiter Device Installations on Commercial Trucks and Buses," Federal Motor Carrier Safety Administration, 2008.

[14] Louisiana Transportation Research Center, "Literature Review of the Implications of Diferential Speed Limit Implementation," 2017.

[15] Owner Operator Independent Drivers Association, "Differential speed limits make roads less safe," [Online]. Available: https://www.ooida.com/wp-content/uploads/2018/08/18-Differential-Speed-Limits-Make-Roads-Less-Safe.pdf.

[16] OOIDA Foundation, "Speed Limiters will negatively impact safety," [Online]. Available: https://www.ooida.com/wp-content/uploads/2018/08/19-Speed-Limiters-will-Negatively-Impact-Safety.pdf.

[17] Owner Operation Independent Drivers Association, "OOIDA Supports Bill to Prevent Dangerous FMCSA Mandate," [Online]. Available: https://www.ooida.com/2025/ooida-supports-bill-to-prevent-dangerous-fmcsa-mandate-2/.

[18] OOIDA Foundation, "Review of NHTSA and FMCSA’s Speed Limiting," 2016.

[19] OOIDA, "OOIDA Supports US Senate Bill to Prevent Dangerous Federal Speed Limiter Mandate," May 2025. [Online]. Available: https://www.ooida.com/2025/ooida-supports-us-senate-bill-to-prevent-dangerous-federal-speed-limiter-mandate/.

[20] OOIDA, "Truckers cheer DOT withdrawal of dangerous mandate," July 2025. [Online]. Available: https://www.ooida.com/2025/truckers-cheer-dot-withdrawal-of-dangerous-mandate/.

[21] American Trucking Associations, "Speed Limiters: What to Know About FMCSA's Latest Announcement," [Online]. Available: https://www.trucking.org/news-insights/speed-limiters-what-know-about-fmcsas-latest-announcement#:~:text=ATA's%20Position,technologies%20shifted%20the%20safety%20discussion..

[22] American Trucking Associations, "Speed Limiters 101," [Online]. Available: https://www.trucking.org/news-insights/speed-limiters-101.

[23] Institute for Safer Trucking, [Online]. Available: https://www.safertrucking.org/.

[24] The Truck Safety Coalition, "Speed Limiters," [Online]. Available: https://trucksafety.org/speed-limiters/.

[25] The Trucking Alliance, "About The Trucking Alliance," [Online]. Available: https://truckingalliance.org/the-alliance/.

[26] The Trucking Alliance, [Online]. Available: https://truckingalliance.org/the-trucking-alliance-strongly-urges-the-house-transportation-infrastructure-committee-to-oppose-h-r-3039-also-known-as-the-drive-act/.

[27] Truckload Carriers Association, "TCA - What we do," [Online]. Available: truckload.org/what-we-do/.

[28] Truckload Carriers Association, "TCA Announces Support of Speed Limiter Legislation," [Online]. Available: https://truckload.org/news/tca-announces-support-of-speed-limiter-legislation/.

[29] S. Das, M. Le, M. Pratt and C. Morgan, "Safety effectiveness of truck lane restrictions: A case study on Texas urban corridors," *International Journal of Urban Sciences,* 2019.

[30] OOIDA Foundation, "The-Dangers-of-Lane-Restrictions," [Online]. Available: https://www.ooida.com/wp-content/uploads/2018/08/Paper-6-The-Dangers-of-Lane-Restrictions.pdf.

[31] Landline Media, "Several states may consider left lane bills to restrict trucks," [Online]. Available: https://landline.media/magazine/several-states-may-consider-left-lane-bills-to-restrict-trucks.

[32] National Highway Traffic Safety Administration, "Fatality Analysis Reporting System," [Online]. Available: nhtsa.gov/research-data/fatality-analysis-reporting-system-fars.

[33] National Highway Traffic Safety Administration, "Fatality Analysis Reporting System Analytical User's Manual," August 2025. [Online]. Available: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813706.

[34] Federal Highway Administration, "Motor Carrier Management Information System (MCMIS)," [Online]. Available: https://highways.dot.gov/safety/data-analysis-tools/rsdp/rsdp-tools/motor-carrier-management-information-system-mcmis.

[35] NHTSA, "Crash Report Sampling System," [Online]. Available: https://www.nhtsa.gov/crash-data-systems/crash-report-sampling-system.

[36] National Highway Traffic Safety Administration, "Crash Report Sampling System Analytical User's Manual," 2023. [Online]. Available: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813707.

[37] Federal Highway Administration, "Highway Safety Information System (HSIS)," [Online]. Available: https://highways.dot.gov/safety/data-analysis-tools/rsdp/rsdp-tools/highway-safety-information-system-hsis.

[38] Federal Highway Administration, "Highway Statistics Series," [Online]. Available: https://www.fhwa.dot.gov/policyinformation/statistics.cfm?utm_source=chatgpt.com.

[39] Mid America Freight Coalition, "MAFC Report #18: Identification and Characterization of the MAASTO Region's Multimodal Freight Network," 2019.

[40] Federal Emergency Management Administration, "FEMA Glossary," [Online]. Available: https://training.fema.gov/programs/emischool/el361toolkit/glossary.htm.

