DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. 74–14; Notice 108]

RIN 2127–AG59

Federal Motor Vehicle Safety Standards; Occupant Crash Protection

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: NHTSA is proposing to amend the agency's occupant crash protection standard to ensure that vehicle manufacturers can depower all air bags so that they inflate less aggressively. The agency is taking this action as part of its comprehensive efforts to reduce the fatalities and injuries that current air bag designs are causing in relatively low speed crashes to small, but growing numbers of children, and occasionally to adult drivers. Taken together, these efforts would affect all existing air bag vehicles, as well as those produced in the next several model years.

Based on agency research and analysis regarding the optimal range of air bag ''depowering,'' the agency has tentatively concluded that an average depowering of 20 to 35 percent would reduce the risk of fatalities in low speed crashes, while substantially preserving the life saving capabilities of air bags in higher speed crashes. The agency is considering the adoption of either, or both, of two different approaches that would permit or facilitate, but not require, such depowering of current air bags. One approach would be to reduce the stringency of the chest acceleration requirement which an unbelted dummy must meet in a crash test at speeds up to 30 mph. The other approach was recently requested by the American Automobile Manufacturers Association in a letter superseding its earlier petition for rulemaking. It would replace the unbelted crash test requirement with a sled test protocol incorporating a 125 millisecond standardized crash pulse. NHTSA is seeking comments and information concerning the relative desirability of these two approaches, including supporting data from industry for the sled test. The agency also seeks comments on whether the same or different requirements should apply to the passenger and driver positions.

There is a possibility that while this rulemaking would prevent a significant number of air bag fatalities, and make it possible to design air bags so that they save increased numbers of belted occupants, it could also result in an even larger number of unbelted occupants not being saved by air bags. Accordingly, the agency is requesting comments on the appropriate duration of such an amendment. If there are adverse safety tradeoffs, and smart air bags offer a way of preventing air bag fatalities while not causing similar tradeoffs, it would be desirable to limit the duration of the amendment so that depowering is only an interim measure. NHTSA currently contemplates that the amended requirement would remain in effect for both passenger and driver air bags until smart air bags are installed pursuant to a mandated phase-in schedule. Establishing that schedule and appropriate performance requirements will be the subject of a separate rulemaking proceeding.

NHTSA is also announcing its granting of a petition by Anita Glass Lindsey to commence a rulemaking proceeding to consider whether to specify the use of a dummy representing a small-statured female in testing the performance of safety belts and air bags.

DATES: Comments must be received by February 5, 1997.

ADDRESSES: Comments should refer to the docket and notice number of this notice and be submitted to: Docket Section, Room 5109, National Highway Traffic Safety Administration, 400 Seventh Street, SW, Washington, DC 20590. (Docket Room hours are 9:30 a.m.–4 p.m., Monday through Friday.)

FOR FURTHER INFORMATION CONTACT: For information about air bags and related rulemakings: Visit the NHTSA web site at http://www.nhtsa.dot.gov and select ''AIR BAGS: Information about air bags.''

For non-legal issues: Mr. Clarke Harper, Chief, Light Duty Vehicle Division, NPS–11, National Highway Traffic Safety Administration, 400 Seventh Street, SW, Washington, DC 20590. Telephone: (202) 366–2264. Fax: (202) 366–4329.

For legal issues: J. Edward Glancy, Office of Chief Counsel, NCC–20, National Highway Traffic Safety Administration, 400 Seventh Street, SW, Washington, DC 20590. Telephone: (202) 366–2992. Fax: (202) 366–3820.

SUPPLEMENTARY INFORMATION:

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I. Background

In 1984, the Department of Transportation issued a final rule requiring the installation of automatic protection (e.g., air bags, automatic belts, passive interiors) in passenger cars. 49 Fed. Reg. 28962; July 17, 1984. The Department took this step to increase the protection of vehicle occupants, especially unbelted ones. At the time, only 12.5 percent of occupants wore their safety belts, and only one state required all motorists to buckle up.

In 1991, Congress mandated the installation of air bags in both passenger cars and LTV's with a gross vehicle weight rating (GVWR) of 8,500 pounds or less. (LTV's generally include vans, pickup trucks, buses, and sport utility vehicles with a gross vehicle weight rating of 10,000 pounds or less). The Intermodal Surface Transportation Efficiency Act required that air bags be put in all new cars by the beginning of model year 1998 and in all new LTV's by the beginning of model year 1999.

Much has changed since 1984, and even since 1991. The cumulative production of air bag cars and LTV's reached the 10,000,000 mark for driver air bag vehicles during model year 1992 and for dual air bag vehicles during model year 1995. Air bags are now standard equipment on most passenger

cars and LTV's. As of the end of model year 1996, approximately 56 million air bag vehicles have been produced for sale in the United States.[1] Safety belt use has reached approximately 68 percent.[2] Forty-nine States and the District of Columbia require the use of safety belts, and all jurisdictions require the use of child safety seats. While males account for a sizable majority of the nonusers of safety belts, females still account for 40 percent of the nonusers.[3]

NHTSA estimates that air bags have deployed more than 800,000 times in crashes and have saved approximately 1,664 lives (164 passengers and 1,500 drivers) as of November 1996. Unfortunately, air bags also have fatally injured at least 32 children, 1 adult passenger, and 19 drivers in low severity crashes in the United States. Apart from the nine fatally-injured infants (included in the figure of 32 above), most of the fatally-injured occupants were unbelted. Thus, while the number of people being saved by air bags is growing annually, so is the much smaller, but significant number of people being fatally injured by air bags.

A. How Air Bags Work

When a vehicle has a frontal impact, its occupants begin to move forward in response to pre-impact braking or the deceleration of the vehicle during the impact. If unrestrained, front-seat occupants will move forward in a fraction of a second and hit the steering wheel, dashboard or windshield. To move into place in time to catch the occupants in moderate and high speed crashes, air bags must inflate very quickly—faster than the blink of an eye.

To ensure that the air bag provides enough resistance to keep large as well as small occupants from ''bottoming out'' the air bag and hitting the vehicle interior, the amount of gaseous pressure within air bags must be carefully modulated. This is done by controlling both the rate at which gas is pumped into the air bag as well as the rate at which the gas is released from the air bag through vents or the porosity of the fabric.

An example from a non-automotive context will help to show the importance of modulating the air pressure in air bags. Vented air cushions are sometimes used by stunt performers who jump or dive from a great height to absorb the energy of their fall. If the vents don't allow enough of the pressure in the cushion to be released as the performer hits it, the cushion will be too rigid and will fail to absorb enough of the performer's energy, causing injury. On the other hand, if the vents release too much pressure, the cushion will ''bottom out,'' thus allowing the performer to strike the ground, also causing injury.

B. Circumstances of Air Bag Fatalities

Air bags need time, and space, to inflate. The sudden release of energy by an inflating air bag can harm some front seat occupants, particularly if they are too close to the air bag at the time of deployment. Properly restrained occupants of a vehicle seat moved back from the dashboard as far as possible, and even most unrestrained teenagers and adults, will meet the air bag after the initial, sudden release of energy. However, some occupants either start out very close to the steering wheel or dashboard or end up there. Most child fatalities attributed to an air bag fall into one of two groups: (1) infants riding in rear-facing infant seats, thus placing them very close to the air bag at the time of deployment, or (2) older children riding forward-facing without any type of restraint, thus allowing them to slide forward during pre-crash braking so that they were too close to the air bag when it deployed. A majority of the fatally-injured drivers were short-statured women who moved the driver's seat forward. More than half of the fatally-injured drivers were not using any type of restraint.

II. The Safety Problem: Frontal Impacts and Air Bags—Lives Saved, and Lives Lost

The number of air bag fatalities and the likelihood of those fatalities must be carefully compared to the likelihood of other related events in evaluating solutions to the causes of those fatalities.

A. Frontal Impacts

Frontal impacts are the number one fatality and injury-causing mode of crash, resulting in 64 percent of all driver and right-front passenger fatalities and 65 percent of all driver and right-front passenger AIS 2–5 injuries. (AIS 2–5 stands for Abbreviated Injury Scale levels of moderate to critical injuries.) The estimated fatality and injury totals for 1994 are shown below. The injuries are those for National Accident Sampling System-Crashworthiness Data System (NASS–CDS) towaway accidents only. (See table below.)

1994 FATALITIES AND MODERATE TO SERIOUS INJURIES IN FRONTAL IMPACTS

[Passenger Cars and Light Trucks]

	Drivers	Right front passengers	Total
Fatalities	13,437	3,814	17,251
Injuries	124,484	30,299	154,783
Total	[4] 137,921	[5] 34,113	172,034

[4] The numbers of fatalities and injuries for drivers far exceed those for passengers in large measure because approximately 80 percent of front seat occupants are drivers.

[5] The figures for right front passengers include the following figures for children under the age of 13: approximately 266 fatalities and 643 moderate to serious injuries.

[1] Over 27,000,000 of those vehicles have both driver and passenger air bags.

[2] Belt use among fatally injured front seat occupants of cars and LTV's is lower, approximately 37 percent, based on 1995 data from the Fatal Accident Reporting System (FARS). The lowness of this rate reflects a number of factors, including the belt use rate by motorists in general and the effectiveness of belt use in preventing fatal injury. A more useful belt use rate is the rate among occupants involved in potentially fatal crashes. Those crashes include all fatal crashes as well as all crashes in which there would have been a fatality but for belt use. The use rate in potentially fatal crashes is slightly over 50 percent.

[3] This figure is based on a September 1994 study by Reinfurt et al. of belt use in North Carolina.

B. Air Bags: Lives Saved, and Lives Lost

As the agency has confronted the problem of low speed fatalities and injuries from air bags, it has faced a serious dilemma. On the one hand, air bags have proven to be highly effective in reducing fatalities, and are resulting in substantial net benefits in terms of lives saved. The agency estimates that, to date, air bags have saved 1,664 drivers and passengers (1,500 drivers and 164 passengers).[6] Current air bags could save an estimated slightly more than 3,000 lives each year in passenger cars and light trucks when all cars on the road are equipped with dual air bags.

At the same time, air bags are actually causing fatalities in some situations, especially to children. As of November 30, 1996, NHTSA's Special Crash Investigation program had identified 32 crashes in this country in which the deployment of the passenger air bag resulted in fatal injuries to a child. The agency has examined all air bag cases with child fatalities in its Fatal Accident Reporting System (FARS) and believes it has identified all cases involving air bag-related fatalities. One adult passenger has been fatally injured (a woman in her 90's). On the driver side, 19 drivers[7] have been fatally injured in this country. (See table below.)

AIR BAGS: CUMULATIVE LIVES SAVED AND FATALITIES CAUSED (1986–PRESENT)

[Passenger Cars and Light Trucks]

	Drivers	Right front passengers	Total
Lives saved	1,500	164	1,664
Fatalities caused	19	33	52
Net lives saved	1,481	131	1,612

Passenger Fatalities. The annual number of fatalities involving children is steadily growing; all have occurred in 1993 and later calendar years. As noted above, 32 children have been fatally injured to date. (See tables below.)

It appears that the children most at risk are infants in rear-facing infant restraints and children not using any type of restraint. All of the infant fatalities (9) involved infants in rear-facing child seats. Most of the other children were not using any type of safety restraint. Of those other children, 18 were unrestrained, two more were wearing only the lap belt with the shoulder belt behind them, and two were wearing a lap and shoulder belt at the time of the crash. In addition, there was a one-year-old child who was fatally injured while riding in a child seat that was not belted to the vehicle seat. (See table below.)

Most children were either infants or children aged 4–7 years old. (See table below.)

The crashes in which the children were fatally injured involved pre-impact braking, and occurred at relatively low speeds. Infants in rear-facing child seats are very close to the dashboard even before pre-impact braking. As to almost all of the older children, the nonuse, or improper use of safety belts in conjunction with pre-impact braking resulted in their forward movement such that they were very close to the instrument panel and the air bag system when the air bag deployed. Because of this proximity, the children appear to have sustained fatal head or neck injuries from the deploying passenger air bag.

In addition to the 32 children who have been fatally injured during passenger air bag deployments, as noted above, one adult, a woman in her 90's, sustained a fatal injury that appears to be due to an air bag deployment.

INFANT PASSENGER AIR BAG-RELATED FATALITIES (IN REAR-FACING INFANT SEATS)

[By MY of Vehicle and CY of Fatality]

	CY 89	CY 90	CY 91	CY 92	CY 93	CY 94	CY 95	CY 96	Total No. of infant passenger air bag fatalities	No. of vehicles produced w/ passenger air bags
MY 89	.....	.....	.....	.....	.....	.....	.....	.....	.....	78,000
MY 90	.....	.....	.....	.....	.....	.....	.....	.....	.....	149,000
MY 91	.....	.....	.....	.....	.....	.....	.....	.....	.....	44,000
MY 92	.....	.....	.....	.....	.....	.....	.....	.....	.....	421,000
MY 93	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,352,000
MY 94	.....	.....	.....	.....	.....	.....	1	1	2	5,547,000
MY 95	.....	.....	.....	.....	.....	.....	2	4	6	8,936,000
MY 96	.....	.....	.....	.....	.....	.....	.....	1	1	10,750,000
Total	.....	.....	.....	.....	.....	.....	3	6	9	27,277,000

[6] This estimate of gross savings is cumulative, through November 1, 1996. The net savings would be 1,612.

