



BENDIX CONTINUES ONGOING COMMITMENT TO THE IMPROVEMENT OF HIGHWAY SAFETY

For 85 years, Bendix Commercial Vehicle Systems LLC and Bendix Spicer Foundation Brake LLC (Bendix) have been setting the industry standard for commercial vehicle air brake charging and control systems. Today, the companies are applying that leadership and momentum to advanced technologies that contribute to vehicle safety.

While accounting for only about 3% of the total vehicles involved in crashes, The Federal Motor Carrier Safety Administration (FMCSA) reports that in 2012 (the numbers most recently reported by the agency), more than 300,000 large trucks were involved in crashes – an increase of 16 percent from the previous year. Fatalities and injuries were also up.

To help stem this tide, Bendix urges the industry to actively participate in five key areas it has identified as vital to improved highway safety.

➤ **Expand incentives, support, and education about advanced safety technologies for crash mitigation/avoidance**

Bendix supports legislative initiatives that offer tax incentives, grants, or other opportunities to fleets and owner-operators for acquiring safety technologies. These incentives help fleets and owner-operators of all sizes equip their vehicles with technologies, such as stability control, forward collision warning and mitigation, lane departure warning, and others. These are proven technologies that can help drivers mitigate some of the most common commercial vehicle crash scenarios, such as rollovers, loss-of-control, and rear and side collisions.

Government estimates show that in 2012 (the latest numbers available), large truck and bus crashes cost \$99 billion, an increase of \$9 billion from 2011. These costs are borne by fleets involved in the accidents, as well as the communities in which the crashes occur – from cleanup and infrastructure repairs to productivity and environmental costs of increased traffic congestion surrounding accident scenes.

Bendix supports the implementation of both proactive and reactive incentives as a means to help promote the increased use of commercial motor vehicle safety systems.

Proactive incentives (monetary or otherwise) are designed to motivate carriers to adopt technologies as a crash prevention tactic. This is an especially salient point when considering the current landscape. The landscape is generally characterized by three overall groups:

- Motor carriers that gain interest in safety technologies only after an incident occurs;
- Carriers that want to be proactive in adopting safety systems but are stymied by the potentially higher cost of vehicles equipped with such devices;
- Carriers that equip vehicles with safety technologies but must then compete in a highly price-sensitized marketplace against those that have not made the sizable investment.

Creating a more balanced operating environment by incentivizing carriers to more rapidly adopt technologies will, we believe, offer the potential for a more direct correlation to crash reduction.

A proactive approach that ties safety technology adoption credits (or incentives) to strengthen or maintain fleet and driver CSA (Compliance, Safety, Accountability) scores is an effective potential stimulus. This approach is rooted in the acknowledgement that CSA scores can be either favorable or detrimental to a motor carrier's overall revenue and profitability. Increasingly, shippers, insurers, and other vested parties have adopted processes that include reviewing fleet scores when selecting transportation service providers, conducting rate-setting reviews, or for other business actions where crashes or poor scores can be a significant influencer. By incentivizing fleets and/or drivers via a CSA score "credit," or "beyond compliance" approach, government and industry will realize their joint goal of helping reduce commercial vehicle crashes through increased market penetration of these technologies. In terms of reactive incentives, Bendix believes this may also help induce fleets and owner-operators that have had issues – and/or are facing low CSA scores or unsatisfactory ratings from compliance reviews – to take action. There are two options we believe are worthy of consideration. First is the use of potential monetary penalties as seed money to acquire safety technologies. This can help fleets and owner-operators gain access to these technologies and help improve their future performance. The second approach is to provide CSA score-related improvement incentives (or credits) for retrofitting or purchasing new safety technologies that can also help spur on adoption.

The insurance industry can also play a key role in helping prevent crashes and driving down these costs. By using educational programs, premium discounts, and even incentives, insurance companies can encourage their policyholders to incorporate advanced safety and crash mitigation technologies either when specifying their commercial vehicles, or (where applicable) as retrofits.

The incremental benefit of any or all of these approaches – in terms of lives saved, as well as crashes and property damage prevented – is likely far greater than the cost of their implementation.

Lastly, experiencing the technology in real-world situations can help educate many regarding the real value of these technologies. Bendix provides an educational forum for insurance companies, as well as government regulators and legislators, advocacy groups, fleets, owner-operators, and commercial vehicle drivers to learn about such technologies through an extension of its Ride and Drive events. Started in 2005, dozens of Bendix® Ride and Drives are held each year across North America, delivering important safety information and demonstrations to thousands of industry leaders, fleets, drivers, and representatives from the insurance industry. The events include educational sessions and hands-on demonstration opportunities that enable participants to see and experience firsthand the impact Bendix active safety technologies can have on highway safety and, ultimately, incident costs.

