Testimony of Deborah A.P. Hersman
President and CEO
National Safety Council
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Committee on Commerce, Science, and Transportation
Hearing on
Transportation Innovation:
Automated Trucks and Our Nation's Highways
**Wednesday, September 13, 2017**

Chairman Thune, Ranking Member Nelson and members of the Committee, thank you for inviting me to testify today on proposed legislation to create a framework to save lives on our roadways. The National Safety Council (NSC) believes that in order for our nation to receive the biggest benefit from this technology, all motor vehicles – both personal and commercial – must be included in this legislative proposal.

The National Safety Council is a 100-year-old nonprofit committed to eliminating preventable deaths in our lifetime by focusing on reducing fatalities and injuries in workplaces, on the road and in homes and communities. Our more than 13,500 member companies represent employees at more than 50,000 U.S. worksites. Not only do we work with companies but also with organized labor, who share our dedication to keeping workers safe on and off the job. With almost 40 percent of workplace fatalities involving motor vehicles, accelerating the availability and adoption of crash reduction and mitigation technology is crucial to that vision.

In 2015, there were 4,067 fatalities in large truck crashes and 667 were occupants of large trucks. Fatalities on our roadways are trending in the wrong direction and technology can help reverse the death toll. However, to achieve maximum benefit and save the most lives, we must do so holistically by applying technological advances to all vehicles. After all, roads are built for both cars.

NSC commends Commerce Committee leaders for offering a framework to increase transparency around the technology in advanced driver assistance systems (ADAS)-equipped vehicles and prioritizing safety in the process. As a nation, there are more vehicles on the road today traveling more miles, and yet the most dangerous factors in roadway travel continue to be human factors. According to the National Highway Traffic Safety Administration (NHTSA), 94 percent of investigated crashes can be attributed to driver error. The top four reasons for crashes are caused by human behavior or choices: alcohol, speed, fatigue and distraction, giving ADAS systems and automated vehicles the potential to reduce preventable crashes and deaths in an unprecedented way.

Critical reasons for crashes investigated in the National Motor Vehicle Crash Causation Survey, United States, 2005–2007


Source: NHTSA (DOT HS 812 115)
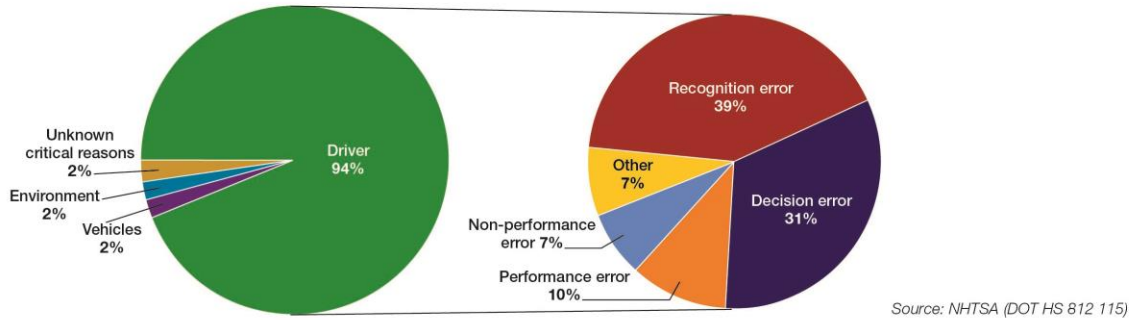
® National Safety Council: Injury Facts 2017 Edition

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NSC estimates that 40,200 people lost their lives on our nation's roadways in 2016, a 14 percent increase from where we were just two years ago. Over 100 people die each day in motor vehicle crashes, and another 4 million people are injured severely enough to consult a medical professional every year. Beyond the human toll, these deaths and injuries cost society over $385 billion, including productivity losses, medical expenses, motor vehicle property damages and employer costs.[2]

Each of these numbers represent a person who leaves behind loved ones. NSC believes advanced vehicle technology, up to and including fully automated vehicles, can provide many benefits to society, but the most important contribution will be the potential to greatly reduce the number of fatal crashes on our roadways.