[7] The figure of 19 is based on information that NHTSA has developed through NHTSA's Special Crash Investigation program and is not a census. Studies of FARS data are underway to obtain a more precise figure.

CHILD (NON-INFANT) PASSENGER AIR BAG-RELATED FATALITIES

[By MY of Vehicle and CY of Fatality]

	CY 89	CY 90	CY 91	CY 92	CY 93	CY 94	CY 95	CY 96	Total No. of child (non-infant) passenger air bag fatalities	No. of vehicles w/passenger air bags
MY 89	.....	.....	.....	.....	.....	.....	.....	.....	.....	78,000
MY 90	.....	.....	.....	.....	.....	.....	.....	.....	.....	149,000
MY 91	.....	.....	.....	.....	.....	.....	.....	.....	.....	44,000
MY 92	.....	.....	.....	.....	.....	.....	.....	.....	.....	421,000
MY 93	.....	.....	.....	.....	1	1	1	.....	3	1,352,000
MY 94	.....	.....	.....	.....	.....	3	1	1	5	5,547,000
MY 95	.....	.....	.....	.....	.....	1	3	8	12	8,936,000
MY 96	.....	.....	.....	.....	.....	.....	.....	3	3	10,750,000
Total	.....	.....	.....	.....	1	5	5	12	23	27,277,000

AGE OF CHILDREN FATALLY INJURED IN AIR BAG DEPLOYMENTS

<1	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
9	1	.....	1	5	7	4	3	.....	2	.....	.....	.....	.....	32

TYPE OF RESTRAINT USED BY CHILDREN FATALLY INJURED BY AIR BAGS

Type of restraint used	No. of children
None	18
Lap belt only	2
Lap and shoulder belt	2
Rear-facing infant restraint attached to vehicle seat	9
Forward-facing child restraint attached to vehicle seat	.....
Booster seat	.....
Other[8]	1
Total	32

[8] One fatally injured child was reportedly strapped into a forward facing child seat, but the child seat was not attached to the vehicle seat.

Driver Fatalities. As of November 15, 1996, NHTSA's Special Crash Investigation (SCI) program had identified 19 minor to moderate severity crashes in which fatal injuries to the driver were associated with the deployment of the driver air bag.[9] The data suggest that unrestrained small-statured and/or older drivers are more at risk than other drivers from a driver air bag. (See tables below.) The agency notes that older drivers are more at risk than younger drivers under a wide range of crash circumstances, regardless of type of restraint used.

NHTSA notes that these driver fatalities are very rare in comparison to the number of vehicles equipped with driver air bags and to the number of drivers saved by air bags. Further, NHTSA notes that the last reported fatality in the United States of a female driver 5 feet 2 inches or shorter in an air bag deployment occurred in November 1995, 13 months ago.

Proper belt use is important. Ten of the 19 drivers were known to have been unrestrained at the time of the crash. Of the six persons properly using both lap and shoulder belts, two appeared to be out of position (slumped over the wheel due to medical conditions). (See tables below.)

DRIVER AIR BAGS: FATALITIES AND LIVES SAVED—ALL DRIVERS

[Fatalities Shown by MY of Vehicle and CY of Fatality]

	CY 89	CY 90	CY 91	CY 92	CY 93	CY 94	CY 95	CY 96	Driver air bag fatalities	Drivers saved by air bag	No. of vehicles produced w/ driver air bags
MY 89	.....	.....	.....	.....	.....	.....	1	.....	1	.....	500,000
MY 90	.....	1	1	.....	1	2	1	.....	6	.....	2,500,000
MY 91	.....	.....	2	2	1	.....	1	.....	6	.....	2,867,000
MY 92	.....	.....	.....	.....	1	1	.....	.....	2	.....	5,084,000
MY 93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,597,000
MY 94	.....	.....	.....	.....	.....	2	1	.....	3	.....	9,886,000
MY 95	.....	.....	.....	.....	.....	.....	.....	1	1	.....	13,686,000
MY 96	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,055,000
Total	.....	1	3	2	3	5	4	1	19	1,500	56,175,000

[9] But see footnote 7 below concerning reported driver fatalities in Canada.

DRIVER AIR BAG FATALITIES—WOMEN (5′2″ OR LESS)

[By MY of Vehicle and CY of Fatality]

	CY 89	CY 90	CY 91	CY 92	CY 93	CY 94	CY 95	CY 96	Total No. of driver air bag fatalities (women 5′2″ or less)	No. of vehicles produced w/ driver air bags
MY 89	.....	.....	.....	.....	.....	.....	1	.....	1	500,000
MY 90	.....	1	.....	.....	1	.....	1	.....	3	2,500,000
MY 91	.....	.....	1	1	.....	.....	1	.....	3	2,867,000
MY 92	.....	.....	.....	.....	1	1	.....	.....	2	5,084,000
MY 93	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,597,000
MY 94	.....	.....	.....	.....	.....	.....	1	.....	1	9,886,000
MY 95	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,686,000
MY 96	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,055,000
Total	.....	1	1	1	2	1	4	.....	10	56,175,000

DRIVER AIR BAG FATALITIES—OTHER ADULTS

[By MY of Vehicle and CY of Fatality]

	CY 89	CY 90	CY 91	CY 92	CY 93	CY 94	CY 95	CY 96	Total No. of driver air bag fatalities (other adults)	No. of vehicles produced w/ driver air bags
MY 89	.....	.....	.....	.....	.....	.....	.....	.....	.....	500,000
MY 90	.....	.....	1	.....	.....	2	.....	.....	3	2,500,000
MY 91	.....	.....	1	1	1	.....	.....	.....	3	2,867,000
MY 92	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,084,000
MY 93	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,597,000
MY 94	.....	.....	.....	.....	.....	2	.....	.....	2	9,886,000
MY 95	.....	.....	.....	.....	.....	.....	.....	1	1	13,686,000
MY 96	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,055,000
Total	.....	.....	2	1	1	4	.....	1	9	56,175,000

AGE OF DRIVERS FATALLY INJURED IN AIR BAG DEPLOYMENTS

<20	20–29	30–39	40–49	50–59	60–69	70–79	>80	Total
1	1	4	4	2	1	6	.....	19

TYPE OF RESTRAINT USED BY DRIVERS FATALLY INJURED IN AIR BAG DEPLOYMENTS

Type of restraint used	No. of drivers
None	10
Belts misused	1
Lap and shoulder belt (Driver blacked out and slumped forward at time of crash due to medical condition)	2
Lap and shoulder belt	4
Unknown	2
Total	19

Comparison of Passenger and Driver Air Bag Fatalities

Several comparisons need to be drawn between the trends and patterns of child fatalities and the apparent trends and patterns of driver fatalities. The annual number of child fatalities is clearly growing steadily as the number of deployments increases. The annual number of adult fatalities does not appear to be growing. If anything, it appears to be decreasing, based on currently identified fatalities. (See tables below.)

Most child fatalities (24 of 32) have occurred in model year 1994 and 1995 vehicles. In contrast, only 4 of the 19 driver fatalities have occurred in a vehicle manufactured after model year 1992. The absence of fatalities in recent model year vehicles appears even more pronounced in the case of women 5 feet 2 inches or shorter. Only one woman 5 feet 2 inches or shorter has died in a post model year 1992 vehicle.[10] Most fatalities of short-statured women occurred in model year 1990–1992 vehicles. (See tables below.)

[10] NHTSA is aware of a number of fatalities in Canada reportedly related to air bag deployment, but only two in recent times. One was a November 1996 crash in Canada in which a 5 foot 3 inch belted female driver was fatally injured in a model year 1996 Ford Ranger. In addition, there was a November 1996 crash in which a 5 foot 2 inch belted female driver was fatally injured in a model year 1993 Lexus. These Canadian accidents are not included in the driver fatality figures cited in this notice. (Similarly, lives saved by air bags outside the United States are not included in the savings.)

COMPARISON OF DRIVER AND CHILD AIR BAG-RELATED FATALITIES BY CALENDAR YEAR OF FATALITY

	CY 89	CY 90	CY 91	CY 92	CY 93	CY 94	CY 95	CY 96	Total
Drivers									
Women (5′2″ or less)	.....	1	1	1	2	1	4	.....	10
Other adults	.....	.....	2	1	1	4	.....	1	9
Total	.....	1	3	2	3	5	4	1	19
Children									
Children (non-infant)	.....	.....	.....	.....	1	5	5	12	23
Infants	.....	.....	.....	.....	.....	.....	3	6	9
Total	.....	.....	.....	.....	1	5	8	18	32

COMPARISON OF DRIVER AND CHILD AIR BAG-RELATED FATALITIES BY MODEL YEAR OF FATALITY

	MY 89	MY 90	MY 91	MY 92	MY 93	MY 94	MY 95	MY 96	Total
Drivers									
Women (5′2″ or less)	1	3	3	2	.....	1	.....	.....	10
Other adults	.....	3	3	.....	.....	2	1	.....	9
Total	1	6	6	2	.....	3	1	.....	19
Children									
Non-infant Children	.....	.....	.....	.....	3	5	11	4	23
Infants	.....	.....	.....	.....	.....	2	6	1	9
Total	.....	.....	.....	.....	3	7	17	5	32

Potential Number of Persons Saved Versus the Potential Number Fatally Injured by Current Air Bags

The dilemma faced by NHTSA, and ultimately the public, is how to address the problem of low speed fatalities from air bags while preserving their substantial life-saving benefits. Based on analyses of real world data, NHTSA estimates that if all passenger cars and light trucks on the road today had current air bags, there would be more than 3,000 lives saved each year, as compared to a no-air-bag fleet (assuming current belt use rates). More than two-thirds of the persons saved would be persons not using any type of safety belt.

On the driver side, 616 belted drivers and 1,686 unbelted drivers would be saved, for a total of 2,302 lives saved. This is a *net* figure, i.e., it accounts for the possibility of 25 drivers being fatally injured annually by an air bag. Given that the average annual rate of driver fatalities for the last five years appears to be three, and that the annual rate does not appear to be increasing, the projected figure of 25 may be somewhat overstated.

The potential number of lives saved by passenger air bags is much smaller than driver air bags primarily because the passenger seat is occupied much less frequently than the driver seat. If all passenger cars and light trucks had current passenger air bags, the agency estimates that 223 belted and 491 unbelted passengers aged 13 and above would be saved annually, for a total of 714 lives.

However, this figure of 714 would be partially offset by air bag-related fatalities involving children 12 and under. If current rates of child fatalities were experienced in an all-air-bag fleet, 128 children would be fatally injured by air bags annually, again assuming no technological improvements, changes to air bags, or behavioral changes by vehicle operators (e.g., ensuring that any children placed in the front seat properly use occupant restraints or, preferably, placing children in the rear seat). The figure of 128 includes 90 forward-facing children, most of whom would be unbelted, and 38 infants in rear-facing child restraints.

NHTSA emphasizes that this and the other rulemaking proceedings and related efforts are intended to ensure that risks of adverse side effects of air bags are reduced so that these theoretically projected air bag fatalities do not materialize, while the potential benefits of air bags are retained, to the maximum extent possible. Thus, the agency anticipates, e.g., that these other actions will result in proper use of restraints by increased numbers of people and that the number of children fatally injured would not be so high as 128. However, the agency does not have a basis for estimating the exact effect. Further, NHTSA recognizes that to the extent that one countermeasure is effective, the potential benefits of another countermeasure could be reduced. The Preliminary Regulatory Evaluation (PRE) for this rulemaking gives an illustrative example of the effect that labeling could have in reducing the benefits of depowering if the labeling were 10 percent effective in inducing more parents to place their young children in the rear seat. (See page IV–54.) Likewise, a countermeasure may reduce the potential disbenefits of another countermeasure. To the extent that belt use is increased, the potential disbenefits of depowering for unbelted occupants would be reduced. NHTSA solicits suggestions for how it can attempt to quantify the interaction between its various initiatives for

increasing belt use and decreasing the adverse side effects of air bags.

Projected Annual Lives Saved by and Fatalities Due to Air Bags [11]

PASSENGER CARS AND LIGHT TRUCKS

	Drivers	Right front passengers	Total
Lives Saved	2,327	714	3,041
Fatalities	25	128	153

III. Search for Solutions

Over the last five years, NHTSA has taken a variety of steps to alert the public to the dangers posed by air bags to children and to explore measures for reducing and even eliminating those dangers. The steps taken in 1991–1995 were recounted in an NPRM published by the agency on August 6, 1996. 61 Fed. Reg. 40784.

