DRAFT

CHARACTERIZING COMMERCIAL VEHICLE SAFETY IN RURAL MONTANA

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1 INTRODUCTION

Despite the fact that they are less frequent than other types of vehicular crashes, commercial vehicle crashes receive considerable attention in the U.S. due to their high severity and resulting economic loss. At a national level, the Federal Motor Carrier Safety Administration (FMCSA) has set stringent goals focused on enhancing commercial vehicle safety through reduced crash severity levels and improved: (1) consistency and effectiveness of enforcement, (2) identification and targeting of those at high-risk and (3) research efforts to enhance and promote commercial vehicle safety practices.

Montana, as with other predominantly rural states, faces somewhat unique challenges with respect to commercial vehicle safety. Unlike commercial vehicle crashes that occur in urban areas, rural commercial vehicle crashes typically involve a single vehicle, occur at higher speeds, are more severe and take longer to be detected and responded to. Further, available regulatory and enforcement resources for commercial vehicle safety monitoring are limited. Montana's large geographic expanse challenges post-crash improvements that could limit the occurrence of fatalities, such as reduced emergency medical response times to the crash. Hence, efforts to improve commercial vehicle safety in Montana must focus on commercial vehicle crash *prevention,* targeting those at highest risk for a severe crash.

The objective of this research is to characterize commercial vehicle safety levels in Montana on the basis of driver, vehicle, cargo, carrier and other characteristics (i.e., roadway geometry, traffic volumes, etc.) using advanced statistical modeling methods. As an example, if the commercial vehicle safety-related data were to indicate low safety levels for out-of-state drivers, carriers with small vehicle fleets and haulers of flatbed trailers, both roadside and on-site carrier-based safety inspections could be performed with these characteristics in mind. On the roadside, regulatory and enforcement personnel could adjust their selection of commercial vehicles for roadside safety inspections; currently vehicles are selected for safety inspections on the basis of historical crash or safety records. As part of a more detailed carrier-based safety inspection program, regulatory and enforcement personnel could increase the frequency of safety inspections for carriers possessing the characteristics that show a lower safety level.

Ultimately, an understanding of the driver, vehicle, cargo, carrier and other characteristics that are most likely to result in a crash, particularly a severe crash, can assist regulatory and enforcement agencies in addressing safety problems in a *preventative* rather than reactionary manner. An additional benefit of this effort, and certainly of concern to public agencies in predominantly rural states, is the ability to make better use of existing resources. Resources are typically more limited and geographic expanses greater in rural states. Having the ability to focus scarce regulatory and enforcement resources on commercial vehicles highest at risk for safety-related problems, public agencies can perform their duties more effectively and efficiently without additional personnel.

Note, that only large trucks having a gross vehicle weight (GVW) of 10,000 pounds or greater are considered in this investigation; buses are excluded. Differences with respect to cargo and passenger transport vehicles between safety protocol, regulation and enforcement activities for and vehicle-handling characteristics were thought to confound this investigation. Further, the proportion of bus-involved crashes is small compared to that of large truck-involved crashes.

This Chapter details the problem at hand nationally and with respect to Montana's commercial vehicle crashes, describes the study area, and provides background information pertaining to existing Federal, State and industry efforts to improve commercial vehicle safety.

Following this introductory material, Chapter 2 describes findings from recent literature pertaining to commercial vehicle safety. Chapter 3 describes this effort's methodology in identifying influential driver, vehicle, cargo, carrier and operating environment characteristics. Chapter 4 expounds on the findings of this investigation and Chapter 5 contains recommendations for implementation and future work.

1.1 PROBLEM DESCRIPTION

In 1999, there were more than 452,000 traffic crashes involving large trucks in the U.S. These crashes accounted for approximately 13 percent of all traffic-related fatalities and 4 percent of all injuries. (1) Contributing to this elevated level of severity are the physical characteristics of large trucks: (1) the difference in mass between large trucks and non-trucks results in a near instantaneous velocity change upon impact, (2) the high rigidity of a commercial vehicle's

structure results in energy dissipation through the collapse of the smaller vehicle, and (3) the height of the truck results in damage to the upper and weaker parts of the smaller vehicle.

Despite this high rate of severity, truck-involved crash *rates* (i.e., crash frequency) tend to be lower than that of non-trucks because:

- trucks typically travel more interurban miles,
- trucks register higher mileage in general,
- truck drivers are generally more skilled, and
- vehicle maintenance of trucks is generally stricter. (2)

Given these noted observations of truck crash severity and frequency, much of the effort towards improved commercial vehicle safety focuses on severity levels. In the FMCSA's draft *2010 Strategy* (1), the primary goals relate to improving commercial vehicle crash severity: (1) reduce the number of injuries in large truck-related crashes by 20 percent by fiscal year 2008 and (2) reduce the number of large truck-related crash fatalities 50 percent by fiscal year 2009.

Nationally, efforts to improve commercial vehicle safety will be challenged by contrary traffic and industry trends:

- increasing international trade will lead to more intermodal freight shipments and north-south, cross-border traffic for long haul trucks;
- continued and growing demand for real-time visibility of shipments and just-in-time freight delivery will heighten competitive pressures already placed on drivers and carriers;
- growth in e-commerce will impact truck distances traveled and travel patterns (e-commerce, particularly business-to-consumer, favors transportation in smaller lot sizes delivered by carriers with nationwide distribution systems); and
- declining availability of commercial vehicle drivers will result in more new drivers with less experience. (1)

The effectiveness of these safety improvement measures is further challenged in a predominantly rural state such as Montana that experiences significant commercial vehicle traffic, a large geographic expanse and limited regulatory and enforcement resources.

