NATIONAL SAFETY COUNCIL

Position/Policy Statement

Automotive Safety Technology

The National Safety Council supports the mandatory or voluntary inclusion of new automotive safety technologies in vehicles to help reduce crashes, injuries and fatalities resulting from the use of motor vehicles.[1] Because of the rapid rate of introduction of these technologies and the risk of driver confusion, NSC also supports education programs to ensure the driving public knows what these technologies do and how to use them appropriately.

Background on traffic crashes

Motor vehicle crashes have been a leading cause of unintentional injuries and death in the United States for decades. After several years of decline, motor vehicle fatalities are now increasing and trending in the wrong direction. NSC estimates that traffic fatalities were 8 percent higher in 2015 than in 2014 – the largest year-over-year percent increase in 50 years.[2] Alcohol-impaired drivers were involved in more than a third of the fatalities.

In addition to the estimated 38,300 people killed on U.S. roads in 2015, NSC also estimates that another 4.4 million were seriously injured. Not only are fatalities from car crashes devastating to families, injuries from crashes are a personal and public health burden. These crashes also contribute to the high cost of repairing and maintaining roadways. Overall, the costs of these incidents to society are as high as $412.1 billion.[3]

Vehicle safety technologies to mitigate or prevent crashes, injuries and fatalities

New and evolving vehicle safety technologies are being integrated into vehicles today. They are (1) crash avoidance technologies, which assist drivers in preventing or reducing the severity of a crash; and (2) non-crash safety technologies, which help prevent injuries and fatalities in and around vehicles. These crash avoidance technologies and non-crash safety features complement the passive safety features car makers have been building into vehicles over the last several decades.

---

[1] New safety technology is also being added to light and heavy equipment, and this policy supports those additions as well.
[2] http://www.nsc.org/NewsDocuments/2016/mv-fatality-report-1215.pdf
[3] http://www.nsc.org/NewsDocuments/2016/mv-fatality-report-1215.pdf

Crash avoidance technologies

Approximately 94 percent of crashes involve driver error.[4] Driver errors are classified into multiple broad categories. These include recognition errors, such as driver distraction; decision errors, including driving too fast for conditions; performance errors, including poor directional control; and non-performance errors, such as falling asleep.

Crash avoidance technologies can help mitigate human error-involved crashes by alerting drivers to hazards or even intervening to avert a potential crash. These systems assist in a variety of ways, including:

- Warning drivers about difficult-to-see hazards in blind zones with aural cues, visual cues or haptic alerts
- Taking partial control of the car to avoid or lessen the severity of crashes if a driver does not respond quickly enough
- Better illuminating or expanding the view of the driving environment
- Improving the braking stability and steerability of the car in adverse driving conditions

According to the Insurance Institute for Highway Safety, one million car crashes could have been prevented in 2014 if vehicles had just two technologies in them – automatic emergency braking and forward collision warning.[5]

Another technology, Driver Alcohol Detection Systems for Safety (DADSS), can help lower U.S. roadway fatalities by preventing drivers under the influence of alcohol from driving. As alcohol-impaired driving is involved in more than a third of all U.S. traffic fatalities, DADSS has the potential to mitigate one of the most common and stubborn behavioral causes of traffic crashes.

Non-crash safety technologies

Juvenile vehicular heatstroke, or hyperthermia, is the leading cause of non-crash vehicle-related fatalities for children 14 years and younger. Fatalities have resulted after children have accessed unlocked vehicles to play, and more commonly, after being left alone in vehicles. Juvenile vehicular heatstroke fatalities have been recorded during 11 months of the year in nearly all 50 states, and “near misses” are reported to be even more common. These tragedies are 100 percent preventable.

Technology exists to remind drivers that passengers may be in the back seat of a vehicle.[6] NSC supports efforts to include technology in support of preventing child fatalities as a result of being forgotten in vehicles.

NSC supports mandatory or voluntary technology integration into U.S. fleet

Vehicle safety technologies enter the U.S. vehicle fleet in one of two primary ways: (1) Federal mandates and (2) voluntary cooperation and integration by car manufacturers. The National Safety Council prefers mandates but recognizes voluntary cooperation and integration promotes the proliferation of vehicle safety technologies into the U.S. fleet.

