Advanced Air Bags

Regulatory Studies Program Comments
Executive Summary

In response to reported fatalities among small adults and children caused by air bag deployment, NHTSA has proposed a complex, detailed set of performance tests that new vehicles equipped with advanced air bags would have to meet. These latest test requirements are another step in NHTSA's effort to devise a single set of requirements that will protect the safety of all vehicle occupants under all conditions.

However, regardless of how sophisticated NHTSA makes its tests, or how sophisticated manufacturers make air bags, this one-size-fits-all approach will not meet the preferences or protect the safety of all consumers under all conditions. Both the costs and benefits of different vehicle components, including safety features, are borne by individual consumers, who in recent years, have become increasingly aware of the benefits and potential dangers of air bags. Moreover, the risk tradeoffs air bags pose are particular to the characteristics and behavior of vehicle occupants. Yet, NHTSA's proposal would not allow consumers to make their own decisions regarding these tradeoffs. Even under the advanced air bag proposal, air bags provide disproportionate benefits to occupants who are not wearing seat belts and they are actually likely to increase the chance of severe injury for properly belted occupants.

Rather than requiring air bags to pass additional elaborate crash tests, which can never fully reflect real world conditions, NHTSA should consider options that allow informed consumers to make their own personal risk tradeoff decisions. One option would be to continue allowing vehicles to pass the sled test, or another crash test that does not force too-powerful air bags. Another would be to permit manufacturers to offer manual on-off switches for air bags. That would allow consumers (rather than a complex computer algorithm in the vehicle) to deactivate an air bag if necessary to reduce the risk to certain occupants or under certain driving conditions.

If NHTSA is concerned that, in the absence of federal standards, consumers will not be adequately informed as to the safety of different options, it could better focus its efforts on providing information about the characteristics and effectiveness of different occupant safety systems under different conditions. Such an approach would allow consumers to pay for what they need, not what government analysts believe they should have.

Department of Transportation, National Highway Traffic Safety Administration

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Federal Motor Vehicle Safety Standards; Occupant Crash Protection

"Advanced Air Bags"[1]

I. Introduction

The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of regulations and their impacts on society. As part of its mission, RSP produces careful and independent analyses of agency rulemaking proposals from the perspective of the public interest. Thus, the program's comments on NHTSA's "Advanced Air Bags" proposal do not represent the views of any particular affected party or interest group, but are designed to protect the interests of American citizens.

The key tests of whether a government action is likely to make society better off are (1) whether it is designed to correct a significant market failure and (2) whether its projected benefits are likely to exceed its projected costs. The Regulatory Studies Program has developed a checklist of elements that are necessary to determine whether these two tests are met. These comments examine how well NHTSA's proposal and the economic analysis (EA) supporting it have complied with these elements.

Section II of these comments provides an overview of NHTSA's proposed advanced air bags rule, including a brief history of NHTSA's rulemaking of automatic vehicle occupant restraint systems. Section III examines the underlying need for the regulation. Section IV comments on the regulatory analysis supporting the proposal. Section V presents the Regulatory Study Program's conclusions and recommendations. Appendix I responds to specific questions raised in the preamble. Appendix II presents RSP's Checklist for this proposed action.

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II. Overview of NHTSA Proposal

A. Background

Federal Motor Vehicle Safety Standard 208 originally took effect in January 1968, and required passenger cars to be equipped with a seat belt for all forward-facing seats.[2] In 1972, NHTSA permitted vehicle manufacturers to comply with Standard 208 by installing air bags, rather than a manual lap and shoulder belt. Although it had been considering them since 1969,[3] NHTSA first required passive restraints (protection that required no action by the occupant) for passenger cars in 1984. These took the form of shoulder belts that automatically engaged over the occupant, and were generally disliked by consumers due to their awkwardness. Within a few years, automobile manufacturers responded to market preferences for air bags over other passive restraints and began installing air bags in all of their passenger cars and light trucks. In 1991, Congress directed NHTSA to require air bags in all passenger vehicles by September 1998. In response, NHTSA issued a September 1993 rulemaking, which amended Standard No. 208 to require air bags that met injury and fatality prevention criteria in designated crash tests.

NHTSA estimates that, since 1986, when air bags first began to appear in vehicles, they have saved about 3,148 drivers and passengers. Of those, 2,267 (72 percent) were unbelted and 881 (28 percent) were belted. When all light vehicles on the road are equipped with dual air bags, NHTSA estimates 3,200 lives will be saved per year.

NHTSA has also confirmed that air bag deployment had resulted in 105 fatal injuries (40 drivers, 61 children, and 4 adult passengers) as of June 1, 1998. In those cases, the occupants were very close to the air bag when it deployed, and the force of inflation proved fatal. Drivers of small stature who sit within 10 inches of the air bag appear to be at risk even when properly belted. However, NHTSA notes that of the 40 drivers who died, only 11 were known to be properly restrained. Infants in rear-facing car seats (representing 13 of the deaths) are also at risk when riding in the front passenger seat, because their heads are close to the bag. NHTSA reports that the majority of older children who were killed by air bags were not properly restrained, and that pre-impact braking caused them to move forward before the crash.

In sum, NHTSA attributes these 105 fatalities to a combination of occupant position and the force of existing air bag deployment. NHTSA's battery of air bag performance tests (Standard No. 208)[4] included test requirements designed to protect an average sized male

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2 Stephen Kratzke, "Regulatory History of Automatic Crash Protection in FMVSS 208," SAE Technical Paper Series. 950865. 1995.

3 Ibid.

4 NHTSA's performance tests involve testing the impact on crash dummies under different simulated crash conditions. For example, the unbelted rigid-barrier test simulates a 30-mph crash into a rigid barrier, using a dummy representing an average-sized male. For a vehicle to pass the test, the dummy and the vehicle must meet defined criteria, including dummy criteria related to head, neck, and chest injuries.

who was not wearing a seat belt. The air bag fatalities reveal that air bags that deploy with sufficient force to protect an unbelted male are powerful enough to fatally injure smaller individuals who are close to the bag when it begins to inflate.

NHTSA has taken several actions to reduce the risks air bags pose to certain occupants. In May 1995, NHTSA temporarily allowed (until August 1996) vehicle manufacturers to install on-off switches for passenger air bags in new cars and light trucks without rear seats or with rear seats that were too small to properly accommodate a child seat. In December 1996, this policy was extended until Aug. 31, 2000.

In March 1997, NHTSA temporarily amended the unbelted dummy test to include a sled test, in which a vehicle is stopped quickly, but not crashed into a barrier (as an alternative to the fixed-barrier test), which would allow manufacturers to reduce the force of the air bags during deployment. NHTSA recently released information on 115 crashes which reveals that the depowering that was permitted by this amendment has virtually eliminated air bag-induced deaths of short women in minor, low-speed accidents.[5]

In November 1997, NHTSA issued a notice allowing dealers and repair shops to install an on-off switch to temporarily deactivate air bags for consumers fitting certain risk profiles who obtain prior authorization from the agency.[6] NHTSA considered, but rejected in November 1997, a rulemaking to permit all air bag vehicles to be equipped with manual cutoff switches.

B. The current proposal

The current proposal for advanced air bags includes several new and revised tests that new vehicles must pass to demonstrate protection of vehicle occupants. These requirements respond to two general objectives—to improve protection provided by air bags, and to reduce injuries caused by air bags—and are summarized below:

1. Improve occupant protection provided by air bags.

1. The proposal would phase out the unbelted sled test, which had been allowed as an interim measure since November 1996 as an alternative to the unbelted barrier test

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[5] Associated Press, 12/10/98 "Less forceful air bags appear to protect adults." The EA supporting this proposal hypothesizes possible negative safety effects if manufacturers were to meet the sled test by reducing the size of air bags, however, manufacturers have not reduced air bag size, and the EA presents no evidence of a decrease in protection associated with MY 1998 vehicles.