1.1.1 Uniqueness of Montana's Commercial Vehicle Crashes

Each year, approximately 1,000 commercial vehicle crashes occur within the State of Montana. Between January 1, 1993 and December 31, 1999, 6,583 commercial vehicle crashes occurred; 6,524 involving large trucks (see Figure 1). As noted previously, Montana's commercial vehicle crashes typically involve a single vehicle, occur at higher speeds, take longer to be detected and responded to and are more severe than nationally reported averages.

Vehicular Involvement. Given Montana's rural environment and low traffic volumes, one would expect a higher proportion of single-vehicle rather than multiple-vehicle crashes as compared to national averages. For the seven-year time span (1993 to 1999) large truck-involved crashes in Montana comprised 46 percent single-vehicle crashes and 54 percent multiple-vehicle crashes. Figure 2 demonstrates the uniqueness of Montana's crashes as compared to national averages for this same time period. Nationally, large truck-involved crashes comprised only 28 percent single-vehicle crashes and 72 percent multiple-vehicle crashes. (3)

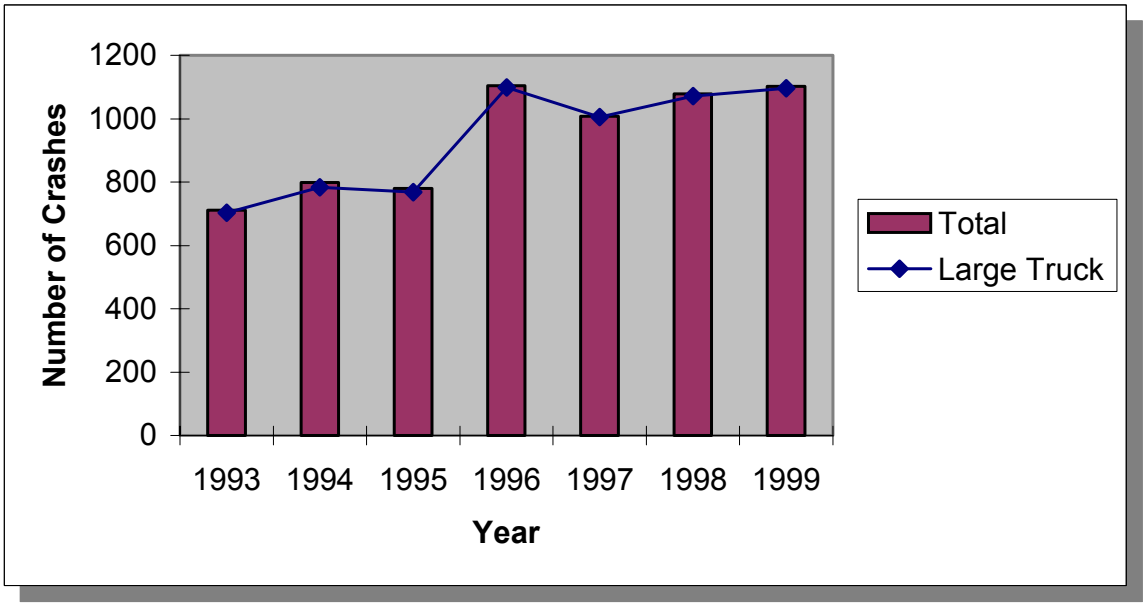

Figure 1. Montana's Commercial Vehicle Crashes, 1993-1999.