In the August 1996 NPRM, the agency proposed several amendments to Standard No. 208, *Occupant Crash Protection,* and Standard No. 213, *Child Restraint Systems,* to reduce the adverse effects of air bags, especially those on children. The agency explained that eventually, either through market forces or government regulation, it expects ''smart'' passenger air bags to be installed in passenger cars and light trucks to mitigate these adverse effects. NHTSA indicated that, for purposes of the NPRM, it considered smart passenger air bags to include any system that automatically prevents an air bag from injuring the two groups of children that experience has shown to be at special risk from air bags: infants in rear-facing child seats, and children who are out-of-position (because they are unbelted or improperly belted) when the air bag deploys.

NHTSA proposed that vehicles lacking smart passenger air bags would be required to have new, attention-getting warning labels and permitted to have a manual cutoff switch for the passenger air bag. By limiting the labeling requirement to vehicles without smart passenger air bags, NHTSA hoped to encourage the introduction of the next generation of air bags as soon as possible. NHTSA proposed to define smart air bags broadly to give manufacturers flexibility in making design choices. The agency requested comments concerning whether it should require installation of smart air bags and, if so, on what date such a requirement should become effective. NHTSA also requested comments on whether it should, as an alternative, set a time limit on the provision permitting manual cutoff switches for passenger air bags in order to assure the timely introduction of smart passenger air bags. Finally, the agency proposed to require rear-facing child seats to bear new, enhanced warning labels. In a section in the August 1996 NPRM titled ''Future Agency Considerations,'' the agency also provided a discussion of possible technological changes to address the forcefulness of air bag deployment, ongoing agency efforts to evaluate the effects of such changes, and possible future agency regulatory actions.

C. Recent Petitions for Rulemaking

Two weeks before the agency published its NPRM, the Parents' Coalition for Air Bag Warnings submitted a petition requesting the agency to commence a rulemaking proceeding to require that the following warning label be placed on dashboard of vehicles with passenger air bags:

''WARNING: DO NOT SEAT CHILDREN IN THE FRONT PASSENGER SEAT. AIR BAG DEPLOYMENT CAN CAUSE SERIOUS INJURY OR DEATH TO CHILDREN.''

After the agency's publication of the August 1996 NPRM, the American Automobile Manufacturers Association (AAMA) submitted a petition for rulemaking requesting that NHTSA immediately announce, by means of a ''direct final rule,'' an amendment to Standard No. 208 to replace the current 30 mph unrestrained dummy barrier crash test requirement with a sled test protocol incorporating a 143 millisecond standardized crash pulse. The petitioner contended that the standard's current requirement ''directly dictates the level of the air bag's inflator power and it is the level of inflator power that unnecessarily increases the risk of injury to vehicle occupants during air bag deployment.'' AAMA also requested that the agency separately issue a notice of proposed rulemaking to propose requirements to improve the safety of drivers and passengers who are extremely close to the air bag at the time of deployment, based on the latest International Standards Organization (ISO) test practices. AAMA recommended the use of the Hybrid III small female dummy in the driver position and appropriate child dummy in the passenger position.

On September 1, 1996, Ms. Anita Glass Lindsey petitioned the agency to commence rulemaking to specify the use of a test dummy representing a 5th percentile female [12] in testing the performance of safety belts and air bags. Currently, Standard No. 208 specifies the use of only a 50th percentile male test dummy. [13]

On September 17, 1996, the National Transportation Safety Board (NTSB) issued a number of safety recommendations to NHTSA for reducing the problem of child fatalities caused by air bags. These recommendations are as follows:

1. Immediately evaluate passenger air bags based on all available sources, including NHTSA's recent crash testing, and then publicize the findings and modify performance and testing requirements, as appropriate, based on the findings of the evaluation.

2. Immediately revise Federal Motor Vehicle Safety Standard 208, *Occupant Crash Protection,* to establish performance requirements for passenger air bags based on testing procedures that reflect actual accident environments, including pre-impact braking, out-of-position child occupants (belted and unbelted), properly positioned belted child occupants, and with the seat track in the forward-most position.

3. Evaluate the effect of higher deployment thresholds for passenger air bags in combination with the recommended changes in air bag performance certification testing, and

[11] This projection is based on the assumption that all passenger cars and light trucks on the road have driver and passenger air bags. It does not take into consideration the impact of this proposal or any of the other agency actions described in the Overview and Summary section above.

[12] A 5th percentile Hybrid III dummy has a standing height of 5 feet and a weight of 110 pounds.

[13] A 50th percentile Hybrid III dummy has a standing height of 5 feet, 8 inches and a weight of 172 pounds.

then modify the deployment thresholds based on the findings of the evaluation.

4. Establish a timetable to implement intelligent air bag technology that will moderate or prevent the air bag from deployment if full deployment would pose an injury hazard to a belted or unbelted occupant in the right front seating position, such as a child who is seated too close to the instrument panel, a child who moves forward because of pre-impact braking, or a child who is restrained in a rear-facing child restraint system.

5. Determine the feasibility of applying technical solutions to vehicles not covered by NHTSA's proposed rulemaking of August 1, 1996, to prevent air bag-induced injuries to children in the passenger position.

On November 8, 1996, the Center for Auto Safety (CFAS) petitioned the agency to amend Standard No. 208 to specify that a vehicle's air bags must not deploy in a crash if the vehicle's change of velocity is less than 12 mph. CFAS noted that many of the crashes resulting in air bag fatalities, especially those of children, involved very low changes in vehicle velocity. CFAS also petitioned the agency to institute investigations of several vehicle models for alleged defects related to air bag deployment.

On November 13, 1996, the AAMA submitted a letter that modified the proposal in its August 1996 petition for rulemaking. In place of the 143 millisecond standardized crash pulse, AAMA requested a sled test protocol incorporating a 125 millisecond standardized crash pulse.

Finally, on November 20, 1996, CFAS and Public Citizen petitioned the agency to begin rulemaking to require dual inflation air bags. These bags would inflate more slowly, and thus less aggressively, than current air bags in low-speed crashes. In higher-speed crashes, they would inflate at the same rate as current air bags. The petitioners assert that their proposal is the best solution in the near future and is superior to depowering, since depowering involves ''some trade-off in safety protection and will not add significant protection for unrestrained children.''

IV. Overview of Comprehensive NHTSA Plan for Addressing Problem

NHTSA is implementing a comprehensive plan of rulemaking and other actions (e.g., primary enforcement of State safety belt use laws) addressing the adverse effects of air bags. As part of that plan, NHTSA is issuing three separate, but related, notices today. Each notice is intended to ensure that some or all of the risks are reduced, and benefits retained, to the maximum extent possible. They provide immediate and/or interim solutions to the problem. A later notice, a proposal to require smart air bags, would provide a permanent solution.

In this notice, NHTSA is proposing to temporarily amend the agency's occupant crash protection standard to help reduce the fatalities and injuries that current air bags are causing in relatively low speed crashes to small, but growing numbers of children, and occasionally to adults. Based on agency research and analysis regarding the optimal range of air bag depowering, the agency has tentatively concluded that an average depowering of 20 to 35 percent would reduce the risk of fatalities in low speed crashes, while substantially preserving the life-saving capabilities of air bags in higher speed crashes.

The agency is considering the adoption of either, or both, of two different approaches that would permit or facilitate an approximate 20 to 35 percent average depowering of current air bags. One approach would be to temporarily reduce the stringency of the chest acceleration requirement that an unbelted dummy must meet in a crash test at speeds up to 30 mph. The other approach would be to temporarily adopt the AAMA's modified proposal for a sled test protocol incorporating a 125 millisecond standardized crash pulse.

NHTSA is seeking comments and information concerning the relative desirability of these two approaches, including supporting data from industry with respect to the sled test. It is also requesting comments on the appropriate duration of such a temporary amendment. NHTSA anticipates that it would remain in effect for both the passenger and driver seating positions until smart air bags are installed pursuant to a mandated phase-in schedule, which will be the subject of a separate rulemaking proceeding. Finally, comments are sought on whether the same or different requirements should apply to the passenger and driver positions.

The other rulemaking actions addressing the adverse side effects of air bags are as follows:

- Based on the August 1996 NPRM, the agency issued on November 22, 1996, a final rule amending Standards No. 208 and No. 213 to require improved labeling on new vehicles and child restraints to better ensure that drivers and other occupants are aware of the dangers posed by passenger air bags to children. The labeling places particular emphasis on placing rear-facing infant restraints in the rear seats of vehicles with operational passenger air bags. 61 FR 60206; November 27, 1996. The new labels are required on vehicles not equipped with smart passenger air bags beginning February 25, 1997, and on child restraints beginning May 27, 1997.
- Based on the same NPRM, the agency is issuing a final rule extending until September 1, 2000, a provision in Standard No. 208 permitting vehicle manufacturers to offer manual cutoff switches for the passenger air bag for new vehicles without rear seats or with rear seats that are too small to accommodate rear-facing infant restraints.
- The agency also is issuing an NPRM proposing to permit motor vehicle dealers and repair businesses to deactivate, upon the request of consumers, driver and passenger air bags that do not meet the agency's criteria for smart air bags. Final action is expected in early 1997.
- In addition to these actions, NHTSA will issue a separate supplemental NPRM (SNPRM) to require a phasing-in of smart air bags, beginning on September 1, 1998, and to establish performance requirements for those air bags. The proposal will be issued in early 1997.

The next two tables summarize the rulemaking actions included in the agency's comprehensive program to address these air bag problems:

ACTIONS ADDRESSING PROBLEMS ASSOCIATED WITH PASSENGER AIR BAGS

	Existing vehicles	Vehicles produced in next several model years	Vehicles produced thereafter
Passenger air bags.	Labels. New, attention-getting labels focusing on dangers of air bags to children, to be mailed by vehicle manufacturers to owners of existing air bag vehicles. Deactivation. Proposal to allow deactivation of passenger air bag that doesn't have cutoff switch and doesn't qualify as a smart air bag.	Labels. Final rule requiring new, attention-getting labels focusing on dangers of air bags to children, in vehicles whose passenger air bag doesn't qualify as a smart air bag, and on child seats. Cutoff switches. Final rule extending until Sept. 1, 2000, provision allowing cutoff switch for vehicles (a) which lack a back seat that can accommodate rear-facing infant seats, and (b) whose passenger air bag doesn't qualify as a smart air bag. Deactivation. Proposal to allow deactivation of passenger air bag that doesn't have cutoff switch and doesn't qualify as a smart air bag. Depowering. Proposal to temporarily allow depowering of passenger air bags that don't qualify as smart air bags.	Smart air bags. NPRM proposing to phase in requirement for smart air bags.
Driver air bags.	Labeling. New, attention-getting labels urging all occupants to use their safety belts and sit as far back as possible to be mailed by vehicle manufacturers to owners of existing air bag vehicles. Deactivation. Proposal to allow deactivation of driver air bags.	Labeling. Final rule requiring new labels urging all occupants to use their safety belts and sit as far back as possible. Deactivation. Proposal to allow deactivation of driver air bags that don't qualify as smart air bags. Depowering. Proposal to temporarily allow depowering of driver air bags that don't qualify as smart air bags.	Smart air bags. NPRM proposing to phase in requirement for smart air bags.

In addition to these actions, the agency is participating with automobile manufacturers, air bag suppliers, insurance companies and safety organizations in a coalition effort to address the adverse effects of air bags by increasing the use of safety belts and child seats. Substantial benefits could be obtained from achieving higher safety belt use rates. If the safety belt use rate were 75 percent in potentially fatal crashes instead of the current level of 52.6 percent, an additional 4,000 lives would be saved annually.

The coalition has a three-point program that seeks to educate the public about safety belt and child seat use, work with state and local officials to improve enforcement of safety belt and child seat use laws and seek the enactment of ''primary'' safety belt use laws. In States with ''secondary'' safety belt use laws, law enforcement officials are hampered in their ability to enforce the requirement to use safety belts because their inability to stop and ticket motorists for the sole reason of the motorists' failure to use their safety belts. A motorist may be ticketed by an official for such failure only if the official has a separate basis for stopping the motorist, such as the violation of a separate traffic law.

A 1995 NHTSA analysis of FARS data on restraint use among fatally injured motor vehicle occupants from 1983 to 1994 indicates that primary enforcement is the most important aspect of a safety belt use law affecting the rate of safety belt use. For virtually all states with a primary enforcement law, statistically significant increases associated with the presence of such a law were detected using several different methods. The analysis suggests that the increase in use rates attributable to the enactment of a use law can be estimated to be (on the average) at least 25 percentage points, while the additional increase attributable to primary enforcement of the law is at least 15 additional percentage points. These increases in safety belt use translate into an estimated 12.6 percent decrease in fatalities in a state that enacts a safety belt use law, and an additional 5.9 percent decline in fatalities in a state that authorizes primary enforcement of the law.

