

Standing Committee on Truck and Bus Safety (ANB70)
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Truck and Bus Safety: Research Topics and Focus Areas

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Motor vehicle crashes are a leading cause of unintentional death in the United States, with over 2.3 million people injured in motor vehicle crashes in 2018 (U.S. Department of Transportation, 2018). Transportation agencies have devoted significant resources to improving safety on the road, including the safety of those who drive a vehicle for commercial purposes.

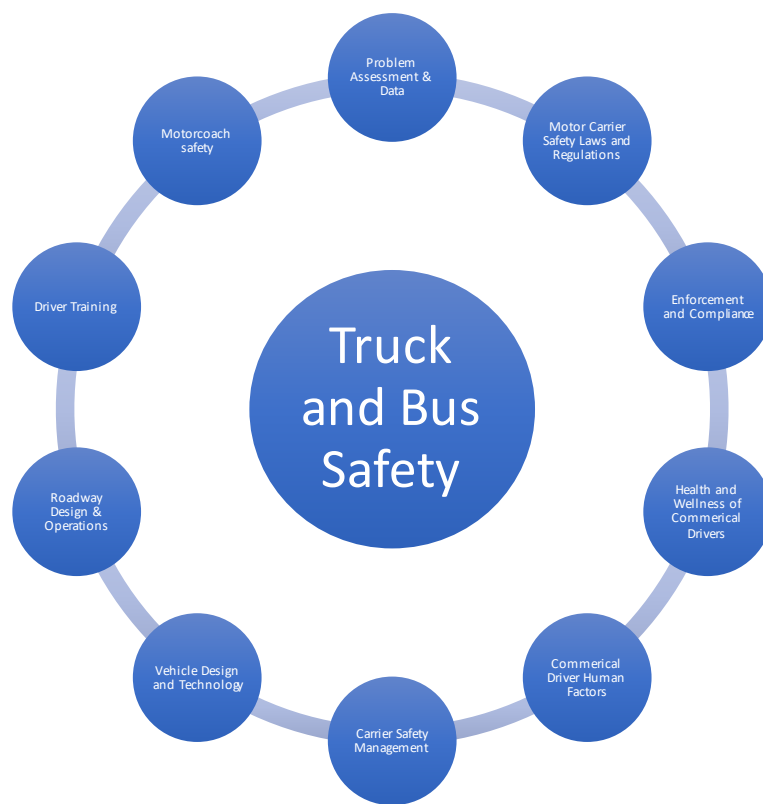
Road freight transportation represents a long-standing public health and transportation safety problem in the United States. According to the Bureau of Labor Statistics (2016), Transportation and Warehousing represented the second highest fatal injury rate of the 15 industry groups (BLS, 2016). In 2014, there were an estimated 438,000 large truck-involved crashes in the United States, resulting in 3,903 people killed and approximately 111,000 injured (National Highway Traffic Safety Administration, NHTSA, 2016). The magnitude of the problem is likely to worsen given the national freight task is projected to double by 2030 (IBIS, 2015).

TRB formalized the Truck and Bus Safety Committee (ANB70) in 2003. Precursors to the committee included a Truck and Bus Safety Subcommittee of the Safety Management Committee (formerly A3B15) and a Truck and Bus Safety Task Force (A3B57), which championed the transition from subcommittee to full committee status. Like other TRB committees, the Truck and Bus Safety Committee consists of professionals committed to advancing their disciplines and improving the transportation system. The committee's goal is to focus on motor carrier safety in all its aspects, including research and evaluation in human, roadway, vehicle, operational, and organizational arenas. Topic areas include problem assessment and data, laws and regulations, enforcement and compliance, driver health and wellness, human factors, carrier safety management, vehicle design and technology, and roadway factors in safety. The research topics of focus within ANB70 provide a significant foundation for research-funding and research-performing organizations to consider within their strategic planning and allocation of resources to the workplace road safety agenda.