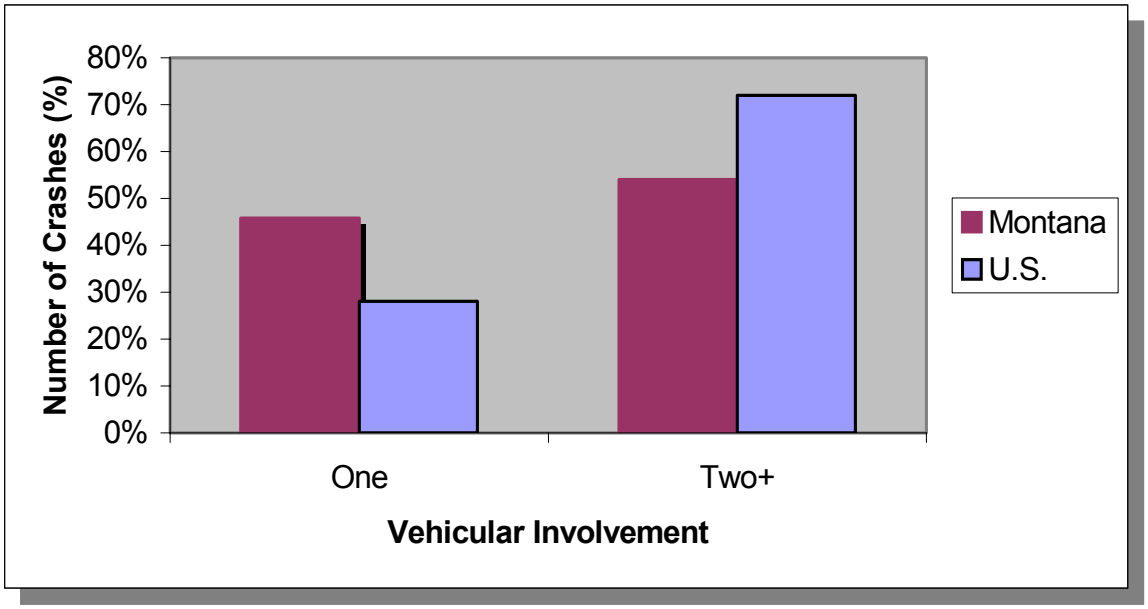

Figure 2. Comparative Vehicular Involvement, 1993-1999.

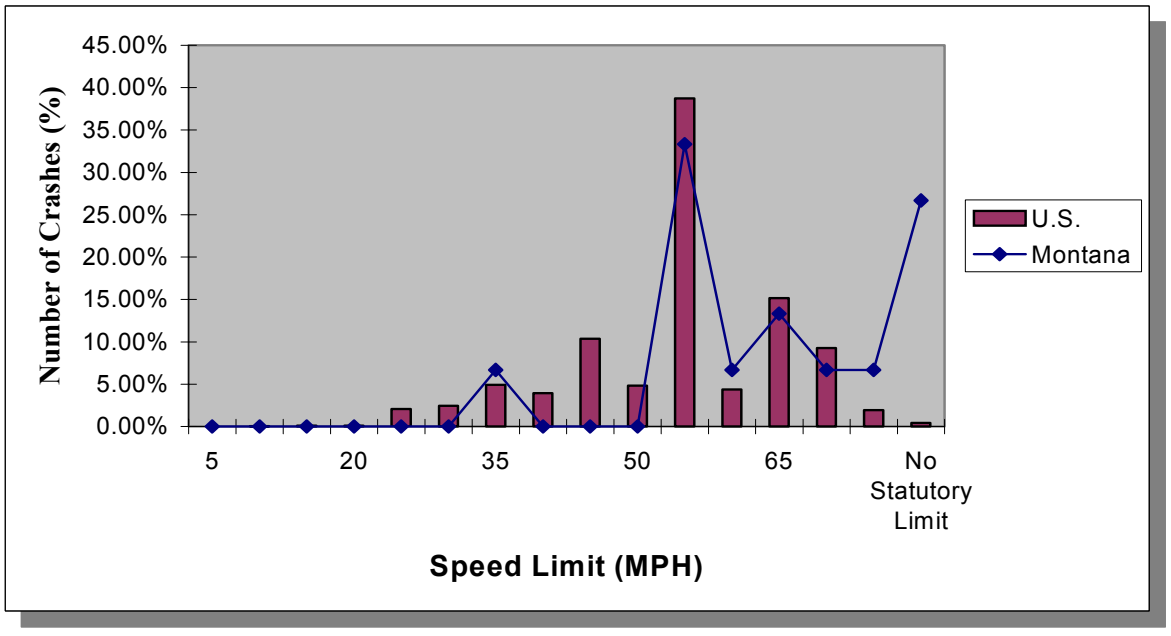

Figure 3. Comparative Fatal Crash Frequency by Speed, 1999.

Speed. In general, vehicular crashes involving large trucks occur at higher speeds in Montana than they do nationally. Data from the Fatal Accident Reporting System (FARS) for the year 1999 illustrates that 60 percent of all fatal crashes in Montana occurred at speeds of 60 MPH or greater, while only 31 percent of fatal crashes nationally occurred at comparable speeds (see Figure 3). (3)

Severity. The combination of higher speeds and single-vehicle involvement result in a higher overall fatality and injury rate in Montana than is seen nationally. In each case, the majority of crashes resulted in only property damage (PDO); 71.02 percent in Montana as compared to 75.58 percent nationally. Of more interest for this investigation is the difference in crash proportions resulting in fatalities or injuries. The proportion of crashes resulting in injuries is approximately 3.5 percent higher in Montana as compared to national averages between 1993 and 1999. More notably, the proportion of large truck-involved crashes resulting in fatalities in Montana is nearly double that of national averages (though the number of resulting fatalities are still relatively small) (see Figure 4). (3)