[4] http://www-nrd.nhtsa.dot.gov/pubs/812115.pdf
[5] Cicchino, Jessica B. 2016. Effectiveness of forward collision warning and autonomous emergency braking systems in reducing front-to-rear crash rates. Arlington, VA: Insurance Institute for Highway Safety.
[6] http://www.gmc.com/gmc-life/suvs/acadia-rear-seat-reminder.html. This is technology that alerts the front seat passenger that a person—most likely a child—is in the rear seat, which will reduce the number of hyper- and hypo-thermia child deaths in the U.S.

It takes approximately three decades for vehicle safety technologies to fully integrate into fleets, according to a 2012 study[7] by the Insurance Institute for Highway Safety's Highway Loss Data Institute (HLDI).[8]

Some crash avoidance technologies have been in cars for decades. These include anti-lock braking systems (ABS), which have been available in passenger cars since the 1970s; and traction control and electronic stability control, which were first released in the 1980s and 1990s, respectively.

There currently are four crash avoidance technologies that have been federally mandated to be included in cars starting by a specified date:

1. Tire pressure monitoring systems (September 2007)
2. Electronic stability control[9] (September 2011)
3. Anti-lock braking systems (September 2011)
4. Rearview visibility systems (May 2018)

Non-crash safety technologies are relatively newer. For example, the *Rear Seat Reminder* feature became standard with all 2017 GMC Acadias voluntarily.[10]

Method 1: Federal mandates

An Insurance Institute for Highway Safety study from 2014[11] looked specifically at the proliferation of safety technologies with high crash mitigation potential in the U.S. driving fleet. The study found that federal mandates significantly sped up their introduction by as much as eight years than without a mandate. These included hypothetical and existing mandates. (See Figure 1)

The study identified two main reasons for the increase:

1) As cars without these technologies age out of the fleet and car manufacturers must integrate mandated technologies into new cars, the proportion of cars with the technologies becomes higher than cars without them.
2) Federal mandates prompt manufacturers to begin integrating these technologies into cars even before the deadline for the mandate; this helps explain the rapid adoption of rear cameras and rear parking sensors. The rearview visibility system rule[12] mandating back-up cameras was released in 2014, but does not go into effect until 2018. However, car manufacturers began adding rearview visibility systems such as back-up cameras

---

[7] http://www.iihs.org/media/db4aeba1-6209-4382-9ef2-275443fcccea/536403661/HLDI%20Research/Bulletins/hldi_bulletin_28.26.pdf

[8] This study included a variety of safety features, from passive features such as safety belts and airbags to active features such as electronic stability control and anti-lock braking systems.

[9] Traction control, which is required for most electronic stability control systems to function, could also be considered a federally mandated system as a result of the electronic stability control mandate.

[10] http://www.gmc.com/gmc-life/suvs/acadia-rear-seat-reminder.html. This is technology that alerts the front seat passenger that a person—most likely a child—is in the rear seat, which will reduce the number of hyper- and hypo-thermia child deaths in the U.S.