The research discussed in the committee is multidisciplinary and encompasses a diversity of perspectives and disciplines. It shares with the broader topic of traffic safety a

concern with human, vehicle, and environmental (i.e., roadway) factors in motor vehicle crashes. Unlike motor transportation in general, however, commercial motor transportation safety is significantly influenced by industry operational requirements, types of operations to meet those requirements, carrier safety management policies and activities, legal and regulatory mandates and restrictions, and multi-faceted enforcement activities. Thus, the structure of the committee and its subcommittees reflects these key topic areas. In particular, the committee has identified ten research foci (see Figure 1).

This paper describes each of these ten topics and current issues under current discussion. While not all encompassing of the work of ANB70, this coverage highlights areas of current interest to research and development needs that are important to the discovery of new knowledge and the initiation and validation of new tools benefiting commercial motor vehicle transport.



CARRIER SAFETY MANAGEMENT

Carrier Safety Management focuses on management practices that affect the safety of the workforce when operating a truck or bus in the roadway environment. Management practices encompass a range of activities including risk management (e.g., purchasing, maintenance, policies and procedures), human resource management (e.g., driver retention, communication, remuneration, job design), as well as the functions of government and regulators in the planning (i.e., allocation of resources) and monitoring (i.e., evaluation of activities) of the workplace road safety agenda. It explores safety management practices that are both compliance-based and voluntary and identifies examples of ‘best practice’ in the

industry. Current topics of interest include: (i) system-based approaches to understanding crash causation, (ii) behavioral safety management, and (iii) contractor safety management.

DRIVER TRAINING

Driver training focuses on key skills required for new entry-level CDL holders and reinstatements. The demand for qualified drivers, new operational technologies (e.g., telematics, diagnostic systems, smart routing, communications), and the trucking industry's poor retention rate in some industry segments place an increasing importance on the quality and student output of commercial driver training programs. This topic addresses training relevant to commercial drivers including entry-level training, in-service "finishing," other fleet training for new hires, refresher training (e.g., for all drivers in a fleet), and remedial training (i.e., for problem drivers), as well as the various providers of these educational programs and the minimum federal standards for these schools. Current topics of interest include: (i) training on the job, (ii) retaining qualified drivers, and (iii) innovative career-long training to improve and sustain driving competencies.

PROBLEM ASSESSMENT AND DATA

Problem assessment focuses on identifying the traffic safety problems of occupational drivers across the truck and bus domain. Traffic safety problems are typically examined as risk, calculated by the prevalence of a positive or negative driving- or environmental-related facet over some measure of exposure, whether time, miles, or a count. Recognizing risk amplification and attenuation factors is a critical component of addressing traffic safety problems and is represented in the methodology applied to each area in the truck and bus domain. To assist with solving problems, identifying, understanding, and transforming available data are necessary. Data are largely focused on crashes, environmental features, carriers, drivers, and vehicles with numerous data sources available publically. Current topics of interest include (i) accuracy and consistency of publically available databases, (ii) collection of accurate driver-related variables, collection of operational variables and (iii) detailed exposure or trip-level data for both trucks and buses.

MOTOR CARRIER SAFETY LAWS AND REGULATIONS

Laws and regulations governing motor carrier transportation have historically focused on regulation of the business of highway transportation for hire, regulation to protect the highway infrastructure, and regulation of safety. The latter being the most relevant discussion to the Truck and Bus Safety Committee. Beyond federally-regulated operations, the committee also considers intrastate, exempt, and light-duty operations' safety and regulation. Topics focus on the revision of laws influencing motor carrier vehicle and driver safety as the knowledge base within the physical sciences, medicine, engineering and public policy domains continues to evolve. Discussion also focuses on the availability of data to estimate the benefits and costs of regulation and the need to develop and test analytical tools to accurately estimate the benefits and costs to both the entities directly affected as well as to society as a whole. Current topics include (i) hours of service regulations and logging, (ii) safety performance measurement of motor carriers, and (iii) chain of responsibility.

ENFORCEMENT AND COMPLIANCE

This topic focuses on the programs and activities of the major federal and state enforcement and compliance programs for interstate motor carriers, bus companies and commercial vehicle drivers, and their vehicles. Discussions focus on the responsibilities of federal and state agencies in regulating and enforcing the standards as well as their enforcement and compliance programs and activities, including their effectiveness in achieving safety

improvements. Various topics are discussed, but are not limited to, standards for trucks equipment, the safety of commercial vehicle in interstate commerce, licensing and vehicle inspection and maintenance. Current topics include (i) inspection standards, (ii) electronic logging of work time not-behind-the-wheel, and (iii) differences among state and federal regulations and compliance standards.