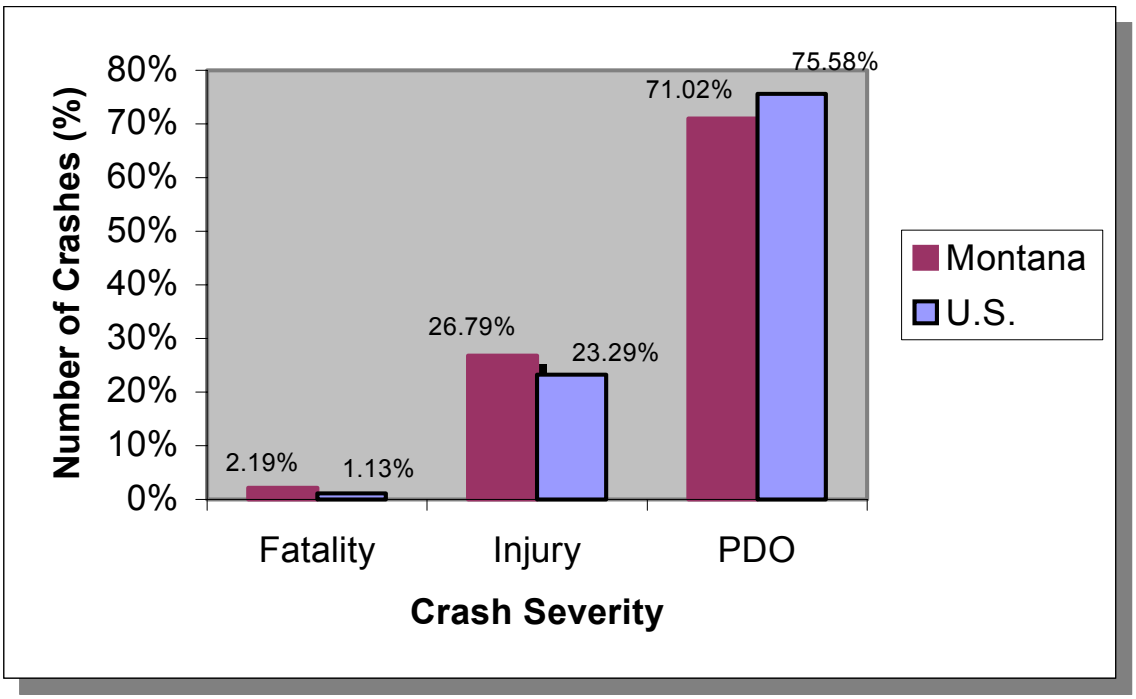

Figure 4. Comparative Crash Severity, 1993-1999.

1.2 DESCRIPTION OF THE STUDY AREA

Montana is located in the Northwestern Region of the United States and shares its borders with Idaho, Wyoming and North and South Dakota, all of which are rural states. Montana shares its northern border with three Canadian Provinces: British Columbia, Alberta and Saskatchewan.

1.2.1 Demographics

Montana is the 4th largest state in the U.S. measuring approximately 500 miles east to west and 300 miles north to south (148,000 square miles). While 4th largest in size, the state is ranked 44th in population with a sparse 902,195 residents. (4) Comparing its geographic expanse to its population density results in an average population distribution of only 6 residents per square mile.

The largest population base is located in southeastern Montana; Yellowstone County has 127,000 residents. The City of Billings is the County Seat, as well as the largest city in the state with a population of 88,000 residents. Other population centers are located in the counties surrounding the cities of Missoula, Great Falls, Helena, Butte, Bozeman and Billings. These counties account for 50.6 percent of the population base while only accounting for 10 percent of the landmass. Accordingly, nearly 48 percent of the population lives and works in the rural areas of Montana. (5)

1.2.2 Economy

The primary forms of industry within the State are agriculture, lumber and wood products, tourism, food processing and mining. Agriculture products include cattle, hogs, wheat, barley, sugar beets, and hay. Transportation provides a critical link between these industries and their respective markets; 92 percent of all agricultural products and 82 percent of manufactured goods are transported by rail and truck, respectively. (4)

1.2.3 Roadways and Trade Corridors

Three interstate highways and numerous primary and secondary roadways comprise the nearly 70,000 miles of public roads in Montana. The north-south Interstate-15 connects the Alberta Province with the lower 48 states, while the east-west Interstates 90 and 94, in part, link the New England states to the west coast (see Figure 5). Figure 6 summarizes total and truck traffic volumes for major roadways in Montana.

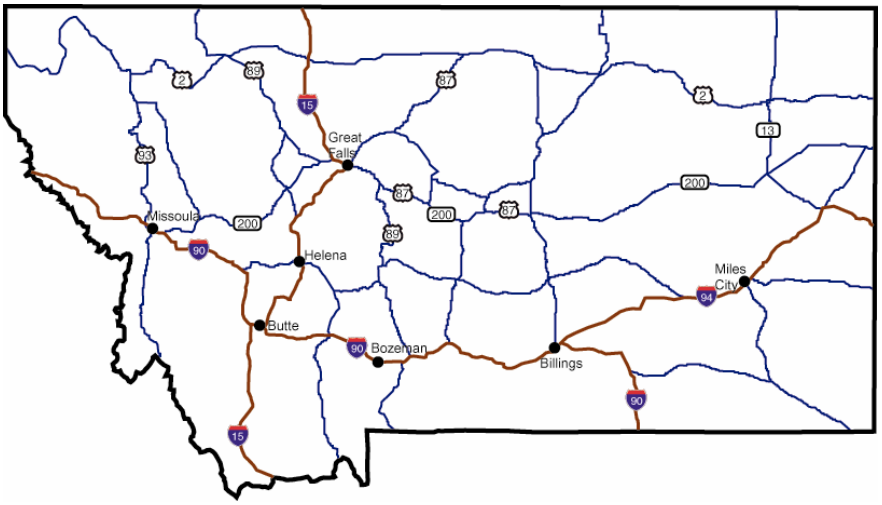

Figure 5. Montana's Interstate and Primary Roadway System.

1.3 Existing Efforts to Improve Commercial Vehicle Safety

At the Federal level, safety regulation of the interstate trucking industry began in 1935 with the *Motor Carrier Act*. Since that time, several statutory milestones have helped shape the safety monitoring activities at both Federal and State levels.