State data support these findings. On average, states with a primary safety belt law have usage rates that are 10–15 percentage points higher than states with secondary laws. In California and Louisiana, states which recently upgraded their laws to allow for primary enforcement, safety belt usage increased by 13 and 17 percentage points, respectively.

V. Depowering Air Bags

A. Results of NHTSA Test Program

To determine whether current air bags can be depowered to a degree that makes a significant contribution to reducing the risk of serious or fatal injury to occupants, especially children, without substantial loss of protection for teenagers and adults, the agency initiated the research testing and analysis program discussed in the August 1996 NPRM. NHTSA explained:

The agency has initiated a research testing and analysis program * * * at the Vehicle Research and Test Center, the agency's in-house laboratory in Ohio. The program's objectives are to:

- Assess the performance of air bag systems in current production vehicles in particular crash conditions, including the effects on out-of-position children.
- Assess the level of improvement possible in out-of-position performance from changes to existing air bag components, including downloaded air bags, as well as newly developed pre-production systems.
- Provide visibility for air bag-related technology, thus promoting the rapid adoption of newer technologies that will

help solve the out-of-position occupant injury problem.

The immediate focus of the program is on the passenger out-of-position problem as related to children. Several vehicle models have been selected based upon field accident investigations and air bag design characteristics. Both domestic and foreign vehicles are included in the selection. The test conditions include four different child positions similar to those recommended by ISO [International Standards Organization], and represent worst case occurrences. These tests will provide ''baseline'' performance of air bag systems when a child is an out-of-position occupant.

NHTSA is inviting vehicle manufacturers and air bag and component suppliers to provide state-of-the-art air bag systems. Systems that show significant improvements over baseline performance for out-of-position children will also be tested with adult-sized dummies in full-scale crash conditions required in Federal standards.

The test program will also address other aspects of air bag safety following the out-of-position child study. These include out-of-position driver tests, vehicle crash sensor testing, and testing of advanced air bag systems. The out-of-position driver testing will focus on small-sized female occupants who are sometimes injured due to the close proximity to the steering-wheel air bag system. Testing will continue into fiscal year 1997.
(61 FR 40784, at 40799; August 6, 1996.)

NHTSA has now tested the depowered air bags solicited from the vehicle manufacturers. The air bags had been depowered through the removal of certain amounts of propellant. While some of the air bags were depowered up to 60 percent, most of them were depowered an average of approximately 20 to 35 percent. However, their design (e.g., folding patterns and venting) had not been optimized for the reduced levels of power. As noted below, the agency believes optimization of the tested air bags would have significantly enhanced their performance.

NHTSA tested baseline air bags (i.e., air bags of current design) and depowered air bags on the passenger side in three different vehicles, and on the driver side in one vehicle.[14] NHTSA conducted these tests using modified versions of recommended test procedures formally adopted and issued in early 1996 by the ISO for evaluating child restraint system interactions (ISO TR 14645) and out-of-position vehicle occupant interactions (ISO TR 10982) with deploying air bags. For the passenger air bags, the agency conducted various tests using out-of-position three-year-old and six-year-old child dummies and normally-positioned, belted and unbelted 50th percentile male dummies.[15] For the driver air bags, the agency conducted various tests using out-of-position 5th percentile female dummies and normally-positioned, belted and unbelted 50th percentile male dummies. The agency also used computer-assisted mathematical modeling in an attempt to assess the effects of depowering on the forces experienced by occupants in air bag deployments.

The results of the agency's analysis of this testing, as well as other available information, are included in the PRE. Portions of the PRE are summarized below.

B. Effects of Depowering and Optimizing

Overview. The agency's testing and other available information [16] indicated that depowering by an average of 20 to 35 percent substantially reduced injury measures for persons close to the air bag, especially out-of-position children, while producing only small increases in injury measures for adult dummies. In the agency's testing, depowering more than 35 percent resulted in more substantial increases in adult dummy injury measures with a large additional reduction in out-of-position child dummy injury measures for only the more aggressive air bags. Thus, it appears that depowering at levels more than an average of 35 percent could result in losing a significant portion of the benefits being provided by air bags without a commensurate reduction in child injury risk. (However, it is possible that some of today's air bags are so aggressive that they could, if optimized, be depowered by more than 35 percent without substantial losses in adult benefits.)

The reductions in injury measures achieved by depowering an average of 20–35 percent would contribute significantly to solving the problem created by overly aggressive air bags.[17] While this average level of depowering would not eliminate all of the risk of serious injury to all persons currently at risk, it would eliminate much of the risk. The agency's other rulemaking actions would reduce the residual risk.

As noted above, the tested air bags were depowered, but not optimized. Had they been optimized, the injury measures for belted passengers would likely have decreased even more and those for belted drivers would likely have improved. Thus, they would have offered increased safety for belted occupants.[18]

Summary of Effects of Depowering on Air Bag-Related Fatalities for Particular At-Risk Occupant Groups

The ability of depowering to prevent air bag fatalities to occupants would vary depending on a number of factors, especially the location and belt use of the occupant. As shown in testing by the agency of passenger air bags, the forces exerted by a deploying air bag generally decrease as a function of increasing distance from the air bag module. Although the surface of an expanding air bag in its initial moments of inflation is potentially lethal, it rapidly changes within inches into an injury-preventing and life-saving surface as it inflates and moves away from its storage location. Thus, the farther away an occupant is from an air bag as it starts to inflate, the better off that occupant will be. While this is true for depowered as well as current air bags, depowering can significantly reduce the size of the zone within which serious injury is possible or likely.

Passengers. The at-risk groups are infants and young children. Properly belted, forward-facing children who are on a vehicle seat moved all the way back, should be at essentially no risk from a deploying, depowered air bag,

[14] The passenger air bag testing began in February 1996. The testing of passenger air bags to estimate the effects of depowering was completed in September. However, the testing of advanced passenger air bag designs and test conditions continues. Testing of driver air bags was conducted from May to September of this year. More tests of driver air bags are planned for the future.

[15] NHTSA did not conduct tests to determine the effects of the depowered air bags on an infant dummy (i.e., nine-month-old dummy) in rear-facing child restraints because the design of the depowered bags would have precluded obtaining meaningful measurements of those effects. Since all of the vehicles had top-mounted air bags (i.e., on top of the dashboard), the air bags would have tended to deploy above the child restraints instead of directly impacting them. This assessment appears consistent with the near total absence of top-mounted air bags from the list of air bags involved in the fatal injury of infants. None of the nine air bags was mid-mounted.

[16] Among the other items of information were the results of testing performed by AAMA using out-of-position dummies representing a six-year-old child, a 5th percentile female and a 50th percentile male.

[17] The actual amount that the air bag in each specific vehicle model would need to be depowered to achieve these benefits would vary depending on the aggressivity of its air bag system. The least aggressive air bags might need less than 20 to 35 percent depowering, while the most aggressive ones might need more, as much as 60 percent.

[18] The agency's belief that depowered air bags will provide increased benefits to real world occupants compared to current air bags is based in part on actual crash data regarding the performance of air bags in an Australian passenger car, the Holden Commodore, which is described below.

even if they are leaning forward while belted. Moderately out-of position, forward-facing children would receive substantial benefits. Severely out-of-position, completely unbelted forward-facing children would receive some benefits. Given their proximity to the air bag, infants in rear-facing child restraints would likely receive only small, unquantifiable benefits from depowered air bags.[19]

Drivers. To the extent that there is an at-risk group, it is short-statured women. Short, belted drivers on a vehicle seat moved as far back as their stature permits would receive substantial benefits, particularly with respect to neck injuries. They are not likely to move as far forward as unbelted drivers during pre-crash braking and during the initial stages of a crash. Benefits for unbelted drivers on a vehicle seat moved all the way forward would depend on the drivers' proximity to the air bag at the time of deployment. If they are at least two or three inches away at the time of deployment, they should receive some benefits from depowering with respect to chest and head injuries. Depowering should help all drivers with respect to arm injuries.

Overall Effects of Depowering. The PRE estimates the potential overall effects of depowering on all forward-facing children, teenage and adult occupants under the two alternative proposals, the 80 g alternative and the generic sled test alternative. Both proposals would produce a mixture of benefits and disbenefits, with the benefits primarily accruing to children and belted teenage and adult occupants, and the disbenefits primarily accruing to unbelted teenage and adult occupants.

The magnitude of the benefits and disbenefits are estimated in the PRE by two different methods. Method One includes only fatalities, while Method Two includes fatalities and serious injuries. The results of Method One, which produces slightly smaller upper end values for lives saved and for foregone savings of lives, are discussed below.

1. Passenger Air Bags

Child Passengers. *Older, Forward-Facing Children.* Depowering could prevent a significant number of the 90 annual fatalities projected above for forward-facing children[20] in an all air bag fleet for passenger cars and LTV's. The PRE estimates that 39 of the projected 90 fatalities could be prevented by depowering air bags by an average of 20 to 35 percent. This includes all of the lap and shoulder belted children who might otherwise be fatally injured and most of the moderately out-of-position children.[21] With the additional depowering possible under the generic sled alternative,[22] up to 83 of the projected 90 fatalities could be prevented since more of the severely out-of-position children could be benefited. Thus, depowering would make it safe, from the standpoint of the air bag, to place a child in the front seat when necessary, assuming that the child was properly restrained in a vehicle seat that was moved all the way back. The agency emphasizes that, even in the absence of an air bag, the rear seat is a significantly safer place for children to ride than the front seat.

Rear-Facing Children (Infants). Based on HIC reductions achieved in testing the effects of depowered air bags on three- and six-year-old dummies, the agency believes that depowering could prevent the death of some of the 38 projected fatalities of infants. However, for reasons explained below, the agency cannot quantify those savings.

As noted above, the agency did not perform any testing of depowered air bags with infants in rear-facing infant seats. Thus, the agency does not have any baseline versus depowered air bag data for rear-facing child restraints to estimate the potential benefits of depowering. However, HIC data from the testing of severely out-of-position three- and six-year-old children indicate that HIC was substantially reduced by depowering, but not typically below the assumed infant injury reference value of 500 HIC. HIC data are relevant because the primary cause of rear-facing infant fatalities in air bag deployments has been skull fractures. Since it is not possible at this time to make appropriate adjustments to reflect greater susceptibility of infants to fatal head injury, the HIC data for dummies representing older children could not be used to estimate potential benefits of depowering for infants. The agency has not made a specific, quantified estimate because of its roughness and therefore its questionable value.

Teenage and Adult Passengers. Depowering air bags to an average of 20 to 35 percent would likely benefit belted teenage and adult passengers on balance, but could necessitate foregoing the opportunity to save some unbelted teenage and adult passengers.[23] These estimates are based on chest g measures because, as noted in the PRE, chest g's are the most important measure for assessing the effects on teenagers and adults, since chest g's appear to have a stronger relationship to fatality risk than HIC. Further, the HIC increases due to depowering in this range were not that significant.

Belted Teenage and Adult Passengers. The agency's PRE assumes a 2.4 g decrease in chest g's for belted passengers under the 80 g alternative, using an air bag that had been depowered but not optimized. This assumption was based on test results showing a 2.4 g decrease in chest g's, although mathematical modeling predicted almost no change for belted passengers. Under the generic sled test alternative, a decrease of 1.9 chest g's is assumed, based on mathematical modeling. Both decreases would result in saving additional lives compared to current air bag designs.

As noted above, NHTSA believes that a greater decrease in chest g's, and therefore a greater increase in life-saving potential, would have occurred had the air bags not only been depowered, but also optimized for the new power level. The depowered air bags tested by NHTSA were not optimized in ways that would likely have reduced the chest g's even more. For example, the air bags were not optimized with respect to their venting rates.

The agency believes that it is unlikely that the vehicle manufacturers would depower their air bags without also optimizing them. NHTSA believes that the manufacturers would, out of reasonable prudence, do both.

This is significant because real world data from Australia regarding the performance of depowered driver air bags optimized for belted occupants suggests that depowering and

[19] As the agency has emphasized in numerous contexts, infants in rear-facing child restraints should NEVER be placed in the front seat of a vehicle with an operational passenger air bag.

[20] As noted above, the age range of the forward-facing children fatally injured during air bag deployments is one to nine years old.

[21] These estimated savings are based on the significant reductions in neck injury criteria values observed in all three tested vehicles. These values are the most important ones for estimating fatality risk, since neck injury has been the typical fatal injury mechanism for these children.

[22] As reflected below in the discussion of the alternative proposals, it is assumed in the PRE that the depowering of any air bags more than 35 percent is achievable only under the second alternative proposal (i.e., AAMA's generic sled pulse) since it appears that HIC or other injury criteria could not be met under the first alternative proposal (80 g limit on chest g's in the unbelted 30 mph test) with air bag systems depowered significantly above 35 percent.

