

## **Proposed New Federal Motor Vehicle Safety Standard for Motor Vehicle Side Impact Protection (FMVSS 214)**

### Proposed Regulation

The U.S. Department of Transportation (DOT) has proposed a major regulatory revision of Federal Motor Vehicle Safety Standard (FMVSS) 214 concerning passenger impact protection. The existing standard does not address side crashes into fixed narrow objects, which account for approximately 20 percent of deaths and serious injuries that occur in side impacts, according to NHTSA. The current standard also does not address head injuries, which account for 43 percent of the total deaths and serious injuries. The revision would require that all new passenger vehicles, trucks, and buses sold in the United States provide substantial head protection in side crashes.

### Background And Analysis

The proposed regulation, developed by DOT's National Highway Traffic Safety Administration (NHTSA), could become a final rule as early as 2005, with a phase-in for all new vehicles beginning four years after publication of a final rule. The proposed phase-in schedule requires all vehicles manufactured on or after September 1, 2011 to meet the requirements. Manufacturers will also have to meet an additional performance test involving a 20-mph vehicle side impact into a rigid pole at an approach angle of 75 degrees. In NHTSA's opinion, the new pole test more accurately reflects real world side-impact collisions in which head injuries are prevalent. Other dangerous side-impact crashes often happen when a large vehicle strikes a smaller one at an intersection. NHTSA estimates a car occupant is 3.5 times more likely to die if the occupant's vehicle is struck by a pickup or SUV. A new, more technically advanced dummy representing an adult male of average height, and, for the first time, a dummy representing a small adult female (4'11"), would be used in side-impact performance testing. These new dummies will promote the development of head and thorax protection systems for a wider segment of the population. Side impact crashes are responsible for approximately 9000 deaths each year in the U.S., or approximately twenty-five percent of all deaths on the road. NHTSA estimates that 60 percent of fatal side-impact crashes involve brain injuries. The agency also estimates the regulatory change would save 700 to 1000 lives per year. NHTSA reports that in 2003 a total of 42,643 people died from motor vehicle crashes of all types, with an additional 2.9 million persons suffering injuries. The agency estimates that highway crashes in the United States cost society \$230.6 billion a year. NHTSA will accept comments on the proposed rulemaking until October 8, 2004.

### Potential Impact on Industry

NHTSA's new proposal, which was anticipated by industry, and lobbied for by the Insurance Institute for Highway Safety, is the most significant auto safety initiative since front air bags became standard in the early 1990's. It will be challenging for the automotive industry to engineer and produce the new systems for all of the different

vehicle models, given the industry's pricing pressures. Protecting passengers from a side impact crash is also more difficult than protecting them from frontal impacts because only the thickness of the vehicle's door can absorb a side collision, which in turn reduces the reaction time for an airbag to inflate. The automakers will need to make engineering changes to the sides of their vehicles, including stronger roof rails to absorb more crash energy. Although NHTSA does not specify any required technologies to meet its performance standards, installing side-impact and side-curtain air bags appear to be the most obvious solution. NHTSA anticipates the vehicle manufacturers would use a 2-sensor (per vehicle) combination air bag system, which it estimates would add \$121 in production costs per vehicle. The Insurance Institute for Highway Safety's research estimates that side head air bags can reduce the risk of a fatal injury in a side impact crash by about 45 percent.

NHTSA acknowledges that the proposed regulations will directly affect all motor vehicle manufacturers and indirectly affect their suppliers: air bag manufacturers, dummy manufacturers and seating manufacturers. NHTSA said the proposal passed the agency's cost-benefit threshold formula, as mandated by Congress. The agency estimates it will cost automakers between \$1.6 billion and \$3.6 billion for research, engineering and equipment changes, adding an average of \$208 in overhead costs per vehicle.

The Alliance of Automobile Manufacturers predicts the automotive industry will likely meet NHTSA's proposed requirements before they are scheduled for implementation. The Alliance estimates that approximately 45 percent of 2004 model-year cars and trucks already offer side and head protection air bags as standard or optional equipment. In December 2003, the industry announced voluntary standards to improve protection in front-to-side crashes, which included head protection technologies such as side air bags. The commitment said 50 percent of the fleet would have the new technologies by 2007 and 100 percent would have them by 2009. The Alliance estimates that new requirements will add approximately \$200 to \$500 to the retail price of each vehicle. Another industry estimate has a typical side-air bag system costing a minimum of \$150 on sedans and a maximum of more than \$300 on large SUV's, with some vehicles having as many as six air bags.