[6] To obtain a switch, consumers must: (1) obtain a NHTSA information brochure and a request form, (2) fill out the request form, certifying that they have read the information brochure and that they fit one of four profiles of people at risk, and send it to NHTSA, (3) receive NHTSA authorization via a letter, and (4) take the letter to a dealership or other service outlet to have an on-off switch installed. The four eligibility profiles are: (1) those who cannot avoid placing rear-facing infant seats in the front passenger seat. (2) Those who have a medical condition that places them at specific risk. (3) Those who cannot adjust their driver's position to keep back approximately 10 inches from the steering wheel. (4) Those who cannot avoid situations -- such as a car pool -- that require a child 12 or under to ride in the front seat.

requirement. The unbelted barrier test will be retained. NHTSA requests comments and suggestions for alternative unbelted crash test requirements.

2. The proposal would upgrade the chest injury criteria and add neck injury criteria.

3. The proposal includes new requirements for ensuring vehicle integrity during a crash (e.g., doors could not open during a crash test).

4. After crash tests, the proposal would require doors to open without tools.

5. Under the proposal, new vehicles must meet existing performance requirements with 5th percentile dummies, belted and unbelted, in addition to the existing dummies representing 50th percentile males. The proposal also calls for an additional 40 km/h offset deformable barrier test requirement using restrained 5th percentile female dummies.[7]

2. Minimize risks caused by air bags to infants, children and other occupants.

1. Under the proposal, new vehicles would have to meet one of two alternative test requirements to protect rear facing infants: one would test the performance of an automatic air bag suppression feature (shown to suppress deployment when in the presence of infant dummies, but not small adult dummies), the other would test the performance of low-risk deployment on an infant dummy.

2. New vehicles would have to meet one of four alternative test requirements using 3-year-old child dummies: (1) a test of the performance of a suppression feature when child is present (weight or size sensor), (2) a test of the performance of a suppression feature for out-of-position occupants (3) a test of low risk deployment for out-of-position 3-yr-old dummies, or (4) a full scale dynamic out-of-position test, which would include pre-impact braking.

3. The proposal would require new vehicles to meet one of four alternative test requirements (similar to those for 3-year-old child dummies) using 6-year-old child dummies.

4. New vehicles would have to meet one of 3 alternative test requirements designed to protect small drivers: (1) a test of the performance of a suppression feature when the driver is out of position, (2) a test of low risk deployment in presence of out-of-position 5th percentile adult female dummies, or (3) a full scale dynamic out-of-position test requirements, including pre-impact braking.

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[7] In the past, NHTSA crash simulations have used crash dummies developed to represent the average adult male (the 50th percentile dummy). Under this proposal, NHTSA would tests air bags on four more crash dummies. The 5th percentile female dummy was developed to represent impacts on women of small stature. Child- and infant-sized crash dummies will be used to evaluate impacts on 12-month old, 3-year-old, and 6-year old children.

NHTSA proposes to phase in these new requirements by September 1, 2005.

III. The Need for Regulation

NHTSA estimates that air bags have reduced fatalities in frontal crashes by about 30 percent. Moreover, judging from vehicle manufacturers' pre-regulation actions and ongoing advertising, which lists dual air bags as a positive attribute in new vehicles, consumers appear to prefer vehicles equipped with air bags. These facts, however, are not sufficient to justify federal regulation *requiring* air bags. If air bags protect lives, and consumers demand them, it is reasonable to assume that automobile manufacturers would have installed air bags in the absence of federal requirements to do so. In fact, the preamble confirms that a "strong market preference for air bags led manufacturers to move toward installing them in all of their passenger cars and light trucks" before federal law required them.

The Administration's economic analysis guidelines state:

> In order to establish the need for the proposed action, the analysis should discuss whether the problem constitutes a significant market failure … Once a significant market failure has been identified, the analysis should show how adequately the regulatory alternatives to be considered address the specified market failure.[8]

The Administration's guidance discusses four major types of market failure: externalities, natural monopolies, market power, and inadequate or asymmetric information. The preamble to the proposed regulation does not identify which of these possible market imperfections its rule is designed to correct.[9]

When purchasing a passenger vehicle, consumers are faced with numerous attributes from which to choose. Those attributes carry different price tags, and individual consumers can weigh the costs and benefits of those attributes in making their decision regarding which vehicle to purchase. Both the costs and benefits of different vehicle components, including safety features, are borne (or internalized) by the consumer, and thus externalities do not inhibit markets from providing the degree of safety consumers demand. Nor would inadequate or asymmetric information hinder markets significantly. Automobile manufacturers have every incentive to inform consumers through advertising and marketing of the safety features of their vehicles.[10] One need look no further than the

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[8] "Economic Analysis of Federal Regulations Under Executive Order 12866," U.S. Office of Management and Budget, January 1996. These are commonly referred to as the "Best Practices."

[9] In fact, the proposal is designed to correct a regulatory failure. The testing required by Standard 208 in the past forced the development of air bags to protect unbelted average-sized adult men, which turned out to be too powerful for smaller passengers seated close to the air bag.

[10] In chapter 6 of its economic analysis, NHTSA suggests that "[t]here may currently be a market failure due to imperfect knowledge by consumers and the fact that new vehicle purchasers would pay for any cost increases due to [air bag] installation, but most of the benefits accrue directly to insurance

advertising of Volvo, Buick and others to know that not only do manufacturers have incentives to tout the safety features of their own vehicles, but some find it profitable to compare their vehicle safety features against those of their competitors.

The above review of the history of NHTSA passive restraint regulations suggests that federal initiatives have followed, rather than driven, vehicle manufacturers' efforts to improve the performance and safety of passive occupant restraints. As NHTSA observed in a 1996 report to Congress regarding regulations that required air bags in all new vehicles, "[a]ir bags have already proven to be the system of choice among consumers, so the trend already had been established before this requirement was implemented."[11]

The current proposal continues this pattern. NHTSA has carefully surveyed the advances manufacturers have made to address recent concerns that air bags increase occupant risks in certain situations, and now proposes test requirements that would mandate those technologies. The federal government will always be a step behind consumer-driven advances in safety technology. As if to confirm this, the executive summary to the proposal states that "as more advanced technology is developed, the agency may develop proposals to require further enhancements in occupant protection under Standard No. 208."[12]

Redundant, non-binding federal requirements may appear to be relatively harmless, though an unnecessary expenditure of taxpayer funds and government resources. But, in fact, the consequences are non-trivial, both in terms of money and human life. There are two fundamental reasons for this:

1. **Mandating a certain level of protection in all new vehicles is unlikely to meet the diverse demands of different consumers.** NHTSA's one-size-fits-all approach takes away consumer choice and precludes manufacturers from meeting diverse demands with a variety of safety measures. Though vehicle occupants internalize both the benefits and costs of occupant protection, and have different preferences and levels of risk aversion, NHTSA's proposed standards would not give them the right to disengage an air bag.

   Different purchasers have different preferences with respect to many different vehicle attributes, including size, color, power, and safety. Some purchasers may prefer a vehicle with safety features that allow a child to ride safely in the front passenger seat, while some may never have a need to carry a small child, and others may be concerned with the safety and comfort needs of small women, or tall men. Some

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companies through lower collision loss payments." It goes on to recognize that competition in the insurance market would cause these benefits to be passed on to consumers through lower premiums, and suggests that the proposal may merely "expedite the installation of some devices that are cost-beneficial for society and would ultimately be demanded by the market anyway." It does not recognize the harmful effects on innovation and consumer choice of the mandated standard.

11 "Third Report to Congress: Effectiveness of Occupant Protection Systems and Their Use," NHTSA, December 1996.