[23] As noted below, the occupants can essentially eliminate the risk to them by the simple act of buckling their safety belts.

optimizing current U.S. air bags could significantly increase the effectiveness of air bags for belted occupants and lead to large savings of lives. Those data, drawn from crashes involving Holden passenger cars,[24] indicate that air bags with lap/shoulder belts reduced AIS 2+ injuries to drivers by 39 percent compared to lap/shoulder belts alone. By comparison, current U.S. air bags have an AIS 2+ effectiveness of 22 percent when lap and shoulder belts are worn. According to the PRE:

The air bag systems in the Commodore are designed to deploy as unaggressively as possible while still providing the necessary protection to occupants of different size, weight and sex who will be potentially involved in a variety of collisions. Great efforts have been taken in the development of the inflators and cushions to ensure they present as little risk as possible to occupants during inflation. Since the air bags have been designed to operate in conjunction with the safety belts, they are only required to decelerate the occupant's head and upper torso, as the primary load path is through the belts. This is fundamentally different from many other air bag designs, especially those used to protect unrestrained occupants. Systems optimized to protect unrestrained occupants typically utilize high-performance inflators in conjunction with cushions with low venting rates. This combination ensures that the air bags are sufficiently stiff to decelerate unbelted occupants.

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If such increased effectiveness could be obtained for belted passengers, it would offset a significant portion of the potential adverse impact of depowering estimated below on unbelted passengers. As discussed in the PRE, current NHTSA analyses indicate that air bags in this country are 8.5 percent effective in reducing belted fatalities. If the relationship in overall effectiveness of the Holden bag to the U.S. air bags for AIS 2+ injuries were the same for fatalities, the effectiveness of U.S. air bags for preventing fatalities to belted occupants could be as high as 15 percent. If depowering and optimizing U.S. air bags increased their effectiveness to that level, large savings in the lives of belted occupants could result.

The agency seeks comments, on a model-by-model basis, if possible, from the vehicle manufacturers on what specific optimization measures they would adopt and on whether such optimization could be accomplished and incorporated in production air bags within the time frame projected by the vehicle industry for introduction of the depowered air bags. As noted below, AAMA projected that its members could begin introducing depowered air bags within 6–9 months and complete the process across their fleets within a year after those first introductions. NHTSA solicits comments as to what effect, if any, efforts to optimize these air bags prior to their introduction might have on the schedule for their introduction. Comment is also sought whether adoption of the sled test suggested by AAMA would enable vehicle manufacturers to accelerate the introduction of optimized and depowered air bags. The agency also requests comments on what effects, if any, the optimization of air bag performance for the benefit of belted occupants would have on air bag effectiveness for unbelted occupants. Finally, comment is sought on the Holden data and the reasonableness of the assumption in the PRE that effectiveness of U.S. air bags in reducing belted fatalities could be raised substantially in the next several years through depowering and optimizing.

Unbelted Teenage and Adult Passengers. Depowering could necessitate foregoing the opportunity to save a significant number of unbelted teenagers and adults. The PRE estimates that, as a result of a significant increase in chest g's associated with depowering by an average of 20 to 35 percent under the 80 g alternative, there could be a reduction of between 86 and 280 unbelted passengers who would have otherwise been saved by current air bags. This reduction reflects an assumed average increase of 11 g's in the chest g's for unbelted passengers as a result of depowering, but not optimizing air bags. This assumption was based on limited test results showing an 11 g increase in chest g's at 30 mph. Mathematical modeling predicted a slightly lower increase. With greater depowering under the generic sled test alternative, it was assumed that chest g's would increase by 22 g's, based on sled tests and mathematical modeling. That increase would result in a potential loss of savings of 115 to 336 unbelted passengers.

It should be noted, however, that AAMA does not anticipate such losses. AAMA provided an estimate of the effects of depowering, based on NASS data, a number of analytic assumptions, and sled/barrier test results. That organization estimates the potential savings of 30 to 200 small adults per year due to increased effectiveness of passenger and driver air bags for those persons and the potential loss of up to eight large adults annually. The agency seeks comment from AAMA on how it calculated those figures.

Further, to the extent that increased numbers of people use their safety belts, the potential losses in savings of unbelted passengers would not materialize. While increasing safety belt use would reduce the benefits of depowering, by reducing the size of some groups (i.e., unbelted children and drivers) vulnerable to air bag fatalities, there would be very large increases in the number of people saved by occupant restraints of one type or another. As noted above, if the safety belt use rate were 75 percent in potentially fatal crashes instead of the current level of 52.6 percent, an additional 4,000 lives would be saved annually. NHTSA plans to work vigorously with the States to increase safety belt use through public education and authorizing primary enforcement of safety belt use laws.

Safety Tradeoffs. NHTSA has carefully considered the potential tradeoffs implicit in depowering passenger air bags. Given the wide range of the above estimates concerning unbelted passengers, the agency believes that the net effect of depowering on safety could be positive. However, even if the net effect were negative, the agency believes that the opportunity to save a significant number of children who would otherwise be fatally injured by air bags justifies foregoing the opportunity to save some unbelted passengers. There are several reasons for this policy choice.

First, it is not acceptable that a safety device cause a significant number of fatalities in circumstances in which fatal or serious injuries would not otherwise occur. In making this statement, the agency draws a distinction between air bags which are fatally injuring young children in low speed crashes in which the other vehicle occupants are uninjured, and other safety devices which may on occasion unavoidably substitute one type of injury for another type that would occur in their absence (safety belts are a good example).[25] Those fatalities are particularly unacceptable in light of the agency's analysis showing that depowering air bags can significantly reduce the number of children being fatally injured by air bags.

Second, it is also particularly unacceptable that the vehicle occupants being fatally injured are young children, and that the number of those deaths is

[24] The Holden passenger cars have depowered air bags that have a ''no-fire'' threshold of 12.4 mph and an ''always-fire'' threshold of 17.4 mph. While thresholds vary for U.S. air bags, a typical one has a ''no-fire'' threshold of 9 mph and an ''always-fire'' threshold of 14 mph.

[25] In severe collisions, safety belts can seriously bruise the chest of an occupant or even cause rib fractures. However, the restraining force of the belt would also likely prevent even more serious chest or head injury from the occupant's striking the interior components of the vehicle.

steadily growing. In confronting the possibility of inevitable short-term safety tradeoffs between young children and unbelted occupants over 12 years of age, the agency believes that greater weight must be placed on protecting young children. NHTSA has always given a high priority to protecting children and accordingly has applied these different cost-benefit considerations to its rulemaking affecting children. The agency's activities related to school bus safety standards are an example of this policy.

A major reason for giving priority to protecting young children is that they are less mature than teenagers and adults and thus less able to exercise independent judgment, assess the risks and take action to improve their safety. The young children are more dependent on the judgment and actions of other persons. The oldest of the 32 children who have been fatally injured by an air bag was nine years old, and most of the children have been much younger. Nineteen were four to seven years old and nine were infants. Conversely, the unbelted teenagers and adults who might not be saved as a result of depowering can take action on their own to protect themselves by simply buckling their safety belts as required by the laws of 49 States and the District of Columbia.

Notwithstanding the justifications for making the safety tradeoffs, NHTSA is concerned about them. It is because of the possibility of disbenefits, especially for unbelted occupants, that the agency is proposing to make only a temporary change in Standard No. 208 to permit or facilitate the depowering of air bags. The agency will shortly issue a proposal to require a phase-in of smart air bags. Requiring smart air bags would not only enable the agency to make depowering a temporary measure, but would also ensure that the problem of adverse effects from air bags is fully addressed, and that air bags achieve their full safety potential for protecting a wide variety of vehicle occupants over an appropriate range of vehicle speeds.

2. Driver Air Bags

Analysis of the net effect of depowering driver air bags is more difficult and therefore less precise largely because the agency has conducted fewer tests of depowered driver air bags and because the test results for the unbelted drivers are a mixture of small increases and decreases in chest g's. Nevertheless, the agency believes that depowering driver air bags would enhance safety. As noted above, belted short drivers who move their seat as far back as their stature permits, would benefit substantially from depowering. Belted drivers, in general, should benefit as well since depowering appears to allow a better ''tuning'' of the combined safety belt-air bag system for belted occupants. Unbelted, out-of-position short drivers could receive some benefit as well. As a result, there would be some reduction in the projected figure of 25 driver fatalities per year.

Belted Drivers. Depowering alone increased the chest g's for belted drivers in NHTSA's vehicle testing. Although the tests showed a 7 g increase at 35 mpg, there appears to be no logical reason for such an increase. In the same test, chest g's decreased for the belted passenger dummy. Further, modeling suggested only a marginal increase of 2 g. The PRE assumes a 2 g increase for belted drivers under the 80 g alternative. Under the generic sled test alternative, chest g's go up or down at different speeds with the net result that there would be no change in overall fatalities for depowered, but not optimized, air bags.

As in the case of passenger air bags and belted passengers, the agency believes that the data concerning the air bags in the Australian Holden passenger car show that optimizing as well as depowering air driver bags would produce a more favorable result for belted drivers than the depowered air bags tested by NHTSA. Since most of the Holden data related to driver air bags instead of passenger air bags, the agency has good reason to be even more confident about the implications of the Holden data for belted drivers in this country. With optimization, the agency believes that, instead of an increase in chest g's under the 80 g alternative or no change under the generic sled test alternative, a decrease is likely. If depowering and optimizing U.S. driver air bags increased their effectiveness to as much as 15 percent, the savings would be 471 drivers.

Unbelted Drivers. Depowering by an average of 20 to 35 percent under the 80 g alternative appears to slightly increase the chest g's of unbelted drivers. It is believed that the energy absorbing steering column is the reason that chest g's do not increase in proportion to the amount of depowering. In vehicle tests with depowered air bags, chest g's increased by 2 g at 30 mph, but decreased by almost 3 g's at 35 mph. The results of modeling were mixed also, but consistent with the vehicle test results. Modeling predicted a slight increase at 30 mph and decrease at 35 mph. Since there was an increase at some speeds, the PRE assumes a 2 g increase under the 80 g alternative. Based on that increase, the PRE estimates a possible loss in savings of 9 to 41 unbelted drivers. Under the generic sled test alternative, the PRE assumed a 10 g increase based on modeling. That increase suggests a resulting loss of 221 to 650 unbelted drivers.

As noted above, there is reason to believe that these losses might not occur. AAMA estimates the potential savings of 30 to 200 small adults per year due to increased effectiveness of passenger and driver air bags for those persons and the potential loss of up to eight large adults annually. Further, to the extent that increased numbers of people use their safety belts, the potential losses in savings of unbelted passengers would not materialize. NHTSA plans to work vigorously with the States to increase safety belt use through public education and authorizing primary enforcement of safety belt use laws.

Arm Injuries. The agency believes that depowering would lead to a significant reduction in driver arm injuries associated with air bag deployments. Compared to MY 1994 vehicles, depowering air bags by an average of 20 to 30 percent could reduce AIS 2–3 arm injuries from 25,006 to 16,254, a reduction of about 8,800 injuries.

Safety Tradeoffs. NHTSA has carefully considered the potential tradeoffs implicit in depowering driver air bags. Despite the wide range of the above estimates concerning unbelted drivers, the agency believes that the net safety effect of depowering passenger air bags could be positive instead of negative. Even if the net effect were negative, the agency believes that the opportunity to avoid causing fatal injuries to some drivers justifies foregoing the opportunity to save more unbelted drivers. The reasons for this policy choice are similar to those for depowering passenger air bags.

First, the principle of not affirmatively causing harm when harm would not otherwise occur applies to all vehicle occupants. While it is probably unavoidable that some safety devices may on occasion substitute one type of injury for another type that would occur in their absence, it is not acceptable that safety devices cause a significant number of fatalities in circumstances in which fatal or serious injury would not otherwise occur.

Second, the drivers who might lose benefits as a result of depowering are unbelted drivers. They can protect themselves by taking the simple step of buckling their safety belts as required by the laws of 49 States and the District of Columbia.

Nevertheless, as noted above, due to the possibility of adverse safety tradeoffs, NHTSA is seeking to limit the duration of the tradeoffs by proposing to make only a temporary change in Standard No. 208 to permit or facilitate the depowering of air bags. The agency's planned proposal to require smart air bags would not only enable the agency to make depowering a temporary measure should the adverse tradeoffs actually materialize, but would also ensure that the problem of adverse effects from air bags is fully addressed, and that air bags achieve their full safety potential.

C. Alternative Proposals

The preceding sections of this notice discuss the benefits of depowering passenger and driver air bags by various amounts, and the net effects on safety. While the agency recognizes that depowering air bags may result in some adverse safety tradeoffs, primarily to unbelted teenage and adult occupants, it believes that depowering represents a desirable temporary means of addressing the problem of fatalities and injuries from air bags.