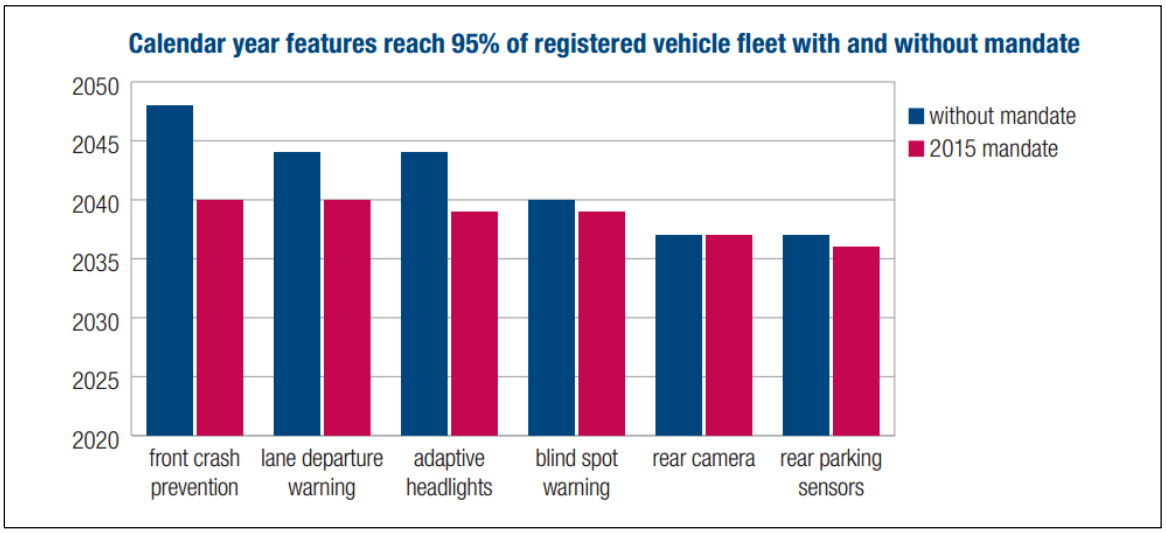
[11] http://www.iihs.org/media/31d3dcc6-79d5-48a8-bafb-1e93df1fb16f/324452632/HLDI%20Research/Bulletins/hldi_bulletin_31_15.pdf

[12] http://www.nhtsa.gov/About+NHTSA/Press+Releases/2014/NHTSA+Announces+Final+Rule+Requiring+Rear+Visibility+Technology

into cars in anticipation of a potential federal mandate. Mandates themselves, as well as the potential for a mandate, can spur adoption by car manufacturers.

Additionally, according to regulatory impact analyses, mandatory inclusion of crash avoidance technologies will help save lives and mitigate injuries. (See Table 1)

Figure 1: Effect of federal mandates on vehicle safety technology proliferation



Source: Highway Loss Data Institute, Insurance Institute for Highway Safety[13]

Table 1: Effect of crash avoidance technologies on injuries, fatalities

Feature	Effective date	Lives saved*	Injuries mitigated*
Electronic Stability Control	Sept. 1, 2011	5,300 to 9,600 per year	156,000 to 238,000[14] per year
Tire Pressure Monitoring Systems	Sept. 1, 2007	119 to 121 per year	8,373 to 8,568[15] per year
Rearview Visibility Systems	May 1, 2018	58 to 69 per year	1,125 to 1,332[16] per year

* Based on when technology is fully implemented in U.S. driving fleet

Method 2: Voluntary cooperation and inclusion agreements

Beyond the formal regulatory process, which can take many years, as was the case with the electronic stability control[17] and rearview visibility system[18] final rules, gains in car safety

[13] http://www.iihs.org/media/31d3dcc6-79d5-48a8-bafb-1e93df1fb16f/324452632/HLDI%20Research/Bulletins/hldi_bulletin_31_15.pdf
[14] http://www.nhtsa.gov/DOT/NHTSA/Rulemaking/Rules/Associated%20Files/ESC_FRIA_%2003_2007.pdf
[15] http://www.nhtsa.gov/cars/rules/rulings/tpmsfinalrule.6/tpmsfinalrule.6.html
[16] https://www.federalregister.gov/articles/2014/04/07/2014-07469/rear-visibility-federal-motor-vehicle-safety-standards
[17] http://www.nhtsa.gov/DOT/NHTSA/Rulemaking/Rules/Associated%20Files/ESC_FR_03_2007.pdf

technology adoption can be achieved through voluntary agreements from car manufacturers. A recent example of a voluntary inclusion agreement on vehicle safety technology was announced on March 17, 2016 by the National Highway Traffic Safety Administration (NHTSA) and 20 manufacturers to make automatic emergency braking (AEB) a standard feature on nearly all new car models sold in the United States by September 1, 2022.[19] AEB is capable of intervening if a driver fails to respond to an impending crash in time. It can apply maximum force to the brakes, preventing a crash or reducing its severity.