12 NPRM, Executive Summary.

consumers may always wear a safety belt, and prefer not to pay the extra costs of the proposed high-tech passive restraints that detect when a belt is fastened, while others may prefer to pay for passive restraints than wear seat belts. NHTSA does not propose to require all vehicles to be equally comfortable or attractive to all consumers, yet through this very complex rulemaking, it attempts to make all vehicles equally safe for occupants with widely different sizes, preferences, and behaviors.

NHTSA's statistics reveal that the air bags developed to meet its standards provide different levels of protection depending on occupant characteristics (age, height, weight and seatbelt usage), vehicle characteristics (type and weight), and the impact of concern (injuries vs. fatalities). In fact:

- Occupants wearing manual lap-shoulder seat belts are more likely to be seriously injured in a crash if their vehicle is equipped with an air bag than if it is not.[13]

- Drivers over 55 years old, *whether they are belted or not*, do not receive statistically significant benefits from air bags.[14]

- Drivers over 5'10" and under 5'5" tall are better protected from moderate or greater injury with a manual lap-shoulder belt than with an air bag plus a lap-shoulder belt.[15]

- Drivers weighing between 135 lbs. and 179 lbs. also appear to be better protected with a manual lap-shoulder belt alone.[16]

2. **Government standards, even performance standards, necessarily favor certain technologies or approaches over others**. The 105 deaths due to powerful air bags, which were designed to meet the rigid barrier test with an unbelted male dummy, provide distressing evidence that even performance standards can lock in technologies that are sub-optimal. Particularly since government standards respond less quickly to changing information and market demands than private initiatives, they can unwittingly hinder innovation. The advanced air bags proposal, while framed as a series of performance standards new vehicles must meet, adds new complexity and new rigidity to the existing requirements. It is certain to prove expensive to consumers, and may pose safety risks, both direct (as in the case of the unforeseen deaths from too-powerful air bags) and indirect (as potentially life-saving innovations may be precluded).

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13 NHTSA, December 1996, *op. cit.* Exhibit 10.
14 NHTSA, December 1996, *op. cit.* Exhibit 6.
15 NHTSA, December 1996, *op. cit.* Exhibit 15.
16 NHTSA, December 1996, *op. cit.* Exhibit 16. NHTSA recognizes that it's "findings for driver height and weight groups appeared somewhat contradictory, since one should expect a high correlation between driver height and weight."

IV. Regulatory Impacts

NHTSA's analysis of the benefits and costs of its proposal reflects careful and thorough work. However, it is important to remember that government standards based on even the best benefit-cost analysis are no substitute for an efficiently functioning market. As NHTSA's insightful review of its Center High Mounted Stop Lamps (CHMSL) requirement revealed, even the most carefully conducted benefit-cost analysis can dramatically misstate actual *ex-post* effects. NHTSA required CHMSL on new passenger vehicles in 1983, based on extensive empirical data that led it to expect a 35 percent reduction in rear-impact crashes as a result of the brake lights. However, NHTSA's retrospective evaluation found that, in the long run, the lamps have reduced rear impacts by only 4.3 percent.[17]

Similarly, in 1977, NHTSA estimated that air bags would reduce fatalities in frontal crashes by 65 percent and in all types of crashes by 40 percent.[18] By 1996, empirical evidence revealed that actual effectiveness at reducing fatalities in frontal crashes was 31 percent rather than 65 percent, and that air bags' effectiveness at reducing fatalities in all types of crashes was 11 percent, not 40 percent.[19] Perhaps more significantly, experience has revealed that some categories of occupants were actually made worse off by the presence of the air bags designed to meet NHTSA standards.

Retrospective studies of the effectiveness of these standards are clearly invaluable in evaluating their long-term impact and in forming future policy. NHTSA should continue to conduct evaluations, like the one highlighted above, which was presented to Congress in 1996. That report's examination of the likelihood of *injury* by age group, height, weight, and seat belt usage revealed some disturbing results (discussed below). It did not present similar statistics broken down by occupant characteristics for *fatalities*, however, and it should. For example, NHTSA's statistics suggest that women who wear seat belts derive no incremental injury reduction benefits from air bags, but the Agency does not report statistics on fatality reduction benefits by seat belt usage and other occupant characteristic (such as size and age).

Overall, NHTSA's economic analysis (EA) is well done. It quantifies fatalities avoided, and the costs and property damage benefits of different compliance options. Instead of explicitly assigning values to statistical lives saved, it estimates the cost-effectiveness of different compliance options. This approach produces implicit values for fatalities avoided that are within the range of values researchers have attributed to the public's willingness to pay for a statistical life.

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[17] Despite the significantly reduced estimate of benefits, NHTSA's retrospective evaluation concluded that the benefits of the lamps outweigh the costs. This assumes, however, that manufacturers would not have installed CHMSLs in the absence of a federal requirement.

[18] NHTSA *Standard 208—Explanation of Rule Making Action*, "Effectiveness" section at p. 8 (July 26, 1977), as cited in testimony of Sam Kazman, Competitive Enterprise Institute, May 20, 1997.

[19] NHTSA, December 1996, *op. cit.* Exhibit 3.

The EA estimates an overall cost-effectiveness of $0.2 to $4.8 million per fatality avoided. The low end of this range includes cost savings NHTSA expects from new "smart" air bags. New technologies that suppress air bag deployment on the passenger side when the seat is empty or occupied by a small person would eliminate the need to replace the air bag, as well as to repair property damage to the vehicle from deployment.[20] As a result of this reduction in property damage costs over the current requirements, NHTSA's passenger-side cost-effectiveness estimates range from a *savings* of $7.2 million per fatality avoided (implying a reduction in both costs and fatalities over the existing requirements) to costs of $4.5 million per fatality avoided. For drivers, the range is $0 to $21.2 million per fatality avoided. These cost-effectiveness estimates are all based on comparisons to pre-MY 1998 vehicles.

While NHTSA's overall approach to estimating the incremental net benefits of this proposal is generally sound, we raise concerns about some specific approaches, assumptions, and analytical techniques in the following sections.

A. NHTSA's baseline does not accurately reflect the state of the world without the proposal.

The relevant measure of the benefits of air bag regulations is not the number of fatalities and injuries that have been prevented by the presence of air bags, because air bags were being offered before they were required by law. Instead, the relevant baseline for valuing the regulations is: what would have occurred in the absence of regulations? This, of course, is difficult to measure with any confidence. Air bags certainly have saved lives. However, it is safe to say that the 3,148 lives saved from air bags since 1986 are not all benefits attributable to NHTSA's regulation of air bags.

NHTSA's economic analysis for the proposed advanced air bag rulemaking starts from a baseline of vehicles designed to meet pre-model year (MY) 1998 standards (that is, vehicles designed to protect an unbelted dummy in a rigid barrier crash test, not the sled test). It also conducts an alternative analysis using a baseline of MY 1998 vehicles, which were designed to meet the sled test. NHTSA's analysis of the proposal from this alternate baseline is important, since policy decisions should benefit from an understanding of the incremental costs and benefits of the proposed tests over the existing solution to the problem of air bag-induced fatalities.

Unfortunately, the analysis conducted with the sled test baseline is not as comprehensive as that completed for the pre-MY 98 baseline. In fact, the baseline NHTSA evaluates is not actually the MY 98 fleet. NHTSA's baseline assumes lower volume air bags (and therefore, higher injuries due to high speed crashes) than actually resulted from the availability of the sled test.[21] NHTSA admits that "relatively modest changes have

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[20] NHTSA's 1993 regulatory analysis supporting its requirement that all vehicles be equipped with air bags did not include the property damage caused by air bags as a cost of the requirement. This is discussed more fully below.