Having tentatively decided that depowering of air bags is desirable, it is necessary for the agency to determine whether a regulatory change is needed to permit this action and, if so, what the most appropriate change would be.

Manufacturers have asserted that a regulatory change is needed because if air bags were depowered to an appropriate extent, manufacturers would be unable to certify that all of their vehicles comply with Standard No. 208's unbelted test requirements.

As discussed in the PRE, the agency's testing shows that an average 20 to 35 percent depowering of passenger air bags would result in chest g's for some vehicles approaching or slightly exceeding Standard No. 208's 60 g limit for the unbelted test. This indicates that a regulatory change would be needed to permit this level of depowering for these vehicles. The agency's limited data suggest that the standard's other requirements would not preclude this level of depowering, although the 1000 HIC limit would prevent significantly higher levels of depowering.

NHTSA does not have data concerning whether a regulatory change would be needed to permit 20 to 35 percent depowering of driver air bags, but is requesting commenters to provide such data. As discussed in the PRE, when driver air bags depowered to that extent were tested by NHTSA at 30 mph, unbelted chest g's increased from 49 to 51. Ford modeling for driver air bags shows similar results, with chest g's rising by only 2 or 3 g's for belted and unbelted drivers. Available NHTSA modeling shows variable results (some chest g's going up and others down), but all were well within the standard at 30 mph. The agency believes that energy absorbing steering columns explain why the driver air bag can be depowered without significantly affecting chest g's. However, the agency conducted only limited testing and did not conduct any angle tests. The agency requests comments, including data, concerning how depowering driver air bags by various percentages would affect the manufacturers' ability to certify compliance with Standard No. 208.

The agency is proposing the adoption of either, or both of two potential changes as alternative temporary amendments to Standard No. 208: either increasing the current chest acceleration limit to 80 g's, or replacing the unbelted crash test requirement with a sled test protocol incorporating a standardized crash pulse. If the agency were to adopt both of these changes, a manufacturer could select either alternative at its option. However, a manufacturer could not mix the two options, i.e., the 80 g chest acceleration limit would not apply in the case of the generic sled test.

A discussion of each of the two alternative approaches being proposed by the agency is presented in the next two sections.

1. Approach I—Temporary Change in Unbelted Chest Acceleration Requirement

NHTSA believes that the simplest regulatory change would be to amend the requirement which appears to be the factor limiting the vehicle manufacturers' ability to depower current air bags by 20 to 35 percent. This points to reducing the stringency of the unbelted chest acceleration requirement. The agency is proposing to increase the current limit from 60 g's to 80 g's. However, the agency is requesting comments on both higher and lower values, and could select a different value for the final rule.

This alternative has other advantages in addition to its simplicity. Occupant protection would continue to be measured in full-scale vehicle tests, protection in impacts at a range of angles would be ensured, and the other injury criteria would not change. The agency notes that recent biomechanical data generated for NHTSA suggests that, with respect to potential chest injuries, the human tolerance to acceleration is higher for air bags than for belts, because the air bag delivers a more broadly distributed, uniform loading to the chest than does a safety belt. Therefore, an 80 g requirement for occupants protected by air bags appears to be at least as protective as a 60 g requirement for belted occupants.

The agency notes that amending the standard to allow chest accelerations of 80 g's does not mean that chest g measurements in crash tests would necessarily rise to that level. The agency's test data suggest that while a change to 80 g's would be sufficient to permit or facilitate 20 to 35 percent downloading, air bags with progressively higher levels of downloading (beyond 20 to 35 percent) are likely to exceed Standard No. 208's head injury criterion before they exceed the 80 g requirement.

NHTSA also notes that the PRE's estimates of safety impacts for the 80 g alternative do not assume an increase to 80 g's, or to any particular level below 80 g's. The estimates are instead based on the agency's analysis of the effects of depowering air bags by 20 to 35 percent.

The agency's analysis assumes, based on limited vehicle testing, that chest g's would rise by an average of approximately 11 g's for the unbelted 50th percentile male. Since compliance data show that chest g's for this test currently average about 43 g's, the assumed 11 g increase means that the average would increase to about 54 g's for the 50th percentile male dummy.

NHTSA intends for any regulatory change to Standard No. 208 to permit or facilitate quick depowering of air bags. In order to reduce the leadtime for depowered air bags, the agency is proposing, as part of its 80 g proposal, to establish a special two-year enforcement policy for Standard No. 208's unbelted test requirements.

The agency recognizes that, under ordinary circumstances, manufacturers making air bag design changes typically conduct extensive testing to ensure that a vehicle will continue to meet the standard's performance requirements at any particular level. They do so despite the existence of various provisions of Standard No. 208 that provide that ''a vehicle shall not be deemed to be in noncompliance with this standard if its manufacturer establishes that it did not have reason to know in the exercise of due care that such vehicle is not in conformity with the requirement of this standard.'' See, e.g., S4.1.5.3.

While NHTSA generally considers some degree of testing to be necessary to satisfy this ''due care'' requirement, under the proposed two-year policy, the agency would consider engineering analyses indicating that a vehicle will pass the unbelted test requirements with a depowered air bag as sufficient during that period to establish that the vehicle's

manufacturer exercised due care to ensure that the vehicle conforms with the requirement, even in the absence of confirming crash testing. Of course, the agency would retain the right to enforce the requirements of the standard if the noncompliance was due to quality control deficiencies or other manufacturing problems. This policy would be reflected in an appendix to the standard.

2. Approach II—Temporary Replacement of Unbelted Crash Test Requirement With a Sled Test Protocol Incorporating a Standardized Crash Pulse

In August 1996, AAMA submitted a petition for rulemaking requesting, among other things, an immediate amendment to the requirements for testing the ability of air bags to protect unbelted occupants. The current requirement measures occupant protection in a full scale crash test in which a vehicle, equipped with test dummies at the outside front seating positions, is crashed into a barrier. Specified injury criteria, measured on the test dummies, must be met in barrier crashes at speeds up to 30 mph, and a range of angles up to 30 degrees off-center.

AAMA requested that this crash test requirement be replaced with a sled test protocol. Under that protocol, all of a vehicle, or a portion of the vehicle representing the interior, would be mounted on a sled. The sled would be decelerated from 30 mph according to a standard formula, called a crash pulse. There would not be an angle test, only a direct frontal test.

NHTSA notes that sled tests can be used by researchers to simulate what will happen to occupants in real world crashes. The crash pulse for a given sled test is a major determinant of the stringency of the test, and how representative the test is of how a particular vehicle will perform in particular kinds of real world crashes.

To explain further, the term ''crash pulse'' is defined as the acceleration-time history of the occupant compartment of a vehicle during a crash. This is typically represented in terms of g's of acceleration plotted against time in milliseconds (1/1000 second). Generally speaking, the occupant undergoes greater forces due to secondary collisions with the vehicle interior and restraint systems if the crash pulse g's are higher at the peak, or the duration of the crash pulse is shorter, which would lead to higher overall average g levels.

The crash pulse experienced by a particular vehicle will obviously differ substantially in different types of crashes, e.g., if the vehicle crashes into a rigid stone wall vs. a stack of hay. Similarly, vehicles with different designs typically experience substantially different crash pulses in the same kind of crash, depending on such things as the stiffness of the vehicle structure and amount of crush space. Large cars typically have relatively mild crash pulses, while small cars and utility vehicles typically have more severe crash pulses.

Under AAMA's recommended amendment, the same crash pulse would be used for all vehicles. The petitioner argued that the standard's current test protocol ''directly dictates the level of the air bag's inflator power and it is the level of inflator power that unnecessarily increases the risk of injury to vehicle occupants during air bag deployment.'' AAMA asserted that its recommended test protocol would allow for lower powered inflators to be introduced into the market as quickly as possible while maintaining air bag protection for all occupants.

In its August 1996 petition, AAMA provided the parameters for its recommended pulse along with a suggested mathematical formula, called a sine pulse. The sine pulse suggested by AAMA is described by the mathematical function: $A=15 \sin (\Pi t/143)$ Gs.

After examining the sled test protocol initially advocated by AAMA, NHTSA concluded that the standardized sled pulse suggested in the petition is representative of a very soft, or benign crash. Indeed, the agency wondered whether the pulse were so benign that a vehicle could meet the requirements for protecting an unbelted dummy without an air bag.

To answer this question, NHTSA tested a 1993 Taurus according to the sled test protocol recommended by AAMA, i.e., the 143 millisecond (msec) sled pulse (15 g peak). The vehicle did not have a passenger air bag. Although the vehicle had a driver air bag, it was deactivated so that it would not deploy. Although protected by neither safety belts nor air bags, neither of the dummies had responses that exceeded the injury criteria specified in Standard No. 208.

In its November 13, 1996 letter, AAMA suggested that the agency use a more severe crash pulse, 125 msec., which corresponds to 17.1 g. AAMA also argued that the agency should consider injury measurements for the neck in evaluating the crash pulse, rather than focusing solely on whether vehicles without air bags could pass the current Standard No. 208 injury criteria (HIC, chest and femur loads) in a test using the pulse. AAMA indicated that a vehicle could not meet appropriate neck injury assessment reference values (IARV's) in a test using the pulse without an air bag.

NHTSA notes that the revised AAMA recommended crash pulse is similar to that experienced by a large car in a Standard No. 208 test, but milder than that experienced by a typical small car, utility vehicle, or light truck. The PRE provides additional information about crash pulses.

In December 1996, NHTSA conducted several tests of a 1993 Taurus according to the revised sled test protocol recommended by AAMA, i.e., 125 msec, 17.1 g. The agency repeated the same test it had conducted with the earlier pulse, i.e., a no-air-bag test with unbelted 50th percentile male dummies. However, NHTSA also measured forces on the neck so that it could make calculations relative to IARV's. The agency also conducted tests with baseline and depowered air bags, and with fifth percentile female dummies.

NHTSA was still reviewing data calculations for this new test series as this notice was being completed. The agency expects to place the data in the docket at, or shortly after, the time this notice is published. NHTSA requests comments on what conclusions should be drawn from the data and on how the results of the tests should be factored into the agency's final decision concerning this proposal.

There are potential advantages and disadvantages to the approach of using a standardized crash pulse representative of a large car as a temporary means of addressing air bag fatalities to children. The approach provides maximum flexibility to manufacturers in addressing these fatalities. In its 1984 rulemaking establishing the automatic protection requirements that were in effect until the implementation of ISTEA, NHTSA recognized that technical problems existed in designing air bags that would not pose a danger to unrestrained small children in small cars. Because the crash pulse of small cars is much more severe than that of large cars, more aggressive air bags are needed to meet the standard's injury criteria. The agency stated:

> Manufacturers claim that little development work has been done with air bags for small (e.g., subcompact or smaller) cars and that a particular problem in these vehicles is how to protect small children, who are not properly restrained, from the more rapidly deploying air cushion in such vehicles. The Department believes that this problem can be mitigated and that technical

solutions are available, as described in the FRIA. However, the lack of experience in this area, as well as the lack of experience for some companies in any form of air bag development, make the Department reluctant to mandate across-the-board air bags. 49 Fed. Reg. 29001, July 17, 1984; See July 11, 1984 FRIA, pp. III–7 to 11.

The AAMA recommended sled test approach would essentially permit the auto manufacturers to use air bags for small cars and other vehicles with severe crash pulses (e.g., utility vehicles and trucks) that are similar to the ones they use for large cars. This would eliminate some of the problems that exist in designing air bags for these vehicles that are not aggressive to children, i.e., the risk of aggressivity would be normalized for all vehicles.

Another advantage of a sled test approach is that it reduces the time and cost of doing certification testing, since sled tests are less destructive of the vehicle. Further, many more sled tests can be conducted in the same time period, since the motor vehicle industry and its suppliers have substantially greater capacity to conduct sled tests than barrier tests.

The primary disadvantage of using a standardized crash pulse representative of a large car is that the test will be less representative of actual performance for small cars and other vehicles with severe crash pulses, i.e., the test measures only air bag performance and not total vehicle performance. The approach also eliminates the effect of angle test requirements, which ensure protection in frontal impacts that occur at a range of angles rather than purely head-on. However, given that recent NHTSA analyses indicate that current fatality reducing benefits of air bags drop off rapidly as crashes diverge from direct ''head-on'' collisions, deleting the requirement for meeting injury criteria in a 30 degree test might not substantially degrade the ''real world'' benefits of air bags in such crash configurations. (''Fatality Reduction by Air Bags, Analyses of Accident Data through early 1996,'' August 1996 NHTSA Technical Report, DOT HS 808 470) NHTSA requests comments on this issue.