According to NHTSA, the voluntary agreement will speed up the proliferation of AEB in the U.S. driving fleet three years sooner than a formal federal mandate.[20] The agreement also may prevent an estimated 28,000 crashes and 12,000 injuries by 2025.[21] Since the announcement, Toyota pledged to make AEB (and its accompanying forward collision warning feature) standard in the majority of its models by 2018.[22]

Additionally, the U.S. Department of Transportation has proposed changes to NHTSA's 5-Star Safety Rating Program, also known as the New Car Assessment Program (NCAP), to include ratings on crash avoidance technologies and assessing pedestrian protection.[23] NSC supports the proposed changes, which provide consumers with information about crash avoidance technology safety benefits and encourage manufacturers to produce vehicles with technologies that will save lives. The new NCAP program will include an "intense consumer awareness effort to help vehicle shoppers understand how the new ratings can guide their new-car buying decisions."[24]

Education as the solution to the information gap around automotive safety technologies

Equipping more cars with vehicle safety technologies should prevent crashes and reduce injuries and fatalities. However, to be effective, drivers must be educated on how to identify and use these systems correctly. Not knowing the capabilities and limitations of these systems could be dangerous to drivers and those operating around their vehicles. The National Safety Council has a long history of leading effective education campaigns including the Airbag and Seatbelt Coalition of the 1990s and the current *MyCarDoesWhat* campaign. Addressing the gaps in knowledge and increasing defensive driving techniques used on the roads are the core purposes behind each and every highway safety campaign NSC develops.

Background

Vehicle safety technologies as well as drivers' relationships to their vehicles are changing rapidly. NHTSA predicts this relationship will change more in the next 10 to 20 years than it has in the previous 100 years.[25]

New crash avoidance technologies are made available in cars with each model year – and individual systems continue to be updated through software even after installation – so it can be

[18] https://www.federalregister.gov/articles/2014/04/07/2014-07469/rear-visibility-federal-motor-vehicle-safety-standards
[19] http://www.nhtsa.gov/staticfiles/nvs/pdf/AEB_FactSheet_031616.pdf
[20] http://www.nhtsa.gov/About+NHTSA/Press+Releases/nhtsa-iihs-commitment-on-aeb-03172016
[21] http://www.nhtsa.gov/staticfiles/nvs/pdf/AEB_FactSheet_031616.pdf
[22] http://www.consumerreports.org/car-safety/toyota-to-hit-safety-goal-well-before-2022-target/
[23] https://www.gpo.gov/fdsys/pkg/FR-2015-12-16/pdf/2015-31323.pdf
[24] http://www.nhtsa.gov/About+NHTSA/Press+Releases/2015/nhtsa-proposes-new-5-star-safety-ratings-12082015
[25] http://www.nhtsa.gov/staticfiles/rulemaking/pdf/Automated_Vehicles_Policy.pdf

difficult for drivers to understand which systems their car has and how to interface with them correctly. In 2015, almost 17.5 million passenger cars and trucks were sold. Many drivers are not introduced to newer crash avoidance technologies until they rent a newer car, drive a friend's newer car or visit a dealership to test drive new cars.

Older cars have crash avoidance technologies installed. According to the Bureau of Transportation Statistics, the average age of cars and trucks in operation in the United States in 2014 was 11.4 years old.[26] Some form of ABS has been available on vehicles for almost 40 years, however, drivers may still be unsure whether to pump their brakes or apply firm pressure if traction is lost.

Thus, there are two core educational challenges to the proper use of crash avoidance technologies to help prevent crashes, injuries and fatalities:

1) Many drivers don't realize they have crash avoidance technologies, including older technology, such as ABS or TPMS, and are unsure how to properly interface with the technology.
2) Drivers may be startled or surprised when systems activate. According to the University of Iowa, 40 percent of drivers had experienced a situation in which their car acted or behaved in a way they were not expecting.[27]

National consumer education on vehicle safety technologies

To address knowledge gaps and consumer confusion about new vehicle safety technologies, driver assist technologies and autonomous vehicles, NSC supports the need for sustained national education campaigns.

Nationally launched on October 7, 2015, *MyCarDoesWhat* aims to accomplish the following:

- Increase U.S. drivers' knowledge of crash avoidance technologies in their vehicles with a campaign focused on how to interact with them appropriately.
- Reduce crashes, injuries and fatalities with this knowledge and increase use of defensive driving skills.
- Encourage drivers to be more active and engaged.
- Help pave the wave for consumer acceptance of driver-assist and fully autonomous vehicles.