[21] This is because manufacturers did not reduce the power of air bags as much as NHTSA predicted.

occurred thus far in air bag designs that use the sled test for compliance," however, it is concerned that possible design changes, such as reducing the size of the air bag, could expose occupants in high speed crashes to greater risk. In fact, without any empirical evidence, it assumes for this baseline that air bags designed to meet the sled test would not protect against fatal injuries in crashes except direct frontal, "12 o'clock," crashes. NHTSA does not offer an explanation for why manufacturers would make air bags smaller, and in fact, it seems unlikely—NHTSA does not assign any cost savings to manufacturers from such a decision, while clearly manufacturers would face increased liability costs. The EA's assumptions for the MY 98 baseline appear to contradict the statistics recently released by NHTSA, which reveal that the air bags depowered to meet the sled test have virtually eliminated air bag-induced fatalities while preserving the safety protection benefits of air bags.[22] This evidence suggests that, contrary to NHTSA's assumptions that they would design restraint systems to meet the bare minimum federal requirement, manufacturers have responded to market forces to produce air bags that meet consumer demands for safety.

B. NHTSA does not consider important alternatives to the proposed test requirements.

The Administration's Best Practices guidelines state: "Once a significant market failure has been identified, the analysis should show how adequately the regulatory alternatives to be considered address the specified market failure." While NHTSA has not identified a market failure, it has identified what might be considered a regulatory failure, in that its pre-MY 98 standards had negative consequences for certain occupants. This proposal addresses that regulatory failure by adding crash test requirements that simulate impacts on small adults and children.

1. Alternative approaches

While NHTSA examines alternatives to its proposed standards, these alternatives are merely different combinations of crash tests to which all new vehicles would be subject. NHTSA does not articulate why additional federally mandated crash tests are the most effective way to meet its occupant safety goals. In recent years, consumers have become increasingly aware of the benefits and potential dangers of air bags. Moreover, the risk tradeoffs air bags pose are individual, varying with the characteristics and behavior of occupants. Allowing informed consumers to make their own decisions regarding those tradeoffs is an important option NHTSA does not address.

NHTSA should consider, as an alternative to the proposed advanced air bags, allowing manufacturers to install manual on-off switches for air bags in all vehicles types. These would allow consumers to deactivate the air bag when appropriate (i.e., when a child or small person is seated in the passenger seat) rather than requiring complex technologies

[22] Associated Press, 12/10/98. *Op. cit.*

to accomplish the same thing.[23] This approach, particularly if combined with tests that permit lower power air bags, could achieve the same protection benefits at lower cost.

If NHTSA is concerned that consumers (or other occupants) do not have adequate information on the safety features of different vehicles to make informed decisions regarding their own safety (or that of their families), it should consider alternatives that directly address this information asymmetry. Perhaps simply reporting information on how different vehicles performed on the various safety tests proposed in this rulemaking could achieve the NHTSA's safety goals at lower costs.[24] Such an approach would allow manufacturers to tailor safety features to the meet the demands of different classes of consumers (e.g., emphasis on child protection in mini-vans, powerful air bags in small sporty cars, etc.), while providing standardized information to consumers that would enable them to make an informed choice as to the safety features that best meet their needs.

2. Performance Standards

NHTSA examines various crash tests and injury criteria in its benefit-cost analysis. It stresses that its crash tests are performance standards that manufacturers can meet in a variety of ways. In general, performance-oriented approaches are preferable to design standards. Design standards, which dictate the means of achieving certain goals, discourage innovation to improve safety and other social goals. However, NHTSA's performance test approach has some inherent problems.

First, the criteria that vehicles must meet under the performance tests are unlikely to be comprehensive nor omniscient. Occupant safety designs crafted to meet NHTSA's tests may be lacking in other attributes that are desirable to consumers. Or, to the extent the simulated crash tests do not accurately reflect real world conditions, vehicles designed to meet NHTSA's criteria in the simulated test environment may perform sub-optimally in an actual accident. As experience with dynamometers for testing fuel economy and federal test procedures for evaluating tail pipe emissions shows, vehicles designed to pass standard tests will not always meet the desired performance goals under real world conditions.[25] While this proposal is an attempt to address deficiencies in the existing performance tests, it continues the requirement that vehicles

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[23] NHTSA defends its "decision to terminate [an earlier action to permit manual on-off switches to be installed in all new vehicles] based on the agency's belief that informed deactivation is a technologically less-intrusive option and that manufacturing resources should not be diverted away from smart air bag technology." It seems ironic to reject manual on-off switches because they are "technologically intrusive" and yet to require the development and installation of technologically complex air bags that detect the presence of a small or out-of-position occupant.

[24] Of course, the tests used to develop the information must be designed carefully to avoid discouraging innovation in dimensions not addressed by the tests.

[25] These tests encourage innovations to meet the test, rather than to meet the ultimate goals under real world conditions. EPA recently amended its emission testing procedures because it found that engines designed to minimize emissions under simulated test conditions did not perform as well under actual driving conditions involving air conditioning use or rapid acceleration or deceleration.

pass the fixed-barrier test with an unbelted male dummy—the very test that forced air bags to inflate with enough power to kill smaller individuals.[26] Auto manufacturers have argued that this test is not representative of real world crashes.[27] Adding further uncertainty, the proposed simulations will involve four new test dummies (to represent small women and children), with which NHTSA has little regulatory experience. The injury criteria for children were derived by scaling adult data and are not based on real world information.

Second, NHTSA's multiple, complex tests, with detailed measures of what constitutes adequate performance, are geared to evaluate the effectiveness of certain sensor and deployment technologies. For example, the new test requirements to minimize injuries and deaths caused by air bags are all technology-specific: designed to test suppression devices or low-risk deployment. Thus, while written as performance standards, they are, in effect, design standards that lock manufacturers into pre-determined paths to achieving compliance.

Third, given a choice, and facing various real-world tradeoffs, different consumers would demand different performance from their vehicles. So even if NHTSA's air bags standards were true performance tests, they would still impose NHTSA's perception of optimal safety performance on all consumers. As discussed above, NHTSA's standards require all vehicles to protect the safety of unbelted passengers, yet the majority of occupants who do wear seat belts might well prefer another combination of safety features, rather than being forced to pay for an air bag equipped with complicated sensors that detect seat belt use, occupant size, position, etc. Particularly since air bags actually increase the risk of serious injury for belted drivers, some drivers may not agree with the trade-off NHTSA has made in setting its test criteria.

C. NHTSA's estimates do not reflect the influence of occupant behavior on the effectiveness of the proposal.

NHTSA recognizes that its economic analysis does not consider the impact changes in consumer behavior would have on the actual benefits and costs of its approach. In particular, it suggests that an increase in seatbelt use, and properly restrained children, which may result from increased educational efforts, would decrease the estimated benefits of its proposal.[28]

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[26] "The aggressivity of today's bags is driven mostly by the unbelted, 30 mph barrier impact requirement of 208. This test drives a bag design that deploys very fast in order to meet the crash dummy requirements. The unwanted consequence of this fast deployment is a risk to short statured drivers, out of position children and infants in child seats." James E. Stocke, JES Engineering, Ann Arbor, MI "Recent Regulatory History of Air Bags." 1998 Society of Automotive Engineers.

[27] "AAMA View on Air Bags," Presented by Barry Felrice, Director of Regulatory Affairs, American Automobile Manufacturers Association, at the American Bar Association, Phoenix, Arizona, April 2, 1998.

[28] Section VII of the preamble recognizes that its baselines do not reflect changes in demographics or behavior. Chapter V of the EA confirms that the potential benefits of advanced air bags would be smaller than predicted if occupants wore seat belts.

Human responses to the standards themselves can also have a significant effect on the net benefits of a rule. NHTSA's retrospective analysis of the benefits of its high-mounted stop lamp (CHMSL) rule observed that the lamps' effectiveness once they became standard in all passenger vehicles was only about one-tenth of their predicted effectiveness. NHTSA attributed this to drivers becoming "acclimatized" to the lamps, and therefore responding less quickly once they were standard features in most vehicles. Another possibility is that the more prominent brake light gave drivers an increased sense of security that caused them to follow more closely behind the vehicle in front.