As a practical matter, the AAMA recommended sled test approach appears to permit more depowering than the 80 g approach. Under the 80 g approach, Standard No. 208's HIC requirement appears to preclude depowering much beyond the 20 to 35 percent range. The agency does not know how much depowering would be permitted by the AAMA approach, but believes it could be considerably greater than 35 percent, at least for vehicles that currently experience a severe crash pulse in the current Standard No. 208 test. While this maximizes manufacturer flexibility in addressing the fatalities to children, it also raises the possibility of greater adverse safety tradeoffs, especially to unbelted teenage and adult occupants.

In the context of a temporary amendment to Standard No. 208, however, the agency believes it is important to distinguish between what the manufacturers might technically be permitted to do and the actions they would actually take in response to a regulatory change. Because of the substantial differences among current air bags, it is likely that very different levels of depowering are needed for different air bags in order to significantly reduce the risk of child fatalities. For some air bags, 10 percent depowering may be necessary; for others, 60 percent depowering may be necessary.

Because the same standards apply to all vehicles, it is possible that any regulatory change that would permit 60 percent depowering of the most aggressive air bags would permit greater than optimal depowering of other air bags. That does not mean, however, that manufacturers would depower all air bags to the maximum extent permitted by the amendment. Instead, the agency anticipates that the manufacturers would only depower particular air bags to the extent needed to address the child fatality problem, and preserve unbelted occupant protection to the maximum extent possible.

As part of proposing the AAMA recommended sled test approach, the agency is proposing to add neck injury criteria for the 50th percentile male dummy. As indicated above, AAMA argued that the agency should consider injury measurements for the neck in evaluating the crash pulse. The source of the proposed neck criteria is ''Anthropomorphic Dummies for Crash and Escape Systems,'' AGARD Conference Proceedings of NATO, July 1996, AGARD–AR–330. A copy of the relevant pages is being placed in the docket. The agency notes that GM uses the same neck criteria for its IARVs. Data provided by AAMA indicate that, in general, all of these neck criteria could not be met without an air bag.

The proposed neck injury criteria represent peak values for very short duration loading. Much lower loads can be tolerated for longer duration loading. Time dependency criteria may need to be specified. The agency solicits comments on this subject.

The agency is proposing a test procedure similar to that presented in AAMA's petition. NHTSA notes that the proposed procedure specifies that the vehicle, or ''a sufficient portion of the vehicle to be representative of the vehicle structure,'' is mounted on the sled. The agency requests comments on the practicality of conducting sled tests with whole vehicles, and on whether the quoted language can be made more objective.

NHTSA notes that AAMA included in its initial petition both a recommended crash pulse and specified corridors for that pulse. The agency believes that it is necessary to specify corridors in addition to a specific pulse, because it is generally not possible to duplicate exact pulses. Manufacturers would be required to certify that their vehicles comply with the standard's performance requirements for all tests within the specified corridors. The agency notes that AAMA has not provided corridors for its revised crash pulse, and has written to AAMA requesting it to provide a figure showing the mathematical equation for the revised pulse, a graph of the pulse and corridors for the pulse. This information will be docketed as soon as possible after it is received by the agency. While the proposed regulatory text specifies only a specific crash pulse and not the corridors for that test, the agency expects to include such corridors in the final rule.

3. Request for Additional Information

In order to help it reach a final decision, the agency is requesting additional information in several areas.

First, the agency is requesting additional information and data to help it refine its estimates of the potential benefits and net effects on safety that would be likely to result from depowering. As discussed above, the estimates presented in the PRE and summarized above are necessarily based on very limited data. The agency requests commenters to address the analyses presented in the PRE, including what conclusions should be drawn from the various test data, modeling data, Holden study, and other information presented in that evaluation, concerning the effect of depowering on fatalities and injuries. The agency also requests commenters to provide additional relevant information, including test data, real world studies, and engineering analyses.

Second, the agency recognizes that there are significant uncertainties associated with the analyses of the available data and the resulting estimates of benefits and disbenefits. If, contrary to the agency's expectation and best judgment, this rulemaking were to

result in a large net loss of life, would taking action (through the adoption of the proposed amendment) to save the children and short adult drivers being fatally injured by air bags still be the correct policy choice?

Third, the agency is seeking comment on the sled pulse test recently recommended by AAMA. The agency has written to AAMA requesting information on why AAMA selected the particular recommended pulse, the amount of depowering that would be permitted for various vehicle types, how those changes would translate into 30 mph barrier test results, and specific manufacturer plans (on a model-by-model basis, if possible) concerning the amount of depowering that would occur if that alternative is adopted in the final rule. This information will be docketed as soon as possible after it is received by the agency. The agency also requests specific estimates on the overall impacts on safety, for children, belted and unbelted passengers, and belted and unbelted drivers.

Fourth, NHTSA requests specific analysis comparing the potential benefits and net effects on safety of the two proposed alternatives. The agency notes that, in a November 13, 1996 submission, AAMA provided estimates concerning its members' ability to depower air bags under various alternative amendments to Standard No. 208. AAMA stated that, for purposes of its analysis, depowering was defined as reducing the force produced by air bags to a level which is estimated to reduce the risk of air bag related fatalities to a 5th percentile unbelted female and unbelted child as close to zero as possible, while still meeting all belted occupant injury criteria. According to AAMA, this generally corresponds to a 25 to 35 percent average reduction in total inflator output and peak mass flow. AAMA provided the following chart:

AAMA Estimates for Air Bag Depowering

The percentage of air bag systems that could be depowered noted below is based on engineering judgment of AAMA members relative to the ability to depower the current air bag design to a level needed to provide meaningful benefit.

Regulatory Action #1—Raise Chest Criterion to 80 g's

passenger cars—36%
trucks—27%
total—31%

Leadtime to implement—6 to 9 months to 4 years

Regulatory Action #2—80 g's + delete angle barrier

passenger cars—43%
trucks—41%
total—42%

Leadtime to implement—6 to 9 months to 3 years

Regulatory Action #3—80 g's + delete angle barrier + 15 msec HIC

passenger cars—48%
trucks—57%
total—53%

Leadtime to implement—6 to 9 months to 3 years

Regulatory Action #4—125 msec Generic Sled Test

100% of total fleet—leadtime to implement—6 to 9 months, complete within 2 years.

Based on compliance data and its limited testing of depowered air bags, the agency believes that an 80 g requirement would permit manufacturers to depower essentially all of their vehicles by 20 to 35 percent, while AAMA estimates that only 31 percent of vehicles could be depowered ''to a level needed to provide meaningful benefit.''

One reason for the difference in the assessment of the sufficiency of the 80 g requirement is that the manufacturers contemplate depowering more than 20–35 percent in the case of the more aggressive air bags. As discussed earlier in this notice, the agency's testing indicates that a considerably higher level of depowering might be needed for some vehicles to significantly reduce the chance of fatality to out-of-position children.

NHTSA has not conducted angle tests with depowered air bags, so another reason for the difference might be that Standard No. 208's current angle test requirement could be a limiting factor even with an 80 g requirement.

The agency requests the individual manufacturers to provide specific analysis, on a model-by-model basis, if possible, comparing the amount of depowering that would be permitted by an increase in the chest acceleration limit alone to that which would be permitted by the AAMA generic sled pulse test, and describing the reasons for any differences in these two levels of depowering. NHTSA has already requested this information from AAMA and will docket it as soon as possible after it is received by the agency.

Fifth, NHTSA is requesting additional information concerning the extent of the existing problem of driver fatalities and injuries from air bags, and the amount of depowering that would be needed for various vehicle types to address those fatalities and injuries. As discussed earlier in this notice, there are substantial differences between the passenger and driver air bag problems. While the annual number of child fatalities is very small but growing steadily, the annual number of adult fatalities does not appear to be growing. While the agency is aware of 18 children who have been fatally injured by air bags this year, it is aware of only one driver who has been fatally injured by an air bag in the United States during the same period. This apparent nearly total absence of driver fatalities has occurred despite the greater than two-to-one ratio of vehicles with driver air bags to vehicles with passenger air bags and the four-to-one ratio of drivers to front seat passengers. (As noted above, however, the agency's figures for driver fatalities are not the result of a census.) Moreover, while most child fatalities have occurred in very recent model year vehicles, the agency is aware of only one woman 5 feet 2 inches or less who has died in a post model year 1992 vehicle. Finally, the ratio of lives saved by air bags to persons fatally injured is very different for driver air bags than passenger air bags. Driver air bags are estimated to have saved 1500 lives, as compared to 19 persons fatally injured. Passenger air bags are estimated to have saved 164 lives, as compared to 32 persons fatally injured.

There are also considerable differences between the size and basic designs of driver and passenger air bags, and the mechanisms by which drivers and children are likely to become too close to the air bag. As discussed earlier in this notice, unrestrained or improperly restrained children are likely to be propelled up against the air bag before deployment as a result of pre-crash braking, and children in rear-facing infant restraints are positioned with their heads up against the air bags. Since drivers have their feet on the brake and/or accelerator pedals and/or floor and are holding the steering wheel, they are not likely to be propelled forward as a result of pre-crash braking to the extent that children are. Pre-braking and crash forces will, however, cause drivers to move toward the air bag. Drivers who sit very close to the steering wheel are at greater risk of being too close to the air bag at the time of deployment, especially if they are unrestrained.

Because driver air bags have been produced in large numbers for several years longer than passenger air bags, the vehicle manufacturers have had time in a number of instances to redesign driver air bags to incorporate a number of

countermeasures that reduce the risk to out-of-position occupants. In deciding whether to adopt its proposal to reduce the stringency of Standard No. 208 as it applies to driver air bags, the agency will therefore take care that it is assessing both current and expected air bag designs.

By way of illustration, General Motors commented in December 1995 that it has introduced a number of air bag system features that according to its test results should reduce the risk of inflation induced injury. These features include minimized inflator output and bag size, module cover tear seam geometry, low break-out force module cover, bag fold, and recessed air bag module. General Motors also stated that it was in the process of introducing air bag systems that include a number of features that can help to further reduce the inflation-induced loads to which an occupant can be subjected. These features (which repeat some of the earlier ones listed by that company) include recessed air bag modules, new bag folds, improved air bag module tear seam geometries, low break-out force air bag module covers, minimized bag volumes, low output inflators, and air bag venting technologies.

NHTSA is also aware that other companies have also redesigned driver air bags in ways that should reduce air bag aggressivity. Agency testing of several new designs shows a substantial reduction in the risk to out-of-position occupants, especially with respect to chest injury, measured as V*C. However, the agency also tested some driver air bags that showed a substantial reduction in some injury reference values and increases in others.

NHTSA requests information on the potential which current driver air bags have for creating adverse side effects. Among other things, the agency requests vehicle manufacturers to provide detailed information, on a model-by-model basis, if possible, concerning all relevant design changes they have made, or expect to make, in their vehicles that may have reduced, or will reduce, the risk of injury or fatality to drivers from air bags. This would include changes in air bag designs, including deployment threshold changes, and changes in related vehicle components. This information will help the agency assess the potential of adverse side effects associated with model year 1997 vehicles, as opposed to the potential associated with model year 1990–92 vehicles.

The agency also requests information on the number of driver air bag fatalities that have occurred to date. NHTSA does not have as much information on driver fatalities as child fatalities, because it does not have the resources to investigate every adult fatality that occurs in a vehicle with an air bag. Therefore, there may be driver fatalities that the agency is not aware of. NHTSA is especially interested in knowing about fatalities that have occurred over the past three years, especially involving late-model vehicles.

NHTSA also requests comments on the extent to which depowering of current air bags would address driver air bag fatalities, and on the extent of the associated safety tradeoffs. Finally, the agency requests comments and data concerning the extent of the need to change Standard No. 208 to permit various levels of depowering, and on the alternatives of raising the standard's chest g limit and/or adopting the AAMA recommended generic sled pulse test.

In view of the potentially substantial disbenefits associated with depowering driver air bags, the agency requests comment about the advisability of limiting the proposed amendment to passenger air bags only. The agency requests specific information about the cost and leadtime implications of excluding driver air bags from the amendment as well as the effects it would have on reducing the magnitude of the apparent disbenefits associated with depowering driver air bags. In making that request, NHTSA recognizes that considerable depowering of driver air bags is already possible under the current standard.

D. Consideration of Other Alternatives

In developing this proposal, NHTSA considered an array of regulatory and nonregulatory (e.g., education) approaches that would address the air bag safety problem.

Other regulatory approaches to facilitate depowering that have been advocated by the industry include dropping the unbelted test altogether, or requiring that the unbelted requirements be met at speeds up to 25 mph instead of 30 mph.

NHTSA is not proposing to drop the unbelted test altogether. A number of vehicle manufacturers have argued that the inclusion of unbelted test requirements in Standard No. 208 should be reconsidered in light of the fact that belt use has increased from 14 percent in 1983 to around 68 percent today. The agency recognizes that, at some point, belt use might rise to a point at which retention of the unbelted test requirements might no longer be appropriate. The agency notes that belt use in Australia is over 95 percent, and averages 93 percent in Canada. However, as noted above, the belt use among fatally injured vehicle occupants is less than 40 percent. Since smart air bags may soon be available that adjust air bag deployment levels based on belt use or nonuse, the possible need to amend the unbelted test requirements may be relatively short-lived. NHTSA will consider the issue of the unbelted test requirements in the context of its forthcoming rulemaking on smart air bags. If it appears that such smart air bags will not be available in the near term, the agency will also consider whether there might be a percentage of belt use at which the agency should examine changing the unbelted test requirements and whether any legislative amendments might be necessary for that purpose.