APPENDIX A – QUESTIONNAIRE RESPONSES FROM STATE SAFETY PROFESSIONALS

Question: Do you see safety concerns with truck lane restrictions and speed limitations (in the form of differential speed limits between cars and CMVs, or speed governors equipped within trucks) for CMVs?
It is difficult to say without reviewing crash data specific to CMVs on freeways. I think it is important for the two restrictions to work together. If there are lower speed limits for CMVs, then there should also be lane restrictions that keep them to the right side and enable orderly passing of them by passenger vehicles. If CMVs have the same speed limit as passenger vehicles, I do not see a strong need to restrict their lane utilization based on safety concerns. Adding to this…CMV crashes often result in greater severity due to their size/weight. Having lower speed limits for these vehicles should, theoretically, enable their drivers to avoid crashes in situations such as unexpected slowdowns and stopped traffic situations or at least lower the severity of a crash does occur. For this reason, I believe there is merit to lower speed limits for CMVs.
Yes, having various speeds on roadways could create other issues that can translate into crashes. For those driving on the segment, differential speeds can cause friction, turbulence, and other issues that could translate into crashes. The other issue is on non-grade-separated facilities; drivers on side streets could have difficulty selecting the correct gaps if traffic is operating at different speeds, especially if certain size vehicles are operating at different speeds. I will add this is mostly theoretical but based on practical knowledge. I have not seen nor am I aware of specific studies that have looked at this issue and done an analytical review of crash data or pointed to specific differences. Most of my knowledge comes from past experiences of others who have claimed it does not work.
Differential speed limits create greater speed variance between the slowest and fastest vehicles. This can contribute to crashes and may lead to riskier behavior on the roadway. WisDOT has not allowed different regulatory speeds for trucks on our highways per the Wisconsin Manual on Uniform Traffic Control (WMUTCD).

Question: Has the state tried using differential speed limits or right-only lane restrictions for trucks, either on select corridors (I-70, I-75, I-80, I-90, I-94), or in the past?
Yes, Michigan has different speed limits on freeways for CMVs. The general speed limit for passenger vehicles is 70 mph while the speed limit for CMVs is 65 mph. Michigan also requires CMVs to travel in the two right-most lanes when a freeway has 3 more lanes.
Not that I am aware. Nothing within recent memory.
No. Our current WMUTCD doesn't allow posting multiple speed limits on our roadways except for ATV/UTV vehicles.

Question: Has the state done any studies on these types of truck regulations and their benefits / challenges?
Not to my knowledge.
No.
No, but we've reviewed research completed in other states that have truck restrictions.

Question: Your experience with speed differentials between trucks (CMVs) and cars.
Mostly anecdotal and observing slower moving semi's operating with higher speed passenger cars.
We recognize that differential speed limits create greater speed variance which is why Wisconsin has elected to not allow different regulatory speeds for trucks on our highway, as such our experience with this specific to CMVs or other vehicles is limited.

Question: What are major safety issues from your / state's perspective with respect to right lane only regulations and speed restrictions for CMVs? How is the resulting highway environment and the interactions between trucks and other vehicles affected by these safety issues?
No one has really pushed for them either from a legislative or policy perspective.
We are aware that other states have truck-specific lane restrictions, and some prohibit trucks in the far-left lane on multilane highways. However, there may be a lot of variation by state (e.g., different definitions of what a truck is, prohibitions may be for certain areas or may only allow under certain circumstances such as for passing, etc.). There is no nationwide regulation or standard on truck only left lane prohibitions at this time. The most reliable safety study we've seen found that crashes increased when trucks were restricted from the leftmost lane of multilane freeways that had greater than 10,000 vehicles per day per lane. Freeways with less than 10,000 vehicles per day per lane showed a small reduction in crashes. Our main safety concerns with this would be the creation of a greater speed variance between vehicles which could lead to riskier behavior, and concentrating trucks into certain lanes accelerates pavement damage in those lanes.

Question: What are some best practices practiced by your state to mitigate CMV involved incidents for these types of accidents:
Overall, when any major roadway crash or incident involving a CMV occurs, our Traffic Management Center (TMC) provides traveler information through various mechanisms including our message boards and our 511 website which is integrated with WAZE. **Lane crossover:** WisDOT does not have any safety treatments specifically designed to mitigate CMV crashes, however we install many safety treatments to mitigate lane departure crashes. Paved shoulders, rumble strips, medians, median barriers including high-tension cable barrier, and pavement markings are installed to mitigate lane departure crashes. We recently increased our channelizing pavement markings to a larger size. **Rear end, Stationary:** We have no practice for these types of crashes. If they are on the shoulder, see below. In work zones, we have been using Queue Warning Systems to alert drivers of stopped or slow vehicles ahead. **Accidents on shoulders and ramps:** Our Move Over / Slow Down law requires vehicles to move over for any disabled vehicles on our highways.
Lane crossover: Cable barrier, shoulder rumble strips **Rear end, Stationary:** Stopped traffic advisories and transverse rumble strips in work zones. Queue warning systems
Lane crossover: Cable Median Barrier, Concrete Median Barrier, 60’ width median separation on divided highways, centerline rumble strips. **Rear end, Stationary:** Improved signal timing. **Accidents on shoulders and ramps:** Wider shoulders/ramps at higher volume roadways

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