Similarly, as consumers become more confident in advanced air bags' ability to protect unrestrained or out-of-position occupants, individuals' incentives to restrain themselves and their children might be reduced. In addition, drivers may drive faster and less cautiously if they are confident in an air bag's ability to protect them in the event of a crash.

NHTSA should have enough information on the trend in seatbelt use over the last two decades to test some hypotheses regarding the impact of passive restraints in general, and air bags in particular, on occupant behavior. Because time-series data may not reliably reveal what would have happened in the absence of NHTSA regulations, or in the presence of different regulations (aimed at encouraging seat belt use, for example), NHTSA should also conduct some cross-sectional comparisons of regulations and seatbelt usage in other countries. For example, do other countries with different air bag requirements have a higher or lower frequency of seat belt use? What factors might account for those inter-country differences?

D. NHTSA's valuation of key benefits and costs may be inappropriate.

NHTSA carefully quantifies the costs of its proposal, and the value associated with property damage avoided by suppressed air bag deployment, in addition to the number of fatalities avoided. These costs and effectiveness estimates are all relative to a baseline of pre-MY 1998 vehicles with dual air bags designed to meet the fixed-barrier and other crash tests. NHTSA's estimates of the cost-effectiveness of its proposal are well documented and generally reasonable, however, the individual nature of occupant restraint decisions highlights the problem with evaluating cost-effectiveness based on averages. Furthermore, NHTSA's counterintuitive results that its advanced air bag proposal could actually save consumers money as well as reduce fatalities are based on an approach that is inconsistent with its earlier economic analyses.

1. Revealed Values

Unlike some other areas in which the federal government takes action, both the costs and benefits of occupant restraints are borne by the same individual—the occupant. The costs of properly restraining oneself might include the time and effort to attach a seat belt, as well as any discomfort associated with restricted movement while the vehicle is moving. The benefits of properly restraining oneself are increased protection against injury and death in the event of an accident. The fact that the occupant internalizes both costs and

benefits suggests that an occupant's decision to buckle or not reveals something about the relative values he places on those costs and benefits.

NHTSA reports that the vast majority of lives saved by air bags are people who were not wearing seat belts. By their actions, these improperly restrained occupants have already revealed that their perceived cost of wearing a seat belt exceeds their perceived benefits. Thus, values of life implicit in NHTSA's cost-effectiveness figures, while they appear to be in an appropriate range, may actually be greater than the values the individuals who are the main beneficiaries of the rules assign to their own lives.[29] As NHTSA notes, the "behavior which leads to increased risk of crash involvement is hypothesized to be associated with an increased tolerance for risk, such as not wearing safety belts, or driving after drinking too much alcohol."[30]

This is might not be a problem if this approach did not have distributional effects that harm more risk-averse or law-abiding citizens, particularly those with lower incomes. By requiring air bags to protect improperly restrained individuals in rare high-speed crashes, the advanced air bag standards would continue to reinforce undesirable behaviors (e.g., not wearing seat belts, driving recklessly), while punishing responsible behavior. As discussed below, air bags designed to protect improperly restrained individuals force all purchasers, including those who wear seat belts, to bear higher costs and higher risks of injury without receiving commensurate benefits.

2. Property Damage Costs Avoided

When air bags deploy, they must be replaced at a cost $400 to $1,300. Sometimes, the windshield must also be replaced, increasing potential total costs to $3,350.[31] These costs were not included in NHTSA's earlier estimates of the cost of requiring air bags in all vehicles.[32]

The suppression technologies that NHTSA expects to be developed in response to the proposal would avoid those costs in crashes without a passenger in front (or with a small child in the front passenger seat.) Although NHTSA never attributed these costs to its mandatory air bag requirements, it now deducts the property damage avoided from the suppressed deployment of air bags as an offset against the direct costs of the proposed standards. In some cases, the benefits of reduced property damage are greater than the direct costs of the advanced air bags, resulting in negative costs per fatality avoided.

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[29] Alternative explanations for not wearing a seat belt could be that the perceived cost of wearing a seat belt is very high (greater than NHTSA's implicit value of life multiplied by the probability of a fatal accident), or that the perceived probability of a fatal accident is unrealistically low. Neither of these explanations justifies NHTSA's one-size-fits-all approach, which forces the costs of air bags designed to protect unbelted occupants to be borne by occupants for whom the cost of being properly restrained are not so high and whose estimates of the likelihood of a crash are more realistic.

[30] 1996 report to Congress, op. cit.

[31] Economic Analysis, Chapter VI.

[32] NHTSA, "Final Regulatory Evaluation, FMVSS No. 208 Mandatory Air Bag Installation," June 1993.

These property damage costs are important consumer costs. Though the direct costs of property damage are often borne by insurance companies, consumers, through lower insurance rates, should reap the benefits of avoiding those costs. These offsetting property damages appear to offer significant incremental benefits over NHTSA's baseline requirements for the pre-MY 1998 fleet. However, it is disingenuous to include avoided property damage from air bag suppression as a benefit to this proposal, but not to have included property damages as costs associated with mandatory air bags.

NHTSA should recognize that significant property damage costs are real consumer costs associated with mandatory air bag requirements. It should consider alternative actions that avoid those costs and protect occupants, such as permitting manufacturers to offer manual on-off switches as an option in all new vehicles.

3. Other issues with respect to benefit and cost estimates

NHTSA's economic analysis assumes that the new tests will virtually eliminate the fatalities caused by air bags, and it attributes the benefits of the newly designed air bags to the proposal. However, the costs undertaken by vehicle and air bag manufacturers to develop these designs in response to the reported air bag fatalities are not included in the proposal's costs. NHTSA should be consistent in its treatment of these costs and benefits. To the extent that auto manufacturers and their suppliers had undertaken efforts to develop safer air bags before the proposed standard, NHTSA should not give the rule credit for their development. Alternatively, NHTSA should attribute those development costs to the proposed standard.

NHTSA should consider evaluating the cost-effectiveness of the rule in terms of cost per life-year saved (as well as lives saved). NHTSA statistics reveal that air bags are more effective at avoiding fatalities in young adults, and a life-year saved approach would better reflect this, and better reflect the overall life-saving benefits of air bags.[33]

NHTSA's estimates of the costs of its standard may be understated. It appears that in estimating the costs of sensors and proximity monitors, the economic analysis often selects a number that is at the low end of the range provided by those designing the technologies.[34]

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[33] NHTSA's 1996 report observes: "Drivers age 29 or less experienced a statistically significant 32 percent fatality reduction with air bags in purely frontal crashes, relative to drivers of that age in comparable cars without air bags. The fatality reduction for drivers age 30-55 was a statistically significant 35 percent. For drivers age 56-69, the observed effectiveness dropped to a nonsignificant 25 percent, and for drivers age 70 or older, it dropped to a nonsignificant 11 percent. These statistics, although based on too few cases to be definitive, suggest that air bags are less effective for older drivers than for young adults."

[34] Economic Analysis, Chapter VI.

E. NHTSA ignores important distributional effects of the proposal.

Air bags are not uniformly effective across all occupants, crash types, and injuries. In fact, NHTSA's December 1996 analysis revealed that many people who wear manual lap-shoulder belts would be safer *without* an air bag. While these distributional effects are not quantified for the proposed modifications to air bag requirements, they are likely to be significant.