- The *Motor Carrier Safety Act of 1984* required that regulations under the 1935 Act be revised, inconsistent state regulations be preempted and a procedure to determine the safety fitness of owners and operators of commercial vehicles operating in interstate commerce be developed. (6)
- The *Commercial Motor Vehicle Safety Act of 1986* required that all interstate truck drivers have a single commercial driver's license. (6)

- The *Motor Carrier Safety Act of 1990* required the publication of company names having unsafe motor carrier procedures, prohibited a company with an unsatisfactory safety rating from transporting hazardous materials or passengers and required enforcement action under certain circumstances. (6)

- As part of a department-wide initiative, the Federal Highway Administration (FHWA) in 1988 issued regulations requiring drug testing of truck drivers. (6)

- The *Motor Carrier Safety Act of 1999* created the Federal Motor Carrier Safety Administration (FMCSA) and required the U.S. Department of Transportation (USDOT) to develop a long-term strategy for improving commercial motor vehicle, operator and carrier safety. (1)

The requirements of each of these statutory regulations are carried out in partnership at Federal, State, and industry levels.

At the Federal Level, the FMCSA, formerly the FHWA - Office of Motor Carriers (OMC) and before that, the Interstate Commerce Commission (ICC) - Bureau of Motor Carrier Safety (BMCS), is the primary regulatory agency. FMCSA's primary mission is to prevent commercial motor vehicle-related fatalities and injuries. FMCSA ensures safety in motor carrier operations through: (1) strong enforcement of safety regulations, (2) targeting high-risk carriers and commercial motor vehicle drivers, (3) improving safety information systems and commercial motor vehicle technologies, (4) strengthening commercial motor vehicle equipment and operating standards, and (5) increasing safety awareness. The attainment of this mission is manifested in three activities: (1) roadside inspections, (2) compliance reviews and (3) educational contacts (detailed later in this Chapter). (1)

1.3.1 Motor Carrier Safety Assistance Program (MCSAP)

These three activities are largely supported through a federal grant program established by the *Surface Transportation Assistance Act of 1982*, the Motor Carrier Safety Assistance Program (MCSAP) (see Figure 7). States can apply for different levels of funding depending on conditions, performance or need. In addition to roadside inspections, compliance reviews and educational contacts, MCSAP also requires activities related to traffic enforcement and data collection.

