INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

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Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Monitoring the Performance of Depowered and Advanced Airbags and Developing Data for Potential Future Airbag Rulemakings
Docket No. NHTSA 2001-8953

Dear Dr. Runge:

The National Highway Traffic Safety Administration (NHTSA) has requested comments on the agency's plan for monitoring and evaluating the performance of advanced airbags. Many manufacturers are equipping some of their vehicles, ahead of the regulatory timetable, with advanced frontal airbags that have features such as dual deployment thresholds, dual-stage inflators, and seat position sensors. These features should do much to decrease the incidence of injury and death to occupants who are close to airbags when they deploy, while at the same time maintaining protection for occupants in higher severity frontal crashes. As the new requirements of the final rule and interim final rule for advanced airbags (65 FR 30680, May 12, 2000; Federal Motor Vehicle Safety Standard 208) take effect starting with the 2004 model year, more and more vehicles will have an increasingly sophisticated array of advanced airbag features.

Given past experience, it is important to closely monitor advanced airbags as they come into the vehicle fleet. Because of the many low- and high-speed tests and the range of dummies required for compliance, there is the potential for unexpected consequences. For example, crash sensors will need to make much finer discriminations than in the past to deploy airbags with differing force depending on crash severity. As another example, manufacturers can choose to use dummies or humans to test automatic suppression systems. There is concern that automatic suppression systems that discriminate in compliance testing between 5th percentile adult female and 6-year-old child dummies to suppress deployments for the 6 year-olds and protect the females may be less reliable in real-world crashes involving people

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instead of dummies. There also is concern with the introduction of less powerful airbags that some vehicle occupants, particularly large males, will not be as well protected as they were in the past. Concerns such as these confirm the need for close monitoring.

The Insurance Institute for Highway Safety supports NHTSA's efforts to put together a comprehensive research plan to ensure that as airbags become more sophisticated they provide the expected protection to occupants of all sizes across the wide range of crash severities. There will be a number of in-depth investigations of frontal crashes (e.g., the Special Crash Investigation Program, the Crash Injury Research and Engineering Network, and the National Automotive Sampling System/Crashworthiness Data System). These crash investigations are critically important because detailed reviews of these cases can shed light on how frontal airbags are working or not working to save lives and prevent injuries. In the short term, they provide an early warning system to identify potential problems with advanced airbag systems; in the longer term, these investigations can support statistical analyses of advanced and depowered airbag effectiveness.

Also planned are information and education programs designed to inform consumers about safe practices that optimize driver and passenger protection. NHTSA will continue public education campaigns to ensure that children still ride in rear seats where they are safest and will evaluate the effectiveness of these programs. The Institute agrees it is important to keep the public aware of the best safety practices, especially given the possibility that automatic suppression systems may make parents less concerned about keeping their children in rear seats.

NHTSA also plans to develop and widely disseminate materials to educate the public about how different airbag systems work. Misunderstandings still exist regarding how airbags deploy and what to expect in a crash. As airbags become more sophisticated, the need for public information will grow.

Another component of the proposed consumer information plan would provide details about the characteristics and performance attributes of advanced airbags. NHTSA plans to assemble a database describing airbag design features such as dual-speed inflators, occupant position sensors, and deployment thresholds by make/model/model year. It is not clear what the purpose of providing such information to consumers might be. Knowing the particular features of airbag design for a given vehicle could prove useful for investigators and researchers in evaluating restraint system performance. However, there have been suggestions in the past that the public should be given detailed information about airbag characteristics to help decide which vehicles

to buy. Providing undigested information about the various features available could be very confusing if no guidelines are provided. However, if NHTSA were to provide the public guidance about preferred features, it would imply that some designs are better than others, creating an unauthorized de facto design standard rather than a performance standard. Airbags are designed to work together with seat belts as an integrated system and are uniquely designed based on a vehicle's performance and crash characteristics. It is questionable whether a listing of restraint system characteristics, even including some detailed information about deployment thresholds and energy levels, would shed much light on real-world airbag performance.

NHTSA also is considering publishing an annual report using manufacturer and NHTSA compliance test data to indicate the extent to which vehicles exceed the performance requirements in the standard. The agency first plans to evaluate whether consumers could effectively use this information as an indicator of relative restraint system performance. The more relevant question is whether such information is meaningful. For example, is an injury measure that is 40 percent below a given injury criterion somehow better than one that is 35 percent below as measured by actual injury risk? While it is theoretically true that injury measures representing lower levels of force or deformation are associated with lower injury risk, the measurements are somewhat imprecise predictors of risk. Thus, small differences in head injury criterion (HIC), for example, may not represent meaningfully lower levels of risk. Furthermore, the relationship between injury measures recorded by crash dummies and injury risk to humans is not linear. Thus, the injury-risk difference between HICs of 600 and 550 is not the same as the difference between 400 and 350. More importantly, reporting compliance margins presumes that regulatory tests somehow represent a complete picture of possible injury causing scenarios when they do not. Thus, a manufacturer may choose relatively narrow compliance margins for its restraint systems in order to provide improved protection in other potentially injurious situations not included in the regulatory tests. The simple reporting of compliance margins would suggest that such systems are inferior to those with wider margins when in fact they may provide superior performance in the real world. Furthermore, given the wide variety of test conditions, different size dummies, and injury measures, it is unclear how such results might be reasonably reported in a way that does not confuse consumers. Different restraint systems likely will rank better on some tests than on others. How does the consumer decide what weight to give these individual results?

In summary, NHTSA has developed a comprehensive plan to monitor the performance of advanced airbags to provide detailed and timely information about advanced airbag performance. In-depth crash

investigations are vital to ensuring that potential real-world problems are uncovered as soon as possible. However, when it comes to providing consumer information, NHTSA should carefully consider the limitations of some of these data. Should the agency nevertheless decide to go ahead with such plans, we would hope for a period of public comment prior to implementation.

Sincerely,

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Senior Vice President, Research

cc: Docket No. NHTSA 2001-8953