Motor-Vehicle Deaths and Rates, U.S., 1993-2016

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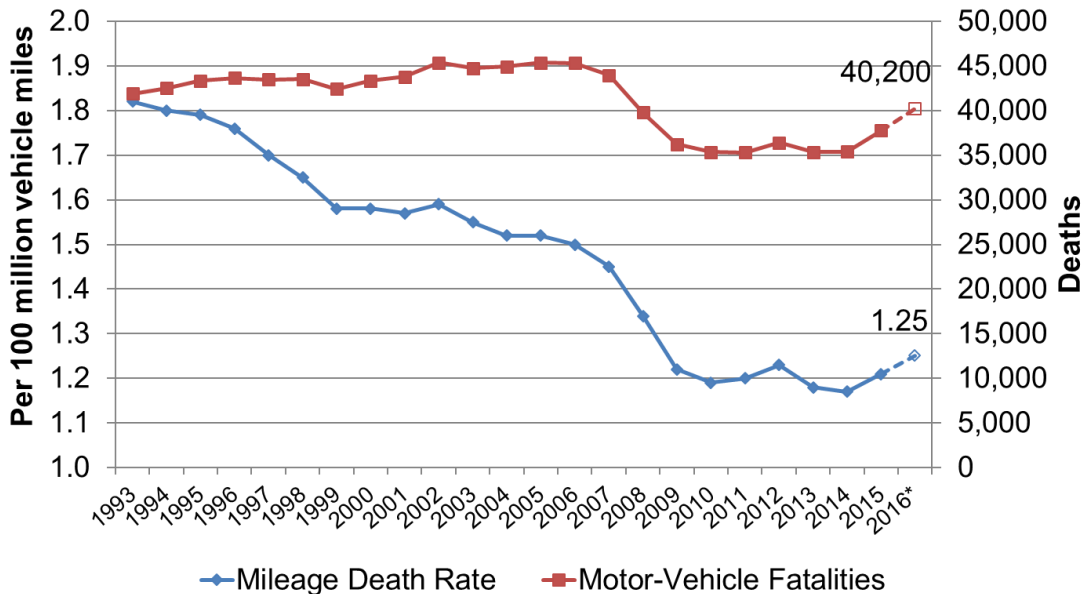
[1] Decision errors include driving too fast for conditions, too fast for the curve, false assumption of others' actions, illegal maneuver and misjudgment of gap or others' speed. Performance errors include factors such as overcompensation and poor directional control. Non-performance error is most commonly sleeping.
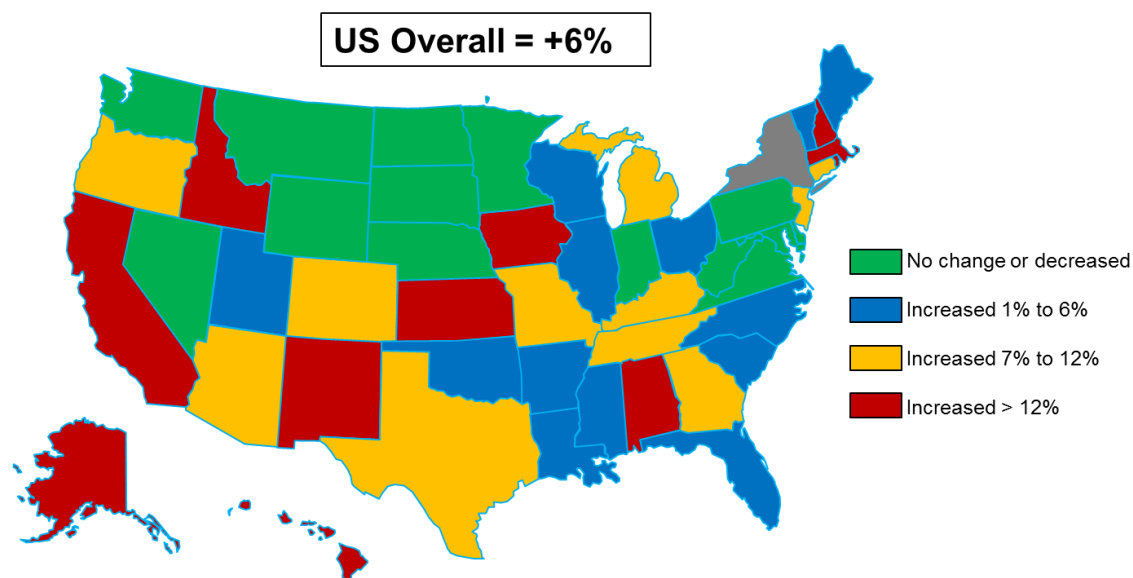[2] National Safety Council *Injury Facts 2017*