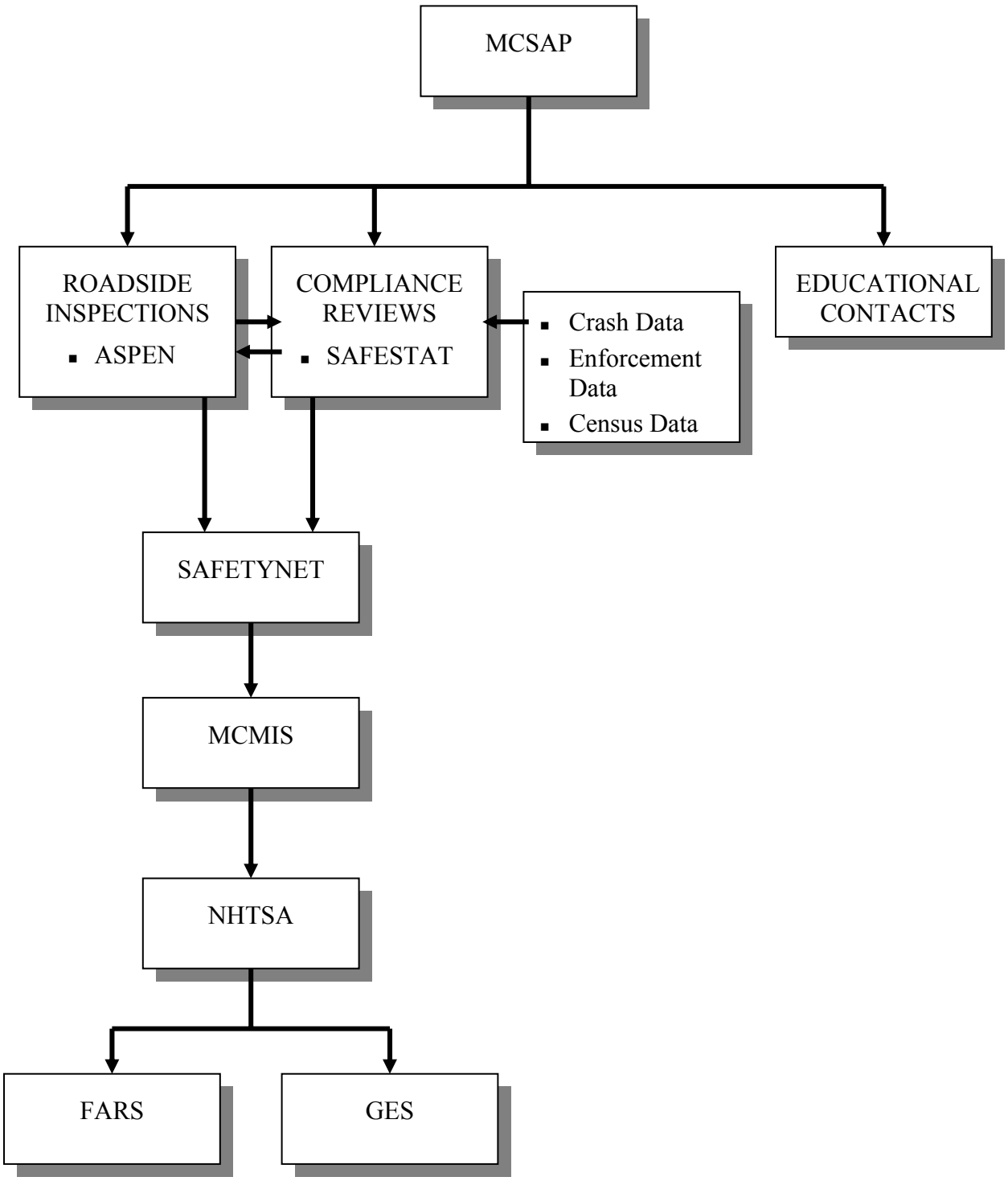

Figure 7. Existing Efforts to Improve Commercial Vehicle Safety.

In Montana, MCSAP activities are performed by the Montana Highway Patrol (MHP) in partnership with the Motor Carrier Services (MCS) Division of the Montana Department of Transportation (MDT). Personnel comprise:

- civilian MHP and MCS employees capable of performing roadside safety inspections;
- Uniformed, weapon-carrying MHP officers not dedicated to safety enforcement but capable of performing roadside inspections and
- FMCSA inspectors who oversee the MCSAP program and perform compliance reviews. (7)

1.3.2 Roadside Inspections

Roadside inspection procedures follow a standard known as the North American Driver/Vehicle Inspection Criteria established by the Commercial Vehicle Safety Alliance (CVSA). CVSA defined 6 levels of inspection (see Table 1):

LEVEL I: North American Standard (NAS) Inspection. Level I inspections include examination of all applicable driver and vehicle credentials as well as physical condition.

LEVEL II: Walk-Around Driver/Vehicle Inspection. Level II inspections include, as a minimum, each of the items specified under the Level I NAS Inspection. Additional items may be checked, though the walk-around driver/vehicle inspection should include only those items that can be inspected without physically getting under the vehicle.

LEVEL III: Driver-Only Inspection. Level III inspections comprise a roadside examination of driver-related credentials and condition. Oftentimes however, the vehicle inspection report and hazardous material requirements (as applicable) will be examined in conjunction with the driver-related observations.

LEVEL IV: Special Inspections. Level IV inspections typically include a one-time examination of a particular item. These examinations are normally made in support of a study or to verify or refute a suspected trend.

Table 1. North American Driver/Vehicle Inspections.

	LEVEL					
	I	II	III	IV	V	VI
DRIVER						
Driver's license	✔	✔	✔			
Medical examiner's certificate and waiver	✔	✔	✔			
Alcohol and drugs	✔	✔	✔			
Driver's record of duty status as required	✔	✔	✔			
Hours of service	✔	✔	✔			
Seat belt	✔	✔	✔			
VEHICLE						
Vehicle inspection report	✔	✔	✔		✔	
Brake system	✔	✔			✔	
Coupling devices	✔	✔			✔	
Exhaust system	✔	✔			✔	
Frame	✔	✔			✔	
Fuel system	✔	✔			✔	
Turn signals	✔	✔			✔	
Brake lamps	✔	✔			✔	
Tail lamps	✔	✔			✔	
Head lamps	✔	✔			✔	
Lamps on projecting loads	✔	✔			✔	
Safe loading	✔	✔			✔	
Steering mechanism	✔	✔			✔	
Suspension	✔	✔			✔	
Tires	✔	✔			✔	
Van and open-top trailer bodies	✔	✔			✔	
Wheels and rims	✔	✔			✔	
Windshield wipers	✔	✔			✔	
Emergency exits on buses	✔	✔			✔	
Hazardous material requirements	✔	✔	✔		✔	

Special Inspections – Any Item may be Inspected

Radiological Shipments Only

LEVEL V: Vehicle-Only Inspection. Level V inspections include each of the vehicle inspection items specified under the Level I NAS Inspection. Level V inspections can be conducted at any location, with or without a driver present.

LEVEL VI: Enhanced NAS Inspection for Radioactive Shipments. Level VI inspections are conducted for select radiological shipments. Because of the sensitivity of the cargo, enhanced inspection procedures, radiological requirements, and the out-of-service criteria are used.

Under any of these inspections, if the driver or vehicle fails to meet the requirements of the out-of-service (OOS) criteria, the inspecting officer will not allow the vehicle to proceed until the requirements have been met. A citation may also be issued.

Historically, commercial vehicles were selected for roadside safety inspections either randomly or through visual verification of a CVSA decal that denoted a positive safety record (those without the decal displayed were selected for inspection). Advances in computer and communication technologies allowed for improvements to this selection method. ASPEN, a vehicle safety and inspection software package, allows electronic: (1) data collection and input by inspection officers, (2) roadside access to motor carrier safety and commercial driver's license information and (3) transmission of completed inspection data to the state-level safety information database, SAFETYNET, via a communication system and processor, AVALANCHE.