Currently there are several configurations of side-impact air bags being used by the automakers. For example, some are tucked behind the door panels to help protect the upper body, some are mounted inside the seat backrests to protect the pelvis, and some are mounted overhead to help protect the head. Many engineers believe the side curtain air bag is the best option to meet NHTSA's proposed standards due to its slim design, which helps reduce inflation time, and its ability to reduce injuries and block glass splinters. The curtain air bag, which has an overhead design, inflates downward from the ceiling trim and covers all of the side windows. The curtains are often used in combination with torso-protecting side air bags. Air bag curtains extend the length of a window and often into the rear seat of the car to protect the heads of all occupants seated near the doors. An industry source estimates that the automakers pay suppliers approximately \$100 for a pair of air bag curtains. It is uncertain if the narrower side air bag tubes that some current models have will be able to meet the proposed standards

because they may not be wide enough across the window and the crash test using the pole could hit the dummy's head.

## Suppliers

The international Automotive Occupant Restraints Council (AORC), based in Lexington, Kentucky, represents approximately 50 companies that develop, manufacture, and provide occupant restraints systems and components, and automotive seating to vehicle manufacturers worldwide. AORC supports the proposed revisions.

Automotive News reports that four suppliers have 93 percent of the North American air bag market: Autoliv (35%), TRW Automotive (25%), Takata (20%), and Delphi (13%). Siemens VDO Automotive and Key Safety Systems (formerly Breed Technologies) also supply airbags. Autoliv has a global patent on inflatable curtains, but has allowed other companies to license its technology. All of the air bag manufacturers and their suppliers are optimistic about the expected volume increases and increased vehicle content. Future demand for side air bags is expected to increase not only in the United States but also in other developed markets around the world. American, Japanese, and European vehicle assemblers most likely will continue to incorporate the use of side-impact air bags into their models worldwide, creating increased opportunities for related suppliers.

Nonetheless, all suppliers are being pressured to continually lower their costs. Assemblers and their suppliers will be faced with challenges, particularly as their products move from an expensive option to standard, higher-volume equipment. They will need to invest in tooling and production equipment to accommodate side-impact air bags in their various models. However, because side-curtain bags will be a mandatory safety item, it should enable suppliers to maintain or increase their receipts. In addition, as the related technology continues to evolve and economies of scale are reached, bags should become less expensive to produce, improving profit margins in the process.

Although there are several U.S.-based suppliers that can provide technology and systems that will satisfy the new regulation, it is unclear how many U.S. export opportunities it will generate, given that the major suppliers already have plants worldwide. TRW Automotive, for example, manufactures and sells side-impact air bags in the United States for the American market, and also produces in Europe for local assemblers there. Moreover, most developed markets have adopted EU side impact regulations, which differ significantly from the new FMVSS 214 (see below).

NHTSA estimates there are 21 suppliers of seating systems, about half of which are small businesses. If seat-mounted head/thorax air bags are used to meet the new pole test and the upgraded movable, deformable barrier (MDB) test, the proposed requirements would benefit seating system suppliers since the cost of seats would increase. NHTSA believes air bag manufacturers would provide the seat suppliers with the engineering expertise necessary to meet the new requirements.

Sensor manufacturers and safety electronics companies would also benefit from increased volumes, if the proposed standards are implemented. Industry sources estimate that side airbags would require two to six additional silicon sensors per vehicle, increasing annual consumption of sensors in the United States by 50 million to 70 million sensors by 2009, when all vehicles are expected to comply. The industry will need to change the location and improve the performance of air bag sensors and their supporting electronics to accommodate the new side air bag curtains. These changes will be challenging, given the complexity of side curtains, the need for processing all of the additional crash data faster, and the requirement to pass NHTSA's new performance tests. Worldwide demand for airbag sensors is expected to reach 200 million units in 2009.

### Harmonization with International Standards

NHTSA has tentatively concluded that adopting its proposed vehicle-to-pole test into FMVSS 214 would result in significantly greater benefits for the American public, than would accrue from adopting EU 96/27/EC or the Euro NCAP side impact test into the standard. The side impact tests of EU 96/27/EC and Euro NCAP moving barrier test address mainly the chest injury problem. NHTSA asserts that the barrier used in those tests is not representative of the vehicles in the U.S. fleet, which has more proportionally more SUVs and other light trucks compared with the European fleet. NHTSA further states that the EU tests do not adequately simulate an impact with an exterior narrow rigid structure, nor do they address head protection in the manner proposed for the agency's pole test.

### Conclusion

ITA's Office of Aerospace and Automotive Industries perceives no competitive disadvantages for U.S. producers in the American market that would arise from the proposed revision of FMVSS 214. It will, in fact, generate increased sales for suppliers of these products. However, the proposed regulation differs significantly from side impact regulations developed by the EU and adopted by most nations that have such vehicle safety standards. This situation, combined with the fact that most major U.S. suppliers also rely on their plants abroad to supply local markets, will limit export opportunities that might otherwise accrue from developing new technologies to satisfy the revised standard.

Prepared: USDOC/ITA/MAS/MFG/OAAI/AIT/Elizabeth Couch/x2-2120/08-26-04