These trends are not improving. NSC data reveal that the 18,680 roadway fatalities during the first six months of 2017 are 1 percent lower than the same period in 2016, but still 8 percent higher than the same period two years ago. Our complacency is killing us. If we are to redirect this trend in a positive direction, we must adopt a sense of urgency coupled with large, near term gains to save lives on our roadways.

So that we all know where we stand, in 2015:

- 10,265 people were killed in alcohol-impaired driving crashes, an increase of almost 300 from 2014,[3]

- 3,477 people were killed in distraction related crashes, an increase of almost 300 from 2014,[4] and

- 9,874 people were killed while unrestrained, an increase of over 400 from 2014.[5]

The maps below tell the story of the national trends in roadway fatalities.

NSC Preliminary Fatality Estimates
2016 Percent change from 2015

US Overall = +6%

No change or decreased
Increased 1% to 6%
Increased 7% to 12%
Increased > 12%

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[3] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812350
[4] https://www.nhtsa.gov/risky-driving/distracted-driving
[5] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812374

NSC Preliminary Fatality Estimates
2016 Percent change from 2014

US Overall = +14%

No change or decreased

Increased 1% to 14%

Increased 15% to 25%

Increased > 25%
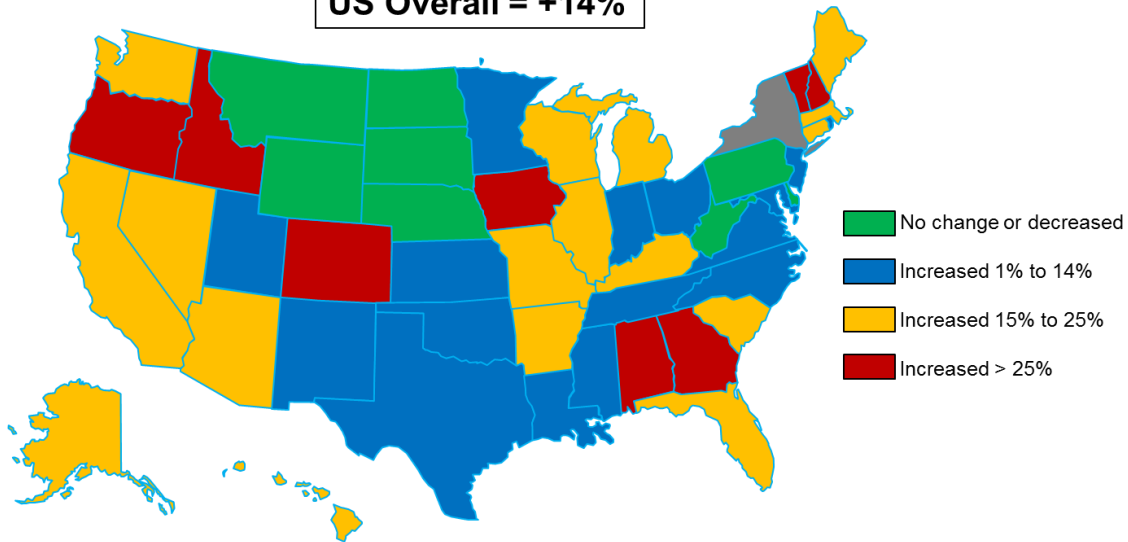
These statistics are not isolated to passenger vehicles, and in the same way, policy options should not be limited to passenger vehicles. Commercial motor vehicles (CMVs) represent 4 percent of vehicles on the roadways but are involved in 11 percent of fatal crashes. That translates to over 4,000 people being killed in crashes with CMVs annually. The large mass, increased time and space required for braking and incompatibility in structures (front, rear and side design of the vehicles) tell part of the story of why these vehicles are involved in so many fatal crashes, but human factors, like speeding, fatigue and distraction also contribute. Rear-end collisions represent 10 percent of fatal commercial vehicle crashes—three times more fatalities than rear-end collisions involving passenger cars. By not deploying ADAS technologies such as forward collision warning or automatic emergency braking, thousands of preventable fatalities and injuries are occurring every year.[6]