Inspection Selection System (ISS). The Inspection Selection System (ISS), an enhancement to the ASPEN system, was developed in response to a 1995 Congressional mandate calling for the use of prior carrier safety data to guide in the selection of commercial vehicles and drivers to undergo inspection. The ISS targets "problem carriers" on the basis of:

- poor prior safety performance shown by either: (1) higher than average driver or vehicle OOS rates as determined through roadside inspections or (2) an unsatisfactory compliance review rating;
- few or no roadside inspections in the previous two years (taking into account the size of the carrier) or
- a known history of regulatory violations (i.e., hours of service, etc.).

Ultimately, the ISS is designed to be incorporated into the pre-clearance process. Now, however, roadside inspectors must manually enter the carrier's USDOT number into an on-site computer utilizing the ISS software. After polling a centralized database of safety-related information, ISS provides the roadside inspector with an "inspection value." Higher values suggest the need for a roadside inspection. Note that the ISS selects on the basis of *carrier* performance and is not vehicle- or driver-specific.

In 1997, Lantz, et al. investigated the effectiveness of ISS in targeting problem carriers. Using inspection data from 1996 that comprised approximately 40,000 roadside inspections, the authors found the following:

- the vehicle OOS rate was 33.7 percent for ISS-targeted carriers versus 20 percent for non-targeted carriers and
- the driver OOS rate was 13.5 percent for ISS-targeted carriers versus 9.9 percent for non-targeted carriers.

While the ISS does show an improvement in enforcement efforts, the improvement is not as significant as one would hope. Secondly, a noted shortcoming in the ISS system is that it only calculates an inspection value for carriers that have had a minimum of three roadside inspections in the last two years. Two-thirds of all carriers are excluded on the basis of this criteria. (8)

1.3.3 Compliance Reviews

Compliance reviews, conducted at the carrier's place of business, consist of an audit of safety-related records. Compliance reviews are intended to determine a carrier's compliance with safety regulations and identify any apparent risk to highway safety posed by the carrier. Specifically, compliance reviews result in the assignment of a carrier-specific "safety fitness rating" of "satisfactory," "conditional," or "unsatisfactory." If satisfactory, compliance reviews may also allow a carrier's participation in voluntary compliance programs tied to monetary or timesavings benefits (i.e., pre-clearance). If conditional or unsatisfactory, compliance reviews may result in enforcement action and monetary penalties.

In 1993, the FHWA's Office of Motor Carriers (now FMCSA) began efforts to improve the assessment of a carrier's safety fitness. Noted shortcomings of the existing assessment procedure included the following:

- a carrier's safety fitness was based solely on a single, one-time, on-site compliance review;
- the safety fitness rating remained until another compliance review was performed;
- only carriers participating in compliance reviews received a safety fitness rating - out of 400,000 active interstate carriers, only approximately 10,000 are reviewed for safety compliance annually;
- the compliance review process was labor-intensive, usually taking several days per review and
- other related safety data, such as state-reported crash reports, roadside inspections, enforcement actions or moving violations, was not utilized to determine a carrier's safety fitness.

Safety Status Measuring System (SAFESTAT). In response to these shortcomings, the Safety Status Measuring System (SAFESTAT) was developed. SAFESTAT is a data-driven analysis system designed to improve the safety fitness assessment process by incorporating roadside inspection information and enforcement history with compliance review information to measure an overall relative safety fitness of interstate carriers. SAFESTAT targets four areas: (1) accident history, (2) driver performance/condition, (3) vehicle performance/condition and (4) safety management measures. SAFESTAT can be used to target individual motor carriers for compliance reviews much in the same way that ISS is used to target carriers for roadside inspections. Benefits to SAFESTAT include its ability to incorporate all current safety-related data and to continually assess the safety status of carriers.

In 1988, Madsen and Wright evaluated the effectiveness of SAFESTAT in accurately assessing motor carrier safety fitness. Specifically, the authors considered whether SAFESTAT identified carriers that were indeed high safety risk carriers. Using historical data, the authors used SAFSTAT to identify carriers that were "at risk" and carriers that had less severe, yet poor safety fitness ratings and compared this identification with the historical crash experience. Carriers identified by SAFESTAT as "at risk" had a 169 percent higher crash rate than carriers not

identified as high risk. Carriers identified as having poor safety fitness by SAFESTAT had a 41 percent higher crash rate than carriers not identified. (9)

Performance and Registration Information Systems Management (PRISM). SAFESTAT is currently being utilized as part of the Performance and Registration Information Systems Management (PRISM) program (formerly referred to as the Commercial Vehicle Information System (CVIS)). PRISM began as a mandate by Congress to explore the potential of linking the commercial vehicle registration process to motor carrier safety. The intent of Congress as stated in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, was to "link the motor carrier safety information network system of the Department of Transportation and similar State systems with the motor vehicle registration and licensing systems of the states" to achieve two purposes:

- determine the safety fitness of the motor carrier prior to issuing license plates and
- cause the carrier to improve its safety performance through an improvement process and, where necessary, the application of registration sanctions.

The PRISM program includes two major processes - the Commercial Vehicle Registration Process, and the Motor Carrier Safety Improvement Process (MCSIP) - that work in parallel.

