



25 years of Bosch ESP®: no more skidding Breakthrough for road safety

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- ▶ In the U.S., the electronic stability program saved more than 9,000 lives from 2008 – 2015.
- ▶ Worldwide, 82 percent of all new passenger cars feature the anti-skid system.
- ▶ ESC has been a mandated feature on all vehicles since the 2012 model year in the U.S.
- ▶ Harald Kroeger: “The development of ESP® was a milestone on the path to our ‘vision zero’ of no more road deaths.”

Stuttgart, Germany – A wet road and a sudden evasive maneuver: there was a time when such a situation would frequently have ended in a ditch or against a crash barrier, and not rarely with fatalities or severe injuries. Almost 25 years ago to the day, a remedy was finally provided in the shape of a pioneering invention – the ESP® electronic stability program that Bosch and Daimler-Benz first launched in S-class vehicles in 1995. Since then, ESP® has been keeping vehicles safely on track, also in critical situations. Bosch accident researchers estimate that in the EU alone, the anti-skid system has saved some 15,000 lives over the past 25 years, as well as preventing just under half a million accidents involving personal injury. In the U.S., NHTSA estimates the technology saved more than 2,000 lives from 2008-2010¹ and more than 7,000 lives for the 5-year period from 2011 – 2015.² In the last year of the NHTSA study, 2015, the technology saved nearly 2,000 lives alone.

Together with the seatbelt and airbag, ESP® is one of the most important life-savers in a vehicle. “The development of the electronic stability program was a milestone on the path to our ‘vision zero’ of no more road deaths,” says the Bosch board of management member Harald Kroeger. “ESP® is an outstanding example of what we mean by ‘Invented for life.’” The innovation may be from 1995, but there is nothing dated about it: Bosch has continuously improved its

¹ Traffic Safety Facts, November 2012 -

<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811634>

² Traffic Safety Facts, March 2017 -

<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812391>

anti-skid system, and produced more than 250 million ESP® systems to date. Modern cars are inconceivable without this electronic guardian angel. Worldwide, 82 percent of all new vehicles are equipped with ESP®. In the U.S. , ESC has been a mandated feature on all vehicles since the 2012 model year.

ESP® can prevent up to 80 percent of all skidding accidents

Especially when roads are wet or icy, when evading unexpected obstacles such as animals on the road, and also when driving into a bend too fast, the electronic stability program intervenes. With ESP® on board, up to 80 percent of all skidding accidents can be prevented. It combines the functions of the ABS antilock braking system and the TCS traction control system, but can do considerably more. It also detects vehicle skidding movements, and actively counteracts them.

The anti-skid system uses information about vehicle dynamics to detect whether the car is heading in the direction the driver is steering. If there is a discrepancy between these two factors, ESP® intervenes. This may sound simple, but is in fact a complex process. Smart sensors help compare steering angle and vehicle trajectory 25 times a second. If the two diverge, ESP® reduces engine torque and brakes individual wheels. In this way, the system helps the driver prevent the vehicle from breaking away or skidding – effectively nipping many accidents in the bud.

Breakthrough following the elk test

The story behind this achievement is a long one. It started in the 1980s with initially independent efforts by Bosch and Daimler-Benz to achieve more vehicle stability. From 1992 until market launch, experts from the two companies worked together in a project unit. The legendary elk test of 1997 helped the system achieve a breakthrough: during tests for a Swedish automotive magazine, a Mercedes Benz A-class tipped over when making an abrupt evasive maneuver. Mercedes-Benz responded by making ESP® standard equipment. Since that time, more and more vehicles of many different automakers have adopted the anti-skid system.

Fewer accidents, fewer injuries, fewer fatalities – legislators have also recognized the benefits of ESP® and made it a mandatory feature of vehicles in many parts of the world. From November 2011, it was initially mandatory for new passenger-car and commercial-vehicle types, and from November 1, 2014, for all newly registered passenger cars and commercial vehicles. And also in Argentina, Australia, Brazil, Canada, China, Ecuador, Israel, Japan, Malaysia, New Zealand, Russia, South Korea, Turkey, and the United States, the anti-skid system is either legally mandated or a self-imposed commitment.

Basis for automated driving

“ESP® has taken road safety to a new level,” Kroeger says. And it has done so across a diverse range of vehicle types. Bosch offers customized ESP® systems for all powertrain types, from combustion engines to electric motors, and for vehicles of all kinds, from micro cars to commercial vehicles. Even for motorized two-wheelers, the company has developed a kind of ESP®. The MSC motorcycle stability control that Bosch launched in 2013 ensures the best possible stability in all riding situations, and is a further pioneering road-safety achievement. At the same time, ESP® is the basic technology for many driver assistance systems, as well as for the automated driving with which Bosch is pursuing its vision zero.

“Whether new or tried and tested, Bosch technologies alert and support drivers in critical situations. And increasingly, they are in a position to assume monotonous and fatiguing tasks. This gives us an opportunity to further reduce the number of accidents and road deaths,” Kroeger says. Whether with or without a driver at the wheel, Bosch will be nipping accidents in the bud in the future as well.

Press photos: #2978892, #2978893, #2978894, #2982730, #2978896, #2978897

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Mobility Solutions is the largest Bosch Group business sector. It generated sales of 46.8 billion euros in 2019, and thus contributed 60 percent of total sales from operations. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector pursues a vision of mobility that is safe, sustainable, and exciting, and combines the group's expertise in the domains of personalization, automation, electrification, and connectivity. For its customers, the outcome is integrated mobility solutions. The business sector's main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

About Bosch

Having established a regional presence in 1906 in North America, the Bosch Group employs 35,400 associates in more than 100 locations, as of December 31, 2019. In 2019 Bosch generated consolidated sales of \$14.4 billion in the U.S., Canada and Mexico. For more information, visit www.bosch.us, www.bosch.ca and www.bosch.mx.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 403,000 associates worldwide (as of December 31, 2019). According to preliminary figures, the company generated sales of \$86.5 billion in 2019. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates

technology that is “Invented for life.” The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in 60 countries. Including sales and service partners, Bosch’s global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company’s future growth is its innovative strength. At 125 locations across the globe, Bosch employs some 72,000 associates in research and development.

The company was set up in Stuttgart in 1886 by Robert Bosch (1861–1942) as “Workshop for Precision Mechanics and Electrical Engineering.” The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant upfront investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.

Additional information is available online at www.bosch.com, www.iot.bosch.com, www.bosch-press.com, www.twitter.com/boschpress.

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