HEALTH AND WELLNESS OF COMMERCIAL DRIVERS

Health, wellness, and fitness of commercial truck, bus and motorcoach drivers have been addressed to focus on factors that directly and indirectly affect driving safety. Addressed are such encompassing topics as: (i) epidemiological surveillance of diseases, illnesses, job injuries, and resultant occupational incidences of CMV driver injuries and death, (ii) proper diet and nutrition, limiting alcohol and tobacco use, maintaining proper weight and physical fitness levels, psychological and physical stress, and workload, (iii) health and safety consequences of shiftwork, irregular and extended work schedules, missed or broken sleep, sleep deprivation and sleep disorders, circadian rhythm disruption, loss of driver alertness, and driver fatigue, (iv) determining whether declining driver fitness and health lead to driving safety risks, and whether leading a health-conscious lifestyle makes drivers behaviorally more apt to be safe on the roads, and (v) determining if health and wellness programs are efficacious to maintaining driving safety. Current topics include: (i) reassessment of impact of obstructive sleep apnea on driving safety (ii) whether prescriptive hours of service rules mitigate fatigued-driving, and (iii) the void we have on the current health status of commercial drivers in all industry sectors.

COMMERCIAL DRIVER HUMAN FACTORS

Driver “human factors” includes considerations of: (i) driver-vehicle interface design from a human engineering perspective, (ii) driver functional abilities pertaining to driving safely for extended periods on our roadways, (iii) drivers’ involvement in crash sequences, causes, responses to crash-likely circumstances, analyzing driver mistakes and errors at work, (iv) assessing adverse & desirable work-shift scheduling, length of driving duty stints, hours of service rules, and related issues. Current topics include: (i) considerations of driver age, experience, training levels, (ii) influence of implementing high technology innovations into CMV vehicles, fleets, and roadways (e.g., robotics, artificial intelligence, autonomous control of vehicles) and (iii) determining the best ways to test and evaluate a myriad of human factors issues in roadway operations.

VEHICLE DESIGN AND TECHNOLOGY

Vehicle design has always been a focus in truck and bus safety. The size and complexity of commercial vehicles places greater demands on conventional equipment such as brakes, tires, and roll stability features. Vehicle mechanical condition plays a greater role in truck and bus crashes than in those of cars. Truck and bus crashes are important in their own right because of their human and economic consequences – 4,564 fatalities in the United States in 2016. Another reason is the opportunity they provide as a supervised testbed for advanced vehicle-based and other safety technologies. This includes collision avoidance systems such as forward collision and lane departure warnings, as well as newly emerging opportunities for automated or partially automated vehicles. Cab-crashworthiness standards is a current topic of interest.

ROADWAY DESIGN & OPERATIONS

Roadway design and operations recognizes the significance of the compatibility of trucks and buses and the roadway environment in crash reduction. Issues relating to physical road

configurations such as curves, exist ramps, speed, intersections, and work zones are recognized as key areas to improve safety as well as the design standards of the vehicles. A key focus is vehicle-based safety technologies and their role in facilitating the effective interaction between vehicles and the roadway environment.

MOTORCOACH SAFETY

Motorcoach safety focuses on key issues affecting these vehicles interaction in the road environment. As use of the motorcoach for transporting groups on our highways broadened in application, occurrences of serious crashes resulting in fatalities and serious injuries also increased. These crashes moved public and government agencies to call for improvements in motorcoach safety beginning in the early 2000s. The TRB Truck and Bus Committee responded to this call by the creation of this Motorcoach Safety subcommittee. Areas of research addressed by the subcommittee have included understanding of motorcoach safety needs through the review of research studies on crash investigations results, lap shoulder belt technology and usage, fire causation and prevention, driver concerns, visibility limitations and solutions, and other matters. Current topics include: (i) consideration of autonomous technology applications and (ii) learnings from other bus types and lighter vehicles.

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