The Commercial Vehicle Registration Process provides the framework for the PRISM program. It serves two vital functions. First, it establishes a system of accountability by ensuring that no vehicle is license plated without identifying the carrier responsible for the safety of the vehicle during the registration year. Second, the use of registration sanctions (i.e., denial, suspension and revocation) serves as a powerful incentive for unsafe carriers to improve their safety performance.

MCSIP is the means by which carrier safety is systematically tracked and improved. MCSIP carriers that do not improve their safety performance face progressively more stringent penalties that may culminate in a Federal “imminent hazard” determination and possible suspension of vehicle registrations by the State. Within MCSIP, carriers with potential safety problems are identified and prioritized for an on-site review using the Motor Carrier Safety Status (SAFESTAT) prioritization program described previously.

1.3.4 Educational Contacts

Educational contacts, formerly termed "safety reviews," are conducted at a carrier's place of business with the intent to provide education and technical assistance to the motor carrier regarding safety compliance. Unlike the previous safety review procedure, the carrier is no longer assigned a safety rating during this activity.

The FMCSA has produced *A Motor Carrier's Guide to Improving Highway Safety* to support the education and technical assistance program. This booklet is comprised of thirteen parts, each containing a specific safety regulation topic that is covered in the Federal Motor Carrier Safety Regulations (FMCSRs):

- Part 382: Alcohol And Drug Testing Requirements,
- Part 383: Commercial Driver's License Standards: Requirements And Penalties,
- Part 385: Safety Fitness Procedures,
- Part 387: Minimum Levels Of Financial Responsibility For Motor Carriers,
- Part 390: Federal Motor Carrier Safety Regulations: General,
- Part 391: Qualification Of Drivers,
- Part 392: Driving Of Motor Vehicles,
- Part 393: Parts And Accessories Necessary For Safe Operation,
- Part 395: Hours Of Service Of Drivers,
- Part 396: Inspection, Repair, And Maintenance,
- Transportation Of Hazardous Materials,
- Motor Carriers Of Passengers and
- Accident Countermeasures.

Educational contacts typically receive lowest priority; roadside inspections and compliance reviews take precedence.

1.3.5 Data Management

At the state level, roadside inspection and compliance review information is entered into the SAFETYNET database. Each state's SAFETYNET data is then uploaded into the Motor Carrier Information Management System (MCMIS) which is maintained by FMCSA. Information from MCMIS and SAFETYNET, accessible from the roadside or other location, in turn also supports inspection and review selection processes.

The Montana Highway Patrol (MHP) completes reports for all crashes on Montana's roadway system. Crash reports that involve a commercial vehicle are then forwarded to the Motor Carrier Services (MCS) Division of MDT and maintained in the SAFETYNET System (see below).

The SAFER system transfers data in a simple and universal manner between Federal and State inspectors and information systems such as ASPEN. SAFER also aids in the management of SAFETYNET.

SAFETYNET. SAFETYNET is an automated information management system that allows the safety performance of interstate and intrastate commercial motor carriers to be monitored (see Figure 6). Each state is required under MCSAP to enter and maintain all commercial vehicle crash reports in the SAFETYNET System. Each State uploads their information electronically.

Motor Carrier Management Information System (MCMIS). MCMIS contains detailed vehicle crash and carrier data from 1989 to the present. Approximately, 375,000 active commercial motor carriers are monitored through MCMIS. Currently, this information is used in the field to determine which vehicles and/or carriers should be selected for safety inspections. This data is also available for other applications through the MCMIS Data Dissemination Program. The MCMIS Data Dissemination Program currently offers:

- census and crash file extracts,
- carrier safety profiles,
- personalized census and crash reports and
- census and crash count reports.

National Highway Traffic Safety Administration. NHTSA, a division within the USDOT is directly responsible for improving traffic safety. Information gathered from MCMIS is used by NHTSA to support the Fatality Analysis Reporting System (FARS) and the General Estimate System (GES) (see Figure 5). FARS records all fatal crashes and processes the information so that it is available and accessible to improve traffic safety. GES considers a representative sample from the MCMIS data and estimates crash severities to form a basis for determining the cost/benefit of existing safety programs.

1.4 IMPLICATIONS FOR THIS INVESTIGATION

This introductory Chapter has detailed the problem at hand, both nationally and within Montana, described challenges related to the study area and summarized existing safety improvement measures at Federal, State and industry levels. Key implications for this investigation include the following.

- The uniqueness of Montana's commercial vehicle crashes may limit the universal application of these findings at a national level. However, these findings should be easily transferable to other predominantly rural states that face similar challenges related to single-vehicle, higher speed, and more severe commercial vehicle crashes.
- The geographic expanse of the study area, combined with constrained enforcement and regulatory resources, limit the choice of alternatives for improving commercial vehicle safety in Montana. Efforts to improve commercial vehicle safety, particularly crash severity, through speedier detection and response times to the scene are not feasible. Instead, efforts must focus on preventing the occurrence of commercial vehicle crashes altogether as a means to improve safety.
- A clear understanding of the safety efforts currently underway at Federal, State and local levels and, perhaps more importantly, the success of those safety efforts in improving commercial vehicle safety are critical in determining potential confounding factors for this investigation and in estimating the potential magnitude to which this research can contribute.
- Lastly, a clear understanding of the national strategic direction for commercial vehicle safety at the onset of this investigation helps to focus and direct this research to ensure consistency with national directives.