Additionally, NSC supports extending and updating NCAP and the U.S. Department of Transportation's stated intention to launch an intense consumer awareness effort to help vehicle shoppers understand how the new crash avoidance technology ratings should guide their new-car buying decisions. This awareness, according to NHTSA, will continue to help generate consumer demand for these safety features to be incorporated into future models.[28] IIHS also rates vehicles on safety features and systems, and those ratings also encourage the inclusion of more effective systems on vehicles.

Whether extending *MyCarDoesWhat* into the foreseeable future, being part of the NCAP public awareness campaign, leading the creation of a new campaign that would incorporate both, or

---

[26] http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_01_26.html_mfd

[27] http://ppc.uiowa.edu/sites/default/files/national_consumer_survey_technical_report_final_8.7.15.pdf

[28] The New Car Assessment Program Suggested Approaches for Future Program Enhancements" (PDF). National Highway Traffic Safety Administration. January 2007.

implementing another option, NSC strongly believes that a sound, continuing public education effort is critical for optimizing safety on the roads.

Defensive driving skills to support the use of vehicle safety technologies

NSC has been a leading expert and educator on defensive driving skills since 1964 – educating over one million people each year in this important area. As such, NSC recognizes the power of defensive driving skills training in reducing crashes, saving lives and preventing injuries. This education includes using crash avoidance technologies to prevent or mitigate crashes.[29]

As previously mentioned, human errors are involved in the majority of U.S. car crashes.[30] The most common error types and examples of how they can contribute to crashes, include:

- **Recognition errors** (41 percent of crashes), such as failing to scan the road and notice hazards
- **Decision errors** (33 percent), such as not choosing the right defensive driving skill for a particular hazard
- **Performance errors** (11 percent), such as failing to slow by a sufficient amount when while approaching an exit
- **Non-performance errors** (7 percent), such as falling asleep behind the wheel

One method NSC uses to mitigate human-error-involved crashes is to teach and remind drivers of the following defensive driving skills:

- Recognizing hazards in the driving path
- Understanding when and how to use defensive driving skills
- Executing driving maneuvers swiftly enough to evade harm
- Knowing when they are fit to drive

Educating the public in defensive driving and ensuring drivers remain vigilant behind the wheel are two of the core challenges to reducing human-error-involved crashes. Crash avoidance technologies represent a new tool in supplementing these existing defensive driving skills – as long as drivers know how to use the technologies appropriately. They provide the driver with additional opportunity to recognize hazards, more time to make safer driving decisions and take evasive actions as necessary to avoid incidents.

Below are a few examples of how crash avoidance technologies can help reduce the effect of human-error-involved crashes. By combining these systems with recognition, skill and performance training, drivers will be much better equipped to drive safely.

- *Adaptive headlights* provide drivers a better view along their driving path by swiveling to illuminate curves in the road (**recognition errors**)
- *Forward collision warning* sensors alert drivers when they're approaching a hazard – a slowing or stopped car, for example – prompting the driver to steer to safety, brake or take another action (**recognition**, **decision errors**)
- *Automatic emergency braking* (AEB), in combination with *brake assist*, can intervene and stop for the driver sooner and stronger than an average person's reaction time would allow (**recognition**, **performance errors**)
- *Drowsiness alert,* through *lane departure warnings*, can warn the driver if it detects he or she may have become drowsy (**non-performance errors**)

[29] NSC courses will integrate crash avoidance technologies in its DDC courses in Spring 2018.
[30] http://www-nrd.nhtsa.dot.gov/pubs/812115.pdf (report is an analysis of a previous survey)

Conclusion

The National Safety Council supports the mandatory or voluntary inclusion of new automotive safety technologies in vehicles to help reduce crashes, injuries and fatalities resulting from the use of motor vehicles.

Additionally, NSC strongly supports education as a powerful tactic to reduce injuries and save lives. NSC will seek to expand and extend national driver education campaigns, as well as extend the education of vehicle safety technologies into defensive driving skills courses.

This position statement reflects the opinions of the National Safety Council but not necessarily those of each member organization.

Adopted by the National Safety Council, 2016