Air bags are known to provide more benefits to unbelted occupants than to belted occupants. Air bags provide drivers who are not wearing a seat belt about a 13 percent reduction in fatality risk, but are significantly less beneficial to the belted driver. Drivers who wear seat belts derive a 45 percent reduction in fatality risk from using a manual lap-shoulder belt, and an additional 5 percentage point reduction in fatalities (for a total risk of 50 percent) from an air bag.[35] Furthermore, air bags appear actually to increase overall injury level to drivers who are using seat belts, and these negative impacts are borne more heavily by some segments of the population than others.[36]

Belted female drivers derive no increase in injury protection from air bags. For male drivers, air bags combined with lap-shoulder belts provide protection against moderate or greater injury of 64 percent compared to 38 percent for manual lap-shoulder belts alone. However, for female drivers, the addition of an air bag provides no incremental benefits over the lap-shoulder belt alone (each had an effectiveness of 59 percent).[37]

Only drivers who are between 5'5" and 5'10" obtain benefits from a reduction in moderate or greater injury from the addition of an air bag over a manual lap-should belt. For drivers less than 5'5" tall, a manual lap-shoulder belt is more protective against moderate or greater injury than an air bag plus a lap-shoulder belt (55 percent reduction compared to 48 percent). Drivers over 5'10" tall are also better protected with a manual lap-shoulder belt alone (46 percent reduction in moderate or greater injury compared to a statistically insignificant 36 percent).[38]

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35 NHTSA, December 1996, *op. cit*. Exhibit 5. Note that NHTSA usually compares the 13 percent fatality reduction for unbelted occupants to a 9 percent fatality reduction for belted occupants, but this 9 percent statistic is misleading because it refers to 9 percent of the remaining 55 percent of cases that are not protected by manual belts alone (100%-45%). Out of 100 potentially fatalities in automobile accidents, air bags alone would save 13, manual seat belts alone would save 45, and air bags in addition to manual seat belts would save 5.

36 NHTSA, December 1996, *op. cit.* Exhibit 10.

37 NHTSA, December 1996, *op. cit.,* Exhibit 13.

38 NHTSA, December 1996, *op. cit*., Exhibit 15. NHTSA also observed that people weighing between 135 lbs. and 179 lbs. Appear to be better protected with a manual lap-shoulder belt than a belt plus and air bag (Exhibit 16), but NHTSA recognizes that it's "findings for driver height and weight groups appeared somewhat contradictory, since one should expect a high correlation between driver height and weight."

The reduction in fatalities attributable to air bags for drivers over age 55 is not statistically significant, regardless of whether the driver is wearing a seat belt.[39] NHTSA's 1996 report does not break down fatality-reducing benefits of air bags compared to manual restraints for sex, age and size, but that would be informative.

The proposed revisions are unlikely to alter these results significantly. However, they will increase the cost of new vehicles. Higher vehicle costs will cause some families not to purchase a new vehicle. McCarthy has estimated a price elasticity of demand for new vehicles of -.87, suggesting that for every percentage increase in vehicle price, demand will decline by .87 percent.[40] This implies that roughly 15,000 to 109,000 fewer consumers will purchase a new vehicle each year as a result of the added cost.[41] Lower income consumers would be more likely to forgo purchasing a new vehicle due to a higher price. (McCarthy's estimate of income elasticity of 1.70 confirms that lower income consumers are more price sensitive in their vehicle purchases than upper income consumers are.) As a result they will forgo all the safety protections a new vehicle affords, including greater reliability, higher performance brakes, etc.

Thus, while not addressed by NHTSA, the distributional effects of air bags include transfers of both wealth and safety not only from belted occupants to unbelted occupants, but from tall or short occupants to average occupants, and from lower income families to upper income families. Air bags were installed in higher priced vehicles before federal law required them. To the extent that upper income purchasers would have purchased vehicles with advanced air bags in the absence of federal regulation, they benefit from the economies of scale provided when advanced air bags are required to be standard equipment in all vehicles.[42] All consumers, even those who would not have chosen a vehicle with advanced air bags, are forced to subsidize the wealthy individuals who prefer them. Lower income families, those who choose to purchase a new vehicle at higher costs, and those who are deterred by the higher price, will bear the greatest costs of this proposal, both in terms of dollars and safety.

NHTSA should estimate the cost-effectiveness of its proposal, not just for the average occupant, but for different categories of occupants including occupants of different sizes, ages, and seat belt wearing habits. It should also examine effectiveness in terms of injury reduction, as well as fatality reduction.

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39 NHTSA, December 1996, *op. cit.* Exhibit 6.

40 Patrick S. McCarthy, "Market Price and Income Elasticities of New Vehicle Demands," *The Review of Economics and Statistics.* Vol. LXXVII, Number 3. (August 1996)

41 These estimates are based on NHTSA's cost range of $22-$162 per vehicle, 15.5 million vehicle sales per year, and an average vehicle cost of $20,000. Note that the price elasticity does not reflect any perceived benefits consumers would attribute to the presence of air bags.

42 For example, Mercedes-Benz already offers passenger air bags whose deployment threshold is 12 mph if the passenger is unbelted and 18 mph if the passenger is belted. NHTSA NPRM footnote 12.

V. Conclusions and Recommendations

NHTSA claims that 3,148 fatalities have been prevented by air bags since their introduction in 1986, and that fatalities in frontal crashes have declined by 30%. These benefits are offset by 105 fatalities caused by air bags. NHTSA expects that, if all vehicles were equipped with dual air bags that complied with pre-MY 1998 standards, they would save more than 3,200 lives, but cause 214 fatalities, each year. The agency expects the proposed advanced air bags to save 165 to 172 lives each year (by protecting out-of-position occupants from air bag deaths, and improving air bag protection for other occupants).

These statistics suggest that federal rules requiring air bags have had very positive safety effects, and that the proposed revisions will further enhance those protections. However, these statistics mask some important facts.

- Auto manufacturers introduced air bags before federal law required them, so all these safety benefits are not attributable to the NHTSA standards. Furthermore, the steps manufacturers have taken to reduce the power of air bags have already virtually eliminated air bag-induced fatalities for small occupants, while preserving the safety protection benefits of air bags for others, so the incremental benefit attributed to advanced air bags does not reflect benefits over the 1998 model year.

- Though air bags reduce fatalities, NHTSA's 1996 statistics reveal that the presence of an air bag actually increases the likelihood that a properly belted occupant will sustain a severe injury in a crash. Nothing in the proposed test requirements appears likely to alter that fact.

- While air bags may offer fatality benefits on average, those benefits are not evenly distributed among all classes of occupants. The benefits of air bags accrue disproportionately to occupants who are not wearing seat belts (72 percent of the benefits, or 2,267 fatalities). Drivers over age 55, whether or not they are belted, derive no statistically significant fatality reducing benefits from an air bag.

- The absolute fatality reduction benefit of an air bag is small relative to a manual lap-shoulder belt alone (50 percent fatality reduction compared to 45 percent for seat belts).

NHTSA's advanced air bags proposal would add additional complex test procedures that would require air bags to deploy with lower risk or to detect whether a seat belt is properly fastened, whether the occupant is properly positioned and of adequate height and weight, and deploy accordingly. This is an attempt to create one standardized air bag that can meet the needs of all sizes of occupants under different driving conditions with different behavior patterns and different risk preferences. However, regardless of how sophisticated NHTSA makes its tests, or how sophisticated manufacturers make air bags, this one-size fits all approach will not meet the preferences or protect the safety of all consumers under all conditions.

Both the costs and benefits of different vehicle components, including safety features, are borne by the consumer, and thus externalities would not inhibit markets from providing the degree of safety consumers demand. In recent years, consumers have become increasingly aware of the benefits and potential dangers of air bags. Moreover, the risk tradeoffs air bags pose are individual, varying with the characteristics and behavior of occupants. NHTSA's one-size-fits-all approach does not allow consumers to make their own decisions regarding those tradeoffs and precludes manufacturers from meeting diverse consumer safety demand with a variety of safety measures and levels.