➤ **Future regulations, if necessary, should support crash mitigation/avoidance, be developed with industry insight, and be delivered in a timely fashion.**

In 2015, The National Transportation Safety Board (NTSB) added "strengthening commercial truck safety" to its "Most Wanted List" of advocacy priorities. Per the NTSB: "To address vehicle factors, regulators must promote proper fleet maintenance and proven life-saving technology. Vehicle inspections should be required during compliance reviews, and vehicle safety equipment and technology, such as collision warning technology, tire pressure monitoring systems, rollover stability control systems, and lane departure warning systems, should be mandated across the entire industry."

At Bendix, we believe motor carriers – not solely mandates – should be the catalyst to drive safety technology adoption. That said, we also acknowledge that regulation is a reality for every member of the commercial vehicle industry. Delivering the right regulations – future-oriented and based on balanced research involving key stakeholders – along with timely implementation and relevant compliance testing methodologies are critical to help reduce crashes, injuries, and loss of life on our nation's roadways. In the decision between crash worthiness and crash mitigation/avoidance, while both approaches are important, Bendix feels that, based on the advances in commercial vehicle safety technologies, a crash mitigation/avoidance focus will yield much greater benefits in terms of reducing crashes, injuries, and fatalities on our nation's roadways. Avoiding – or reducing the severity of – the crash in the first place is a better strategy than hoping to survive a crash.

In May, 2015, the National Highway Traffic Safety Administration (NHTSA) is scheduled to publish a Final Rule (FR) requiring stability technology for commercial vehicles. NHTSA, based on the original Notice of Proposed Rulemaking (NPRM) delivered in May, 2012 plans to have full-stability technology –

known as ESP (Electronic Stability Program) or ESC (Electronic Stability Control) – standard on tractors and motorcoaches in the future. The agency cites the higher level of effectiveness of ESP/ESC over RSC (Roll Stability Control) in helping drivers mitigate rollovers and loss-of-control situations. We expect that ESP/ESC full-stability technology will be standard on most tractors and motorcoaches in the next four to five years.

Bendix supports the technology choice of ESP/ESC for this rulemaking. From our perspective, it is most effective to mandate full-stability (ESP/ESC) technology as opposed to roll-only stability technology. Through ongoing field testing and evaluation, the company has offered extensive evidence to support its position that full-stability technology for commercial vehicles provides the maximum rollover *and* loss-of-control mitigation potential available. Beyond tractors, however, ESP/ESC is the only stability technology for motorcoaches, and for possible future regulations impacting single-unit trucks, such as heavy-duty concrete mixers and dump trucks, as well as medium-duty truck applications using air brake systems.

NHTSA’s own studies have found that full-stability systems (ESP/ESC) – which combine both roll and directional (yaw) stability control – could prevent more crashes, reduce more property damage and injuries, and save more lives than roll-only systems. Given NHTSA’s desire to enhance and improve highway safety, this technology is proven to provide more impact than roll-only mitigation systems. Full-stability technology is available through all major truck OEMs and is the recommended technology for use on vocational vehicles and motorcoaches. Bendix’s own analysis of data from the “Large Truck Crash Causation Study” has found that full-stability technology could have helped mitigate up to 78 percent of the crash situations where stability may have helped, versus about 47 percent for roll-only technology.

Future government crash mitigation/avoidance research efforts, such as the undertaking referenced above, however, should solicit broad industry participation. Companies such as Bendix – which are involved in the creation, development, testing, and deployment of commercial vehicle safety technologies – can provide their expertise and perspectives to the questions being considered. As we do with our customers, Bendix remains open to sharing its expertise with regulators and legislators as they review and consider commercial vehicle safety technologies and their potential impact to help reduce crashes, injuries, and fatalities. We look forward to working with NHTSA and the industry as the agency moves forward with consideration of a potential collision mitigation regulation. Bendix is also actively engaged in better understanding how the future of intelligent transportation systems (ITS) and autonomous vehicle technologies will impact our systems, while we continue striving to deliver enhanced solutions to help fleets and drivers help reduce commercial vehicle crashes.