Fatalities in crashes involving large trucks, United States, 2015

Non-occupants
10%

Occupants of
large trucks
16%

Occupants of
other vehicles
74%
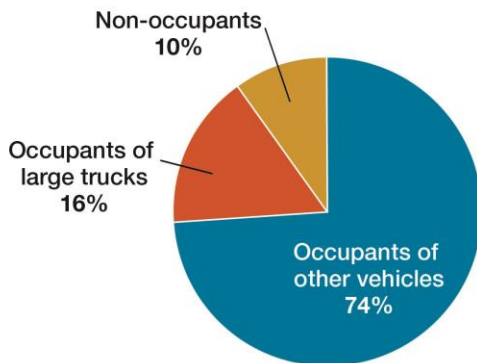
® National Safety Council: Injury Facts 2017 Edition

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[6] Federal Motor Carrier Safety Administration

Safety Evaluation Report and Data Recorders

The proposed legislation is intended to set the framework to aid the inevitable transition to ADAS technologies and fully automated vehicles. Our roadways were not made for passenger and commercial vehicles to operate independently of each other, and both types of vehicles are being tested at this time. Therefore, the policies outlined in this legislation should apply to all vehicles.

The current draft legislation establishes greater transparency around the development of ADAS and automated vehicles by mandating the safety evaluation report (SER) that outlines reporting requirements for manufacturers. The bill also includes the use of a data recording device, something which is already widely used in the automotive industry today and yields valuable data in crash reconstruction efforts.

Electronic logging devices (ELDs) and electronic data recorders (EDRs) provide a window into the human-machine interface with advanced vehicles. The knowledge gained from these devices allows manufacturers to be nimbler and make adjustments in near real-time to improve safety based on what is actually occurring in operation, rather than making changes based on assumptions and estimations that must be accommodated in a later model year. To this end, Congress should facilitate data sharing as widely as possible by requiring that manufacturers provide accessible, standardized data to law enforcement, state highway safety offices, investigators, insurers, and/or other relevant stakeholders. Collecting and sharing de-identified data about near misses and other relevant problems would also help to aggregate vital performance information for the motor vehicle industry, allowing it to take proactive steps based on leading indicators rather than waiting for a crash or a series of crashes to occur. Leading indicators are "proactive, preventative and predictive measures that monitor and provide current information about the effective performance, activities and processes of a … system that drive the identification and eliminate or control of risks."[7] The NSC Campbell Institute, a leader in environmental, health and safety, states that tracking leading indicators allows world-class safety organizations to make further improvements to their safety records.[8]

Acquiring an understanding of what happens when systems perform as intended, fail as expected, or fail in unexpected ways yields is valuable information for manufacturers– some of whom have common suppliers—and researchers and the safety community in analyzing the safety benefits and potential limitations of these technologies as they continue to mature. Further, in-service data, as well as near miss and post-crash information sharing, can help civil engineers and planners design better and safer roadways, as well as help safety and health professionals design better interventions to discourage risky driving or affect the behaviors of other roadway users.

De-identified data sharing has existed in the aviation industry for many years and proven highly successful. The Aviation Safety Information Analysis and Sharing (ASIAS) system allows for sharing of de-identified data across the industry, making it possible for manufacturers, operators, researchers, regulators and other stakeholders to identify

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http://www.thecampbellinstitute.org/file/download.php?id=20130925358263a8956de938e7c00a2bbbb8413d
[8] http://www.thecampbellinstitute.org/file/download.php?id=2015092336b107f72d10a379134af9249d3457ab

trends and act on them. Similarly, analysis of de-identified data in the vehicle industry will provide windows into leading indicators, increasing the potential to save lives.

While there are competing priorities regarding protecting personal privacy and proprietary systems or designs, NSC believes that safety should be the ultimate priority. Requiring the SER and data sharing will aid in improving safety.