Different purchasers have different preferences with respect to many different vehicle attributes, including safety. Some purchasers may prefer a vehicle with safety features that allow a child to ride safely in the front passenger seat, while some may never have a need to carry a small child, and others may be concerned with the safety and comfort needs of small women, or tall men. Some consumers may always wear a safety belt, and prefer not to pay the extra costs of high-tech air bags that detect belt use, while others may prefer to pay for passive restraints than wear seat belts. If manufacturers were allowed to design occupant protection systems to meet consumer needs, they could respond to these different needs with a variety of safety options.

Rather than requiring air bags to pass additional elaborate crash tests, which can never fully reflect real world conditions, NHTSA should consider options that allow informed consumers to make their own personal risk tradeoff decisions. One option would be to continue allowing vehicles to pass the sled test, or another crash test that does not force too-powerful air bags. Another would be to permit manufacturers to offer manual on-off switches for air bags. That would allow consumers (rather than a complex computer algorithm in the vehicle) to deactivate an air bag if necessary to reduce the risk to certain occupants or under certain driving conditions.

In fact, NHTSA has had such success in recent years informing consumers about the benefits of manual restraints, and the pros and cons of air bags, that it should consider eliminating the air bag requirements altogether. Seat belt use has increased dramatically since passive restraints were required in 1984, when only 12.5 percent of the population wore them (compared to 68 percent today).[43] What's more, seat belt use is mandatory in all but one state.[44] Consumers have become very aware of the tradeoffs associated with air bag use for certain occupants. NHTSA also has more information on the real-world effectiveness of different options; its statistics show that manual lap-shoulder restraints are more effective than automatic restraints, and often as effective, if not more effective than a combination of manual restraints and air bags. NHTSA should reconsider all of its passive restraint rulemakings in light of this fact and the increased rate of seatbelt use in the nation. Public safety may well be maximized if NHTSA simply required manual lap-shoulder belts, and left further decisions to the market place.

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[43] Stocke, *op. cit.* 1998.
[44] New Hampshire.

If NHTSA is concerned that, in the absence of federal standards, consumers will not be adequately informed as to the safety of different options, it could better focus its efforts on providing information about the characteristics and effectiveness of different occupant safety systems under different conditions. Such an approach would allow consumers to pay for what they need, not what government analysts believe they should have.

Appendix I – Response to NHTSA's Specific Requests for Comments

In section VI(I) of the proposal, NHTSA requests comments on a list of specific questions. This appendix responds to selected questions, in the order they are presented in the preamble.

> 1. Overall safety. Does the agency's overall proposal achieve an appropriate level of safety with respect to risks from air bags for out-of-position occupants?

It is impossible for NHTSA to determine a universally "appropriate level of safety." Different individuals place different values on safety, and are willing to expend different degrees of effort and resources to achieve safety levels. NHTSA's one-size-fits-all approach, which mandates standardized test requirements and uniform safety levels, imposes NHTSA's notion of an appropriate level of safety (as well as NHTSA's notion of what is an acceptable price for that safety level) on consumers who may have very different preferences.

In fact, NHTSA's December 1996 analysis revealed that many people who wear manual lap-shoulder belts would be safer *without* an air bag. While these distributional effects are not quantified for the proposed modifications to air bag requirements, they are likely to be significant.

Air bags are known to provide more benefits to unbelted occupants than to belted occupants. Air bags provide drivers who are not wearing a seat belt about a 13 percent reduction in fatality risk, but are significantly less beneficial to the belted driver. Drivers who wear seat belts derive a 45 percent reduction in fatality risk from using a manual lap-shoulder belt, and an additional 5 percentage point reduction in fatalities (for a total risk of 50 percent) from an air bag.[45] Furthermore, air bags appear actually to increase overall injury level to drivers who are using seat belts, and these negative impacts are borne more heavily by some segments of the population than others.[46] The new proposal will alter none of these facts.

> 2. Accommodation of all effective designs. Do the proposed manufacturer options accommodate all designs under development that would effectively address air bag-induced injuries and/or fatalities, and designs that are expected to be under development in the foreseeable future?

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[45] NHTSA, December 1996, *op. cit*. Exhibit 5. Note that NHTSA usually compares the 13 percent fatality reduction for unbelted occupants to a 9 percent fatality reduction for belted occupants, but this 9 percent statistic is misleading because it refers to 9 percent of the remaining 55 percent of cases that are not protected by manual belts alone (100%-45%). Out of 100 potentially fatalities in automobile accidents, air bags alone would save 13, manual seat belts alone would save 45, and air bags in addition to manual seat belts would save 5.

[46] NHTSA, December 1996, *op. cit.* Exhibit 10.

In considering this question, NHTSA must address two issues: (1) Why is a federal role necessary to the development of air bag designs, and (2) Does a federal role hinder innovation in the development of effective designs.

NHTSA has carefully surveyed manufacturers to identify what designs are under development and then proposed test requirements that would require those designs. Since manufacturers are already designing advanced air bags in response to consumer demand, it is not clear why NHTSA test requirements are necessary at all. Market forces (consumer demand) are driving manufacturers' research and development efforts, and, in the absence of a market failure, federal standards are not likely to improve upon market forces.

NHTSA standards are unlikely to be accurate at predicting the level of safety that consumers demand, and are more likely to inadvertently inhibit the development of new designs by prescribing certain tests procedures. As the proposal recognizes in its question 9, existing test dummies and out-of position occupant simulators may not adequately test novel technologies for detecting the presence of occupants and their distance from the air bag. If NHTSA allowed manufacturers to compete in the provision of occupant restraint safety, just as they compete in other aspects of vehicle design, market incentives would lead to the development of designs to accommodate different customer preferences and sizes. Unlike NHTSA test requirements, market forces would also encourage continued innovation to meet evolving customer demands.

> 4. Possible unintended consequences. To what extent could the advanced technologies the manufacturers might adopt result in unintended adverse consequences? For example, could some occupants face higher risks than now? How should the agency consider that possibility in this rulemaking? Are there any additional or alternative requirements the agency should adopt to prevent such consequences?

In the absence of a clear market failure, the substitution of government judgment for market forces will always result in a less-than-optimal social outcome. The increased costs associated with advanced air bags in new vehicles would be expected to reduce demand for new vehicles, and force individuals and families to drive older, less safe, vehicles for longer than they would otherwise. Because of the higher cost of vehicles, consumers will have less wealth to spend on other life-saving or life-enriching activities. These negative effects will be felt disproportionately by lower income citizens, who are less likely to purchase new vehicles as their costs increase.

NHTSA should focus more attention on the distributional impacts of its proposal and consider market approaches that allow manufacturers to tailor occupant protection systems to the diverse demands of different consumers.

> 17. Possible Information for Consumers. NHTSA notes that, during the phase-in of new requirements for advanced air bags, consumers may be interested in knowing which vehicles are certified to the new requirements. The agency requests comments on whether a means should

> be provided so that consumers can easily determine whether a vehicle has been certified to these requirements and, if so, which option(s) were selected. NHTSA also requests comments on what means should be established for communicating such information to consumers, should the agency decide to do so, e.g., a required statement on the certification label. The agency notes that such a statement or other means could also be used to determine whether the vehicle is permitted to have a retrofit on-off switch under Part 595.

To the extent that consumers place value on the presence of advanced air bags, vehicle manufacturers and sales people will have incentives to inform prospective new vehicle purchasers of these safety features. Information regarding the existence of advanced airbags may be less reliable in the secondary market. However, private publications already have proven effective at providing consumer information on a variety of used vehicle attributes, and air bag design is unlikely to be any different.

In section VI (H) of the preamble, NHTSA also requests comment on the value of requiring warning labels on vehicles with advanced air bags. Labels are valuable for informing consumer choice. Since NHTSA's proposal does not offer consumers a choice of whether to purchase vehicles with air bags, a warning would add little, if any, value.