➤ **Support of driver education, technician training, and proactive brake and tire maintenance**

According to Christopher Hart, chairman of the National Transportation Safety Board in a February 5, 2015 exclusive interview with trucking publication, *Transport Topics*, “Trucking companies with poor safety records should redouble their maintenance efforts and pay particular attention to brake systems. We see issues regarding vehicles that aren’t well-maintained.” “The use of automatic slack adjusters in brakes has been a big help, but there are too many brake problems found on roadside truck inspections,” he said”

Bendix agrees. Active safety systems are dependent on good brake and tire maintenance practices to ensure optimal performance. More frequent and continuous education and awareness programming can help identify and correct brake issues throughout the year, helping to prevent brake-related crashes. ***Bendix supports events such as Brake Safety Week – an annual initiative sponsored by the Commercial Vehicle Safety Alliance – as a tool to help improve highway safety by identifying potential brake performance issues and educating drivers about the importance of regular brake maintenance.***

One illustration of the importance of correct, regular brake maintenance is the Commercial Vehicle Safety Alliance’s annual Brake Safety Week inspection program. In September 2014, nearly 2,200 commercial vehicles out of 13,305 inspected were placed out of service for brake violations.

Bendix offers ongoing, expert technical support, as well as a variety of educational opportunities, including in-person Bendix Brake Training Schools, for the commercial vehicle industry. More than 250,000 people have successfully completed Bendix® Brake Training School education, logging over 350,000 student training hours over the past decade. The school began more than 50 years ago, making it one of the longest running training programs in the industry.

In March 2013, Bendix launched its online brake training and education portal, www.brake-school.com, providing free access to its knowledge database and technical resources. Delivering more than 750,000 courses to registered users, the training portal currently boasts more than 25,000 registered users from more than a dozen countries. The tool is frequently updated with nearly 20 additional courses developed and added to the curriculum in the past 12 months alone. The extensive course catalog includes interactive content from Bendix's popular Air Brake Training course, plus an always growing curriculum that covers a range of product topics, segments that address highway safety, as well as a review of emissions regulations and the federal Reduced Stopping Distance mandate. Course material is covered in detailed documents, videos, and interactive presentation modules, allowing students to review the information at their own pace and on their own schedule. Knowledge checks at the end of each course measure what they've learned.

Because easy-to-use tools and good diagnostic information are integral to keeping safe vehicles on the road, Bendix offers a variety of approaches that help technicians identify and implement braking system repair needs in a timely fashion. Examples include: Bendix® ACom® diagnostic software, which is currently available at no additional charge via the Internet; and the Bendix® RDU (Remote Diagnostic Unit), which plugs into the vehicle communication port and quickly identifies brake system default codes. Additional tools, such as the SmarTire® Tire Pressure Monitoring System (TPMS) by Bendix CVS – along with the trailer solution, SmarTire® Trailer-Link™ TPMS – can help both drivers and maintenance technicians stay knowledgeable about tire pressure, and help deliver additional safety and ongoing savings for the fleet. Lastly, the SafetyDirect® Web portal delivers crucial insight – such as vehicle data and GPS and video information – to help better understand the details surrounding critical events with their trucks and drivers on the roadway.

Through classroom and online instruction, advanced diagnostics, easy-to-use tools, and the availability of comprehensive air and foundation brake training clinics, schools, and other learning opportunities, Bendix provides commercial fleets, technicians, and drivers with a robust menu of post-sales service and support tools. These tools are needed to ensure safe operation through assessment, maintenance, and repair.

Bendix reminds fleet operators that responsibility for the safe operation of their vehicles remains with the drivers at all times. Bendix safety technologies complement safe driving practices and are not intended to enable or encourage aggressive driving. No safety technology replaces the need for safe, alert drivers practicing safe driving habits, and the importance of comprehensive, proactive driver training. In the CSA environment of today's trucking industry, both driver education and braking system maintenance – along with advanced active safety technologies – will be even more critical to help ensure driver and fleet success and to help improve safety for all who share our nation's roadways.

➤ **Integrating advanced safety systems and data**

Bendix develops heavy-truck safety technologies that can dramatically enhance highway safety. Continued investment in the development of such technologies will help ensure the future safety of our roadways. ***Integrating new systems with existing systems, such as Bendix® Wingman® Fusion™ which fuses the vehicle's integrates radar, camera and brake system to enhance system performance, and which is also integrated with Bendix® ESP® Electronic Stability Program full-stability system, deliver the improved active safety performance on the road and information to the office to help drivers and fleets operate safely and efficiently on our nation's roadways.***

Bendix Wingman Fusion – launching in 2015 – helps enable safer fleet operation through always available warnings, active interventions, and information. The system uses throttle reduction, engine retarder, and brake application to decelerate the vehicle and maintain a set following distance. This system can help drivers potentially avoid rear-end collisions or, at least, help reduce their severity – particularly if drivers are momentarily distracted and the lead vehicle suddenly slows. Integrating the

system with Bendix® ESP® aids in helping mitigate loss-of-control and rollover situations. Plus, if the fleet or owner-operator chooses, data from the combined systems can be generated to help improve skills and capabilities.