Education and Training

Another encouraging component in the draft legislation is the creation of the consumer education workgroup focused on new safety technologies. With nearly 17.4 million new passenger cars and trucks sold in 2015,[9] understanding the technology on these vehicles is necessary, yet a University of Iowa survey found that 40 percent of respondents reported they had experienced a situation in which their vehicle acted in an unexpected way. When this occurs in a real-life driving situation, among multiple drivers and a variety of vehicles, it can lead to disastrous outcomes.

The National Safety Council and our research partners at the University of Iowa are focused on educating consumers about in-vehicle safety technology through our MyCarDoesWhat campaign.[10] This brand agnostic education campaign informs drivers about how safety technologies work, how to best interact with them, and how to identify situations when the technology may not perform optimally and should not be relied upon. Because of the need for continued human involvement in the operation of many of these features, the campaign tagline is, "You are your car's best safety feature." Too often, marketing and media reports using terms such as "autopilot" and "autonomous" only confuse consumers about the capabilities of their vehicles and contribute to losses of situational awareness around the driving task.

Drivers cannot effectively use these life-saving technologies if they do not understand both their functions and limitations, and these education efforts should be extended to the safe use of automated commercial vehicles. The AV policy proposes that this education be delivered in multiple ways, including computer based, hands-on and virtual reality training, and other innovative approaches. The MyCarDoesWhat education campaign follows that approach and has developed a virtual reality module. Further, we recommend ongoing evaluation to determine the effectiveness of the various messages, methods of delivery and media so they can be improved over time. NSC appreciates the recognition by the Senate that education is a necessity if we are to realize the life-saving effects of these vehicles.

The AV START Act

As previously mentioned, there are several good provisions in the draft bill that the National Safety Council would like to highlight.

- Including whether a vehicle in a crash is equipped with some automation on post-crash investigation reports. NSC called this out in our report "Undercounted is Underinvested: How Incomplete Crash Reports Impact Efforts to Save Lives" earlier this year. This data can be vital to improve safety systems.

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[9] http://www.autoalliance.org/auto-marketplace/sales-data

[10] www.mycardoeswhat.org

- Improving research on the human machine interface to ensure drivers remain engaged in the driving task before full automation. In too many other modes of transportation, users have become confused about what technology is "saying" to them and results have been fatal. Standardizing these alerts (visual, aural, haptic) could decrease this confusion.

I offer some additional provisions for your consideration to include in the legislation.

- Reporting of certain types of crashes, such as fatal and serious injury crashes, to a Department of Transportation database can help ensure correct information is disseminated about these events. We have already seen the overwhelming media attention on automated vehicle crashes. By creating a database, one place would exist for locating common and accurate information.
- Testing on public roads should be reported to the states in which tests occur. Adding this level of transparency can help states be more involved, especially if they must send resources to respond to a testing event.
- Encouraging the designation of a common nomenclature and performance standard for each safety feature or system so drivers can better understand and compare performance.
- Tying ADAS and automation components to vehicle identification numbers (VIN) so that more complete crash reporting and analysis can be completed.
- Requiring rulemaking to mandate safety technology with proven results to require it on all vehicles.

Technology in Transportation

Improvements in technology and safety in transportation have historically gone hand-in-hand. During my decade at the National Transportation Safety Board, the NTSB called for many safety improvements that would reduce or mitigate fatal transportation incidents, some of which were at least partially attributable to predictable and preventable human behavior. Technology like auto-pilot features in aviation control airspeed and heading, leaving human operators free to monitor larger systems and issues to ensure safe flight. Similarly, positive train control is still being implemented on passenger and freight railroads but will certainly prevent numerous collisions. Electronic charts standardize routes and transponders in the maritime industry projecting the routes other vessels will travel. This Committee oversees all of these industries and these very technologies are ones you have debated and mandated. You know that each advancement in technology has impacts, some of which are known while others may result in unintended outcomes.

At this point in the deployment of vehicle safety technology, human drivers are still ultimately responsible for the safe operation of their vehicle and often need to intervene in certain conditions. We can expect this intervention will continue to be necessary as technologies mature. However, we also fully understand that this may not always be the case. At some point drivers, including those who may be impaired, may do more harm than good.

