



## AUTOMOTIVE ENGINEERING

# FACT SHEET



## AUTOMATIC EMERGENCY BRAKING

### BACKGROUND

Automatic emergency braking is an advanced driver assistance system that automatically applies a vehicle's brakes if it determines a collision is imminent. Depending on the programming of the system, the functionality of the technology varies among automakers. Some systems are designed to mitigate crash severity by reducing vehicle speed, while others are designed to avoid a crash altogether when possible.

On March 17, 2016, Audi, BMW, Fiat Chrysler, Ford, General Motors, Honda, Hyundai, Jaguar Land Rover, Kia, Masarati, Mazda, Mercedes-Benz, Mitsubishi Motors, Nissan, Porsche, Subaru, Tesla Motors, Toyota, Volkswagen and Volvo all made a commitment to make automatic emergency braking standard equipment on new vehicles by September 1, 2022.

AAA conducted primary research in the area of automatic emergency braking to better understand how automakers are implementing this safety technology.

### KEY FINDINGS

Systems were tested and compared based on the capabilities and limitations stated in the owner's manuals and grouped into two categories -- those designed to prevent crashes and those designed to lessen crash severity.

- The systems capable of preventing crashes reduced vehicle speeds by twice that of systems designed to lessen crash severity. (79 percent speed reduction vs. 40 percent speed reduction).
- **With speed differentials of under 30 mph, systems designed to prevent crashes successfully avoided collisions in 60 percent of test scenarios.**
- The systems designed to only reduce vehicle speed were also able to completely avoid crashes in nearly one-third (33 percent) of crash scenarios.
- **When traveling at 45 mph and approaching a static vehicle, a scenario designed to push systems beyond the stated limitations, the systems designed to prevent crashes reduced speeds by 74 percent overall and avoided crashes in 40 percent of scenarios. In contrast, systems designed to lessen crash severity were only able to reduce vehicle speed by 9 percent overall.**

To better understand the capabilities and limitations of automatic emergency braking systems, AAA pursued three lines of inquiry:

- 1. How effective are automatic emergency braking systems in various test scenarios with a target car?**
- 2. What crashes could potentially be mitigated or avoided with the use of automatic emergency braking technology?**
- 3. What are the consumer options for purchasing vehicles with automatic emergency braking systems and what is the cost impact to the consumer?**

## KEY FINDINGS, continued.

Automatic emergency braking systems are designed to help drivers avoid rear-end and vehicle-pedestrian collisions.

- In 2014, 4,884 pedestrians were killed and 65,000 were injured in traffic crashes in the United States.\*
- Rear-end collisions account for nearly one-third of traffic crashes. In 2014, there were 1,966 fatalities and 521,668 injuries as a result of rear-end collisions\*.

Automatic emergency braking systems are offered as standard equipment on 10 percent of new vehicles, and as an optional package on 53 percent of new vehicles.

- The median optional equipment package price for automatic emergency braking technology is \$2,775.

Among those aware of the technology, 68 percent of Americans believe automatic emergency braking systems are designed to bring the vehicle to a complete stop to avoid a collision.

Nine percent (9%) of U.S. drivers report having an automatic emergency braking system on their current vehicle.

Among U.S. drivers, 39 percent want automatic emergency braking technology on their next vehicle.

- Men are more likely than women to want automatic emergency braking on their next vehicle (42% vs. 35%).

Overall, 44 percent of U.S. drivers trust automatic emergency braking systems to work as described.

- Drivers that have automatic emergency braking in their current vehicle are more likely to trust it than those that do not (71% vs. 41%).
- Men are more likely than women to trust automatic emergency braking (49% vs. 40%).

## AAA RECOMMENDATIONS

- Automatic emergency braking systems are never a substitute for an engaged driver. Never rely on the technology to apply the brakes.
- AAA found that automatic emergency braking systems are effective in mitigating crash severity. Drivers should consider this technology when making a new vehicle purchase.
- Not all automatic emergency braking systems are created equal. Drivers should know the capabilities and limitations of all vehicle technology before getting behind the wheel.



## METHODOLOGY

All testing was conducted at the Auto Club Speedway in Fontana, California in partnership with the Automobile Club of Southern California's Automotive Research Center. Test vehicles included 2016 model year Volvo XC 90, Subaru Legacy, Lincoln MKX, Honda Civic and Volkswagen Passat.

Test procedures and scenarios for AAA's evaluation of automatic emergency braking were designed to mirror and build upon testing by the National Highway Traffic Safety Administration, the Insurance Institute for Highway Safety and the Alleghmeiner Deutcher Automobil-Club. Static testing included a subject vehicle approaching a static target at both 25 and 45 mph. Dynamic tests included a subject vehicle (45 mph, 60 mph) approaching a moving target vehicle (20 mph, 30 mph) and a dynamic cut-in scenario with a moving target vehicle (35 mph) passing a subject vehicle (30 mph) followed by hard braking.

Dynamic Research, Inc's *Low Profile Robotic Vehicle* and *Soft Car 360™* were utilized in testing to create static and dynamic crash scenarios that minimized vehicle damage. Vehicle speed, separation distance and deceleration data were precisely measured with an Oxford interial measurement unit equipped with a differential GPS. All test data was collected at a sample rate of 100Hz to enable post processing and analysis of the dynamic test data.

For the consumer survey, the sample consisted of 1,000 adults (18 years old and older) living in the continental United States and is proportionally representative of the U.S. adult population. The margin of error for the sample of 1,000 is +/- 3% at the 95% confidence level.