> 22. Possible development of alternative unbelted crash test requirements. The vehicle manufacturers have raised various objections to the existing unbelted barrier test requirements. As discussed earlier in this notice, NHTSA is placing in the docket a technical paper which discusses the representativeness of those requirements with respect to real-world frontal crashes which have a potential to cause serious injury or fatality. NHTSA requests comments on that paper and on whether the agency should develop alternative unbelted crash test requirements. NHTSA requests commenters that advocate alternative unbelted crash test requirements to recommend specific alternative requirements …

NHTSA's request for suggestions on alternative unbelted crash test requirements sidesteps the more fundamental question of why unbelted crash test requirements are necessary at all. In order to meet the unbelted test requirements in the past, manufacturers have designed air bags that inflate with a much greater force than necessary to protect belted passengers. This has resulted in some injuries and fatalities of belted passengers, particularly rear-facing infants and women of small stature. The current proposal attempts to correct for this problem by requiring more sophisticated air bags, which have suppression or variable deployment features that detect when occupants are smaller than average or out of position. These new features, necessitated by NHTSA's unbelted barrier test designed to protect unbelted passengers, will increase the cost of air bags for all occupants.

The benefits of air bags fall disproportionately on those who do not buckle their seat belts, while the costs of air bags are born by all purchasers of vehicles, including those who always wear seat belts. Furthermore, NHTSA statistics reveal that air bags pose

greater risks of severe injury to belted passengers than does the manual lap-shoulder belt alone.[47] This disparity in the distribution of benefits and costs is more disconcerting because the main beneficiaries could achieve the same benefits at minimal cost (by simply buckling up), but make a conscious choice not to do so. In other words, when the benefits and costs of proper restraints are internalized, the main beneficiaries of this and previous air bag rules have revealed that the much lower cost of buckling a seat belt outweighs the expected benefits. It cannot be welfare maximizing then, to impose higher costs on non-beneficiaries to protect those who have revealed that the benefits do not warrant lower costs.

Insurance companies charge lower rates to individuals who always wear seat belts. Every state in the country but one[48] now mandates seat belt use. Yet to protect individuals who still choose not to wear a seat belt, NHTSA's unbelted barrier test imposes unnecessary costs, both in terms of dollars and safety, on law-abiding, safety-conscious consumers.

Furthermore, recently released NHTSA statistics reveal that the depowering allowed by the sled test alternative to the existing unbelted test is working well. The air bags depowered to meet the sled test have virtually eliminated air bag-induced fatalities while preserving the safety protection benefits of air bags.[49] While the sled test may also suffer from not accurately reflecting real-world conditions, the air bags depowered to meet it appear to be working well.

> 23. Possibility of more children sitting in the front seat with advanced air bags. As vehicle manufacturers install advanced air bags which minimize the risks air bags pose to children, the public may believe that the front seat is now safe for children, and more children would then sit in the front seat. However, the back seat has always been safer for children, even before there were air bags. NHTSA conducted a study of children who died in crashes in the front and back seats of vehicles, very few of which had passenger air bags. The study concluded that placing children in the back reduces the risk of death in a crash by 27 percent, whether or not a child is restrained.(22) NHTSA requests comments on what steps it and others can take to address the possible problem of more children riding in the front seat with advanced air bags.

As NHTSA's thoughtful retrospective study of the costs and benefits of center-high-mounted stop lamps revealed, consumer responses to regulatory-induced changes can have a big effect on the ex-post costs and benefits. New advanced air bags may lull occupants into a false sense of safety regarding the placement of children in the front seat.

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47 "Third Report to Congress: Effectiveness of Occupant Protection Systems and Their Use," NHTSA, December 1996. Exhibit 8.

48 New Hampshire.

49 Associated Press, 12/10/98 "Less forceful air bags appear to protect adults."

NHTSA should conduct a retrospective study of whether the presence of air bags has influenced occupants' behavior with respect to seat belt use. The results of that study would be interesting in themselves, and may provide insights into expected behavioral responses regarding placement of children.

NHTSA should also recognize that busy parents may value rare chances for uninterrupted conversation with their children enough to allow them in the front seat, despite the greater risk in the event of an accident. If auto manufacturers were free to design safety systems that met consumer demand, rather than NHTSA performance tests, some vehicles would likely be designed for families who often have children in the front seat.

Appendix II

RSP Checklist

NHTSA Advanced Airbags

Element	Agency Approach	RSP Comments
1. Has the agency identified a significant market failure?	The agency justifies the proposal based on the life-saving potential of air bags, and a statutory requirement to issue a rule to improve air bags. **Unsatisfactory**	The lack of a market failure justifying this proposal is a significant weakness. The proposal is driven by a failure in the design of existing NHTSA standards. NHTSA presents no evidence that vehicle manufacturers do not have sufficient incentives to provide the level of safety consumer's demand. In fact, manufacturers are responding more quickly than NHTSA to the failure of the 1993 requirements
2. Has the agency identified an appropriate federal role?	Federal standards forced the development of air bags, which themselves induced fatalities, so federal action is necessary to correct the problem. **Satisfactory**	NHTSA should consider alternatives to new federal requirements though, including deregulatory initiatives. Given the increase in consumer awareness and seat belt use, non-federal solutions, such as private initiatives or state laws encouraging seat belt use, are likely to be superior to federal standards.
3. Has the agency examined alternative approaches?	The EA examines 2 alternative combinations of test standards. The proposal relies on performance standards rather than design standards. **Satisfactory**	NHTSA should consider a broader range of alternatives that includes permitting new vehicles to be equipped with manual on-off switches, eliminating air bag requirements in lieu of manual lap-shoulder belts, and providing information to consumers on the relative safety of different air bag technologies under different circumstances. NHTSA's performance standards are complex and detailed, and designed to test certain technologies, so they become *de facto* design standards and hinder innovation in occupant safety.

Element	Agency Approach	RSP Comments
4. Does the agency attempt to maximize net benefits?	NHTSA estimates the cost-effectiveness of different alternatives, using two alternative baselines. **Good**	NHTSA's approach to estimating the cost-effectiveness is generally sound, and reveals implicit values for fatalities avoided that are within the range researchers have attributed to the public's willingness to pay. Problems with NHTSA's choice of baseline, consideration of behavioral impacts, differential valuation, treatment of property damages and distributional impacts are discussed in RSP's comments.
5. Does the proposal have a strong scientific or technical basis?	NHTSA's proposal is based on a survey of manufacturers, and its own technical analysis. **Good**	NHTSA appears to have examined the advanced air bag designs under development in a thorough manner. However, consumer demand is driving manufacturers' R&D efforts, and in the absence of a market failure, NHTSA's standards (which require designs under development) are not likely to improve upon market forces. Rather, they are likely to hinder further innovation to meet evolving consumer demands.
6. Are distributional effects clearly understood?	NHTSA's economic analysis examines the effectiveness of the proposal for average consumers without discussing the distribution of those effects. **Unsatisfactory**	NHTSA should pay more attention to the distributional effects of the proposal. The benefits of air bags fall disproportionately on those who do not buckle their seat belts, while the costs of air bags are borne by all purchasers of vehicles, including those who wear seat belts. Air bags actually increase the risk of severe injury to belted passengers. Moreover, lower income Americans may bear a disproportionate burden.
7. Does the proposal respect individual liberties and property rights?	NHTSA does not address this question. **Unsatisfactory**	NHTSA's one-size-fits-all standards undermine individual liberty and individual responsibility. If NHTSA allowed manufacturers to compete in the provision of occupant restraint safety, just as they compete in other aspects of vehicle design, market incentives would lead to the development of designs to accommodate individuals' preferences, sizes, ages, driving habits, etc.