Currently, vehicle manufacturers are making different choices about how to develop fully automated vehicles. Some manufacturers believe that human drivers will always be required behind the wheel and that highly or fully automated features will serve to assist

the human or take over when the driver fails to take corrective action. Others see the role of the traditional driver disappearing entirely, with vehicles providing safe transportation and mobility through artificial intelligence – all by themselves. NSC believes that both should be seen as viable courses of action and thus addressed in any new policies.

There is real debate today as to whether fully self-driving vehicles will actually achieve widespread acceptance in the coming decades. Some people believe that American drivers, while willing to embrace systems that provide them assistance, will always want the option of hands-on driving. Other people believe that it may actually be safer for humans to simply be passengers in fully automated vehicles.

Regardless of the level of autonomy, we know that active safety system integration into the U.S. fleet will be more robust in years to come, and as these features continue to penetrate the driving world, we can expect to see changes in the very definition of the word "driver." In the last few years, NHTSA offered that there may be a day when "driver" may refer to an automated system rather than a human being. Today, some states are contemplating this same idea, especially those who run the licensing systems and law enforcement charged with enforcing state regulations. These state leaders, along with other federal and state entities, should cooperate and collaborate, moving beyond their traditional roles to respond to the new questions rather than addressing them on a piecemeal basis.

Finally, one of the biggest challenges in moving from level 1 to level 4/5 vehicles is successfully identifying the challenges and improvements needed for the human-machine interface to be successful. In other industries, such as aviation, there have been many lessons learned regarding mode confusion and overreliance on automation. We must recognize that the most dangerous environment will exist when both the human and machine are involved in the safe operation of a vehicle. The greatest risks are not when one or the other has sole responsibility for the vehicle, but when the control is shared. A "driver" whose role is primarily to serve as a safety monitor, always on-guard in case of a system malfunction or other emergency, will be susceptible to boredom, fatigue, and/or distraction, all of which may contribute to a more dangerous situation.

In order to save lives on our roadways—the most dangerous way to travel in this country—all options should be at the disposal of policy makers. If necessary, NHTSA must use its authority to address defects quickly and effectively, sharing as much information with the public as possible.

NTSB-NSC Roundtable on Safety Technologies in Large Trucks

On July 24, NSC and the National Transportation Safety Board (NTSB) co-hosted a roundtable discussion with nearly two-dozen fleet managers, vehicle manufacturers, government officials, researchers, software experts, safety advocates and more. The panel discussed strategies to increase adoption of ADAS in commercial motor vehicles.[11] NTSB has recommended advanced technology on CMVs since 1995

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[11] https://www.ntsb.gov/news/events/Pages/2017-adas-rt.aspx

because of the life-saving potential of this technology, and this issue is currently on its Most Wanted List of transportation safety improvements.[12]

The NTSB-NSC roundtable discussion provided three key takeaways. [13] First, technologies exist today that can reduce both the frequency and severity of crashes involving large trucks, saving lives and preventing injuries. Some of the lifesaving technologies available for large trucks include automatic emergency braking, forward collision warning, lane departure warning and blind spot monitoring. These technologies assist – but do not replace – the driver. Roundtable participants who had investigated fatal crashes said many of those tragedies could have been mitigated or prevented entirely by collision avoidance technologies. However, the penetration rate of these technologies in large trucks is less than 10 percent.[14]

A second takeaway from the discussion centered on the importance of proper training for drivers. Drivers must use new technologies appropriately, and the threat of overreliance on new technologies is legitimate and must be addressed in training sessions. For example, a truck equipped with electronic stability control does not give a driver freedom to go faster around curves. Likewise, a truck that features collision avoidance technologies does not clear the way for a driver to be drowsy or distracted behind the wheel. Drivers must remain alert and attentive at all times even with new ADAS features in place.

The third and final takeaway was that manufacturers, carriers and others who work in the trucking industry can take the lead in this life-saving mission. There is power in partnerships. Regulations could speed the adoption of ADAS in large trucks, but nothing is preventing fleets from equipping new vehicles and retrofitting old vehicles with some of these technologies. There is a cost component to this investment, but one trucking company at the roundtable reported a significant return on investment.[15] After installing collision avoidance technologies, the company recorded a 70 percent reduction in frequency and a 95 percent reduction in severity of crashes. Not only did this keep both its employees and the public safer, but also cut down drastically on the legal, health care, insurance and operational costs associated with crashes. Another participant noted that costs associated with a single crash can destroy a small fleet or an owner-operator.[16]

NTSB Commercial Motor Vehicle Crash Investigations

As mentioned earlier, NTSB first recommended advanced technology in vehicles over 20 years ago in 1995, calling on U.S. Department of Transportation to test collision warning systems in commercial fleets.[17] NTSB specifically singled out commercial operations in this initial recommendation, and since that time, NTSB has expanded its recommendation to include passenger vehicles.