Wingman® Fusion™ also includes Lane Departure Warning (LDW) and the SafetyDirect® data management portal to its portfolio of active and supportive safety technologies. Integrated technologies provide drivers with maximum active safety with a minimum of distractions on the road, and fleets with information and insight to proactively optimize driver training and safety efforts.

As we look to the future, combining (or fusing) different sensors into one system – along with information from other systems, such as stability, can help the fused system deliver even more robust decisions and additional features. In situations where the system today offers an alert, the fusion of camera and radar information may enable active braking interventions to help slow or even redirect the vehicle. Additional information can come from other sensors mounted on the truck – such as tire pressure monitoring systems – as well as from diagnostic data providing readiness indications, or GPS information letting the system know where the vehicle is going and what roadway situations (e.g., sharp curves) it may be approaching.

In the future, intelligent transportation system (ITS), vehicle-to-vehicle (V2V), and vehicle-to-infrastructure (V2I)/infrastructure-to-vehicle (I2V) data may provide additional information for the active safety system. These inputs might reveal what other vehicles around and ahead of the truck are doing, and what roadway obstacles – such as work zones – may be ahead. This additional information can help the system deliver even more meaningful alerts (and help reduce false alerts), as well as potential additional interventions to help drivers mitigate greater numbers of potential crash scenarios. As additional information is available and utilized by the active safety system on the commercial vehicle, more opportunities to help drivers mitigate more crash situations will exist, helping reduce fatalities and injuries even further.

The full range of Bendix® foundation brake solutions delivers significantly shorter stopping distances for commercial vehicles – reductions exceeding those mandated in the strengthened stopping distance regulations. Many configurations of Bendix® Air Disc and High Performance Bendix® ES™ Drum Brakes can be specified to exceed the standards in place, as well as the expectations of fleets in the widest variety of applications/vocations. Bendix foundation brake solutions deliver significantly shorter stopping distances for increased safety, reduced cost per mile, and increased peace of mind. However, ongoing performance of the brakes is, in large measure, dependent on ensuring system integrity remains intact. Relining RSD brakes with RSD-certified materials helps provide this safeguard. Use of RSD-certified friction helps ensure that the stopping distance improvements of the new vehicle are retained following preventive maintenance on a vehicle. Ensuring stopping distance performance, while integrating advanced foundation brake technology with Bendix active safety solutions, optimizes the performance of the safety system even more. Foundation brake technologies that help reduce stopping distances can also deliver effective emergency braking when active safety systems, such as Bendix® ESP®, are engaged, but only as subsequent brake relines are completed with materials that meet new high performance demands for reduced stopping distances.

➤ **Eliminating counterfeit parts that may deteriorate safety system performance**

In addition to its continued leadership in the development of advanced safety technologies, Bendix is committed to ensuring the safety of such technologies by leading the battle against counterfeit and knock-off parts. Bendix urges its industry partners to join this fight. As the commercial vehicle industry experiences greater globalization, it will also continue to experience the proliferation of knock-off and counterfeit components. The appeal of these lesser quality, lower-priced options drives some buyers to consider alternatives to genuine products, while others are unwittingly misled by distribution outlets seeking to make a greater profit.

Bendix encourages the industry to participate in opportunities to increase awareness and educate the market about the impact of counterfeit and knock-off parts. Such parts can threaten the safety of our highways – they do not undergo the rigorous testing and quality assurance of their genuine counterparts and do not offer the same level of performance or reliability. The company's genuine Bendix® initiative employs an aggressive strategy to address the consequences associated with counterfeit and knock-off

parts. The program – grounded in a three-pronged approach – includes extensive education and outreach, rigorous intellectual property protection, and the enforcement of patents and trademarks.

“Bendix has always been a leader in the commercial vehicle industry,” said Joe McAleese, Bendix chairman, president and CEO. “Our primary focus is to deliver cost-effective solutions that are meaningful for the vehicle operator and help make the roadways safer. Through continued partnership and a commitment to advancing commercial vehicle safety technology, plus supporting driver and technician training, we can truly have a significant impact on highway safety. We encourage our industry partners to join us in these efforts. Together, we can save lives.”

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