The agency is also not proposing to reduce the unbelted test speed to 25 mph. While this approach was advocated in the past by Ford, Ford has now reached consensus with the other members of AAMA on the approach of replacing the unbelted crash test requirement with a sled test protocol incorporating a standardized crash pulse. In addition, the agency believes that the proposed approaches are preferable to reducing the test speed because they would allow a more rapid introduction of depowered air bags.

Given the possibility that amending Standard No. 208 to permit significant depowering might lead to a reduction in the lives saved by air bags, NHTSA has assessed other available approaches to the air bag safety problem in terms of their relative timeliness, effectiveness and net effect on safety. The results of such a comparative assessment are relevant to deciding whether there is a need to reduce stringency of the standard and, if so, for how long. The agency has considered the following alternatives in addition to depowering. (There is some overlap between the alternatives; for example, smart air bags may incorporate some design features that could also be used individually.)

Behavior-Related Actions Only. One possibility would be for NHTSA to focus entirely on behavior-related actions, such as public information efforts, encouraging the States to improve and enforce their safety belt and child restraint use laws, requiring improved warning labels, and permitting or requiring passenger manual cut-off switches (a technological change which would also require behavioral changes to be effective) in all vehicles. Behavioral changes are especially relevant to the problem of child fatalities caused by air bags, since these fatalities can be prevented by behavioral means, e.g., ensuring that

children always buckle up and that they sit in the back seat whenever possible.

NHTSA is actively pursuing efforts to bring about behavioral changes. The agency's efforts include its public education campaigns, addressed at length in the August 1996 NPRM and other Federal Register notices, and the agency's final rule (issued November 22, 1996) amending Standards No. 208 and No. 213 to require improved labeling to provide better assurance that drivers and other occupants are aware of the dangers posed by air bags to children.

As discussed above, NHTSA is a part of a coalition including automobile manufacturers, air bag suppliers, insurance companies and safety organizations working to improve safety belt use by a variety of means, including education efforts, urging the States to adopt primary enforcement safety belt use laws, and improving enforcement of seat belt and child seat use laws. To the extent that these efforts are successful, belt use rates should increase.

The agency's rulemaking concerning manual cutoff switches for passenger air bags also represents a way of reducing air bag fatalities by behavioral means. The switches provide drivers, in vehicles lacking a back seat large enough to accommodate a rear-facing infant seat, with a means of ensuring that their young children, particularly infants, would not be harmed by the air bag.

However, while behavioral changes are an important part of the efforts to reduce low speed fatalities due to air bags, it is not realistic to expect that those efforts will fully solve the problem. This is illustrated by the number of drivers who continue to drive without safety belts and the number of children who remain unrestrained, despite decades of efforts to encourage people to wear safety belts and use child restraints, and the existence of laws requiring such use in most states. Accordingly, it is also necessary for the agency to pursue technological changes.

Higher Deployment Thresholds—i.e., Increasing the Vehicle Speed at Which Air Bags Deploy. NHTSA has also considered whether vehicle manufacturers should be required to increase the minimum vehicle speed at which air bags deploy, and possibly have different deployment thresholds for the unbelted and belted conditions, as a short-term solution for reducing air-bag-induced fatalities and injuries. This would lessen the number of deployments at low speed where the possibility of serious injury for occupants (even unrestrained occupants) is small.[26]

As indicated above, CFAS and Public Citizen requested in their petition that, for vehicles without dual stage inflators, a minimum ''trigger speed'' of 10 mph barrier equivalent velocity (BEV) be set beginning with the 1998 model year for passenger cars and 1999 for light trucks. The CFAS petition submitted a few days earlier had suggested a 12 mph minimum deployment threshold. Mercedes Benz suggested in its comment on the August 1996 NPRM the possibility of using thresholds as high as 18 mph regardless of belt use, as a short-term means of addressing the problem of low speed fatalities to children.[27] NTSB recommended that the agency evaluate the effect of higher deployment thresholds for passenger air bags in combination with certain recommended changes in air bag performance certification testing, and then modify the deployment thresholds based on the findings of the evaluation. The Holden air bag, in addition to being designed to deploy less aggressively, has significantly higher thresholds than typical U.S. air bags. As noted above, Holden bags have a ''no-fire'' threshold of 12.4 mph and an ''always-fire'' threshold of 17.4 mph. While thresholds vary for U.S. air bags, a representative one has a ''no-fire'' threshold of 9 mph and an ''always-fire'' threshold of 14 mph.[28]

NHTSA stated in its August 1996 NPRM that it is interested in whether increasing the minimum vehicle speed at which an air bag deploys, and possibly having different deployment thresholds for the unbelted and belted conditions, may be an effective way to reduce air bag-induced injuries. An examination of the child fatalities that have occurred to date shows why such an increase might be effective.

Of the 32 crashes in which deployment of the passenger air bag caused a child fatality, NHTSA has, to date, analyzed the severity of 24 of those crashes. The estimated change in velocity (delta V) was 20 mph or less in 23 cases, 15 mph or less in 20 cases, and 10 mph or less in eight cases. For the remaining case in the group of 23, delta V was estimated at 20–25 mph. For an additional four cases, the agency did not estimate crash severity but did a damage estimate. Damage severity was low in three cases and moderate in the fourth. The remaining four cases out of the 32 crashes are still under investigation. These data suggest that a moderate increase in threshold could make a significant contribution to reducing child fatalities due to air bags.

NHTSA recognizes that there are many highly complex issues involved in selecting thresholds, including leadtime issues and safety tradeoffs. The agency recognizes that the use of a higher threshold, in combination with the mechanical crash severity sensors used by some vehicle manufacturers, could delay the signal to inflate and thus provide less time for the air bag to deploy, and possibly necessitate even more aggressive air bag deployments. NHTSA believes this problem could be addressed by adding an additional mechanical sensor, but that would involve a hardware change and require additional leadtime. The agency believes that the leadtime to achieve universal usage of electronic sensors would be at least two years. For vehicles which already have electronic sensors, there would be a shorter leadtime for increasing thresholds.

Additional tradeoffs involve the possibility of increased non-fatal injuries. Auto manufacturers have stated that selection of thresholds is typically based on their analysis of the crash severity at which serious facial, head, and brain injuries may occur. However, the agency believes that current steering assembly designs might permit thresholds to be increased without affecting the risk of facial fractures.

NHTSA believes that manufacturers could significantly increase deployment thresholds and still comply with the current requirements of Standard No. 208, although the agency does not have specific information concerning how high. Standard No. 208 does not specify a threshold requirement but does require vehicles to pass crash test requirements at speeds up to 30 mph. The agency believes that most, and perhaps all current vehicles could

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[26] As part of a comprehensive rulemaking on automatic restraints (then called ''passive restraints''), in 1970 NHTSA proposed to require that air bags not deploy when the vehicle impacts a fixed barrier at any velocity less than 15 miles per hour, at any angle. 35 Fed. Reg. 16937, at 16938; November 3, 1970. However, after considering opposing comments from vehicle manufacturers, the agency did not adopt this requirement because it determined that it was preferable to allow manufacturers freedom in the design of their protective systems at all speeds. 36 Fed. Reg. 4600, at 4602; March 10, 1971.

[27] That company currently uses a threshold of 12 mph for unbelted occupants and 18 mph for belted occupants. If no occupant is present, the air bag does not deploy, regardless of the speed.

[28] The agency notes that regardless of what nominal design threshold is selected by a manufacturer, some deployments will occur at speeds below that nominal value, and some air bags will not deploy at speeds slightly above that value. The range of delta V's at which a particular air bag may either deploy or not deploy is dependent on a number of factors, including manufacturer efforts to fine-tune the deployment decision to reflect different crash conditions with the same delta V, and variability inherent in air bag designs.

probably pass the unbelted crash test requirements without air bags at speeds as high as 16 mph. Therefore, for manufacturers with the capability of increasing thresholds quickly, the necessity of meeting the injury criteria at speeds below the higher thresholds does not appear to be an impediment. The agency requests comments on whether this belief is correct.

NHTSA notes that mandating a minimum deployment threshold would be design-restrictive and could undermine the development of two-stage systems that could deploy ''softer'' air bags at lower speeds.

The agency requests commenters to provide analysis comparing the benefits/disbenefits and leadtime for increasing deployment thresholds versus depowering.

Dual Stage Inflators. Public Citizen and CFAS petitioned for the agency to amend Standard No. 208 to require dual stage inflation air bags beginning with the 1999 model year. The petitioners stated that dual inflation bags offer the best solution in the near future, as they neither surrender protection for adults in high-speed crashes, nor sacrifice low-speed crash protection for children. The petitioners asserted that inflator deployment and trigger speeds can be adjusted now without waiting until the 21st century for smart air bags that use infrared or sonic sensors to determine whether there is an out-of-position occupant.

NHTSA notes that the leadtime for implementing dual stage inflators is longer than for depowering. As indicated above, manufacturers can begin introducing depowered air bags in six to nine months and potentially complete their introduction of depowered air bags by a year later. Based on comments from suppliers, the earliest that dual stage inflators could begin to be implemented is for model year 1999, i.e., September 1998.

While the leadtime is longer, it appears that dual stage inflators could provide essentially all of the benefits associated with depowering, without raising the same possibility of safety tradeoffs. This is because such designs would in essence provide a ''depowered'' air bag for low to moderate speed crashes (and possibly all belted crashes), and a fully powered air bag to provide protection to unbelted occupants in higher speed crashes. The agency notes that dual stage inflators might qualify as smart air bags.

Other Air Bag-Related Changes, Not Including Smart Bags. In its November 1995 request for comments, the agency requested comments on many variables in air bag design and related vehicle design that can affect aggressivity. Variables related to air bag design include air bag volume, fold patterns, tethering, venting, mass/material, shape and size of air bag module opening, and module location and deployment path. Related vehicle design variables include such things as recessing the inflator/air bag in the steering wheel assembly or in the dash, pedal adjusters, and safety belt pretensioners. The agency notes that Holden safety belt systems use webbing clamps, which help reduce the payout and spooling of the webbing. In its August 2, 1996 comment, CFAS cited many of these variables (as well as ones discussed above in connection with its petitions) in arguing that other means of reducing air bag aggressivity should be used before manufacturers resort to decreasing the inflation rates.

NHTSA agrees that there are many variables besides inflator power which affect air bag aggressivity, including many cited by CFAS. Many of these changes already are being made. However, any currently unplanned changes relating to these other variables would generally require unanticipated hardware changes, which would take longer to implement than depowering. The agency believes that hardware changes require leadtimes of at least two years. In addition, the agency does not have information showing that these types of changes would be as effective as depowering in addressing child fatalities.

Smart Air Bags. NHTSA has similarly considered how quickly manufacturers could begin installation of smart air bags. As discussed above, the vehicle manufacturers have indicated that they plan to introduce these devices as soon as they become available. Several suppliers commenting on the August 1996 NPRM indicated that smart air bags can begin to be phased in beginning with the model year 1999 fleet, i.e., approximately September 1, 1998.

Tentative Conclusions about Alternatives. As the agency considers technological alternatives to address the adverse side effects of air bags, several things seem evident. First, for many vehicles, depowering has a shorter leadtime than any of the other alternatives. While manufacturers can begin introducing depowered air bag vehicles in six to nine months and potentially complete the depowering of the air bags in their vehicles within about a year after they begin introduction, dual level inflators and other smart air bags cannot begin to be phased in until at least September 1, 1998. The agency has less information on the leadtime for raising deployment thresholds, but it appears that it would take at least two years to switch from mechanical to electronic sensors.

Second, there are various alternatives that may be superior to depowering, i.e., alternatives that result in equal or greater benefits without raising the possibility of adverse safety tradeoffs, but whose leadtime is longer than that of depowering. Therefore, while depowering appears to be an appropriate short-term approach, there is no need for permanently changing the Standard to enable manufacturers to fully address the adverse side effects of air bags.

NHTSA also believes it is important to emphasize that a change in Standard No. 208 is not required to permit manufacturers to implement these other alternatives.[29] The agency expects to ultimately require smart air bags through rulemaking. In the meantime, the agency is not endorsing depowering over other solutions. Instead, the agency is proposing a regulatory change to add depowering to the alternatives available to the vehicle manufacturers to address this problem on a short-term basis. To the extent that manufacturers can implement superior alternatives for some vehicles, the agency would encourage them to do so.

Some commenters, including Takata, expressed concern that