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[12] https://www.ntsb.gov/safety/mwl/Pages/default.aspx
[13] https://www.youtube.com/watch?v=vCeGam2RNfE
[14] https://www.ntsb.gov/safety/safety-studies/Pages/SIR1501.aspx
[15] https://www.youtube.com/watch?v=vCeGam2RNfE
[16] Ibid.
[17] https://www.ntsb.gov/safety/safety-studies/Documents/SIR1501.pdf

While at NTSB, I was the unfortunate witness to many crashes that could have been prevented by advanced technology that has been available for years. The crashes cited below represent just a few involving commercial vehicles.

Bronx, New York: 15 dead and 18 injured. This crash could have been prevented or mitigated by lane departure warning, adaptive cruise control (ACC), and a speed limiter. The driver was operating at 14 mph over speed limit and run off the road due to fatigue.

Osseo, Wisconsin: 4 dead and 36 injured. This crash could have been prevented or mitigated by AEB, ACC and lane departure warning (LDW). This was a high school band returning from a band competition.

Munfordville, Kentucky: 11 dead and 2 injured. This crash could have been prevented or mitigated by AEB and LDW. The truck crashed into a church van on the way to a wedding, and the two surviving passengers were children restrained in car seats pictured below.

Miami, Oklahoma: 10 dead and 6 injured. This crash could have been prevented or mitigated by AEB. The truck did not react to stopped vehicles ahead and struck the end of a passenger vehicle, resulting in a multiple vehicle collision.

Grey Summit, Missouri: 2 dead and 38 injured. This crash could have been prevented or mitigated by AEB.

If this bill is moving forward, it should do so including all motor vehicles.

Road to Zero

On October 5, 2016, NSC, NHTSA, the Federal Highway Administration (FHWA), and the Federal Motor Carrier Safety Administration (FMCSA) announced the *Road to Zero* (RTZ) Coalition. RTZ is an initiative focused on identifying new ways to look at the persistent problem of roadway fatalities. Today, nearly one year later, there are over 350 unique organizations that have joined the coalition that I am honored to lead with a number of Steering Group members (listed below). Our shared vision of a future with no roadway fatalities cannot be realized unless we redouble efforts on existing solutions and accelerate implementation of new measures like ADAS and automated vehicles.

In early 2018, the Road to Zero coalition will produce a vision for reaching zero fatalities on our roadways by 2050. I look forward to sharing this document with you, as I know it will be an important addition to the discussion of roadway safety policy development.

NSC is joined on the Steering Group for the Road to Zero Coalition by the following organizations: AAA, Advocates for Highway and Auto Safety, American Association of Motor Vehicle Administrators (AAMVA), American Association of State Highway and Transportation Officials (AASHTO), Association of Global Automakers, Commercial Vehicle Safety Alliance (CVSA), Governors Highway Safety Association (GHSA), Institute of Transportation Engineers (ITE), Insurance Institute for Highway Safety (IIHS), Intelligent Car Coalition, International Association of Chiefs of Police (IACP), Mothers

Against Drunk Driving (MADD), National Association of State Emergency Medical Services Officials (NASEMSO), National Association of City Transportation Officials (NACTO), National Association of County Engineers (NACE), and the Vision Zero Network.

Conclusion

We cannot continue to do things the same way and expect different results. When it comes to saving lives on our roadways, this means implementing a legislative framework for advancing safety technology on ALL motor vehicles. By advancing safety technology in trucks and buses, as well as passenger cars, the bill before you today represents a step in that direction to move us closer to a goal of zero fatalities on the roadways.

The National Safety Council is committed to working with you to advance safety, up to and including automated vehicles. Doing this well is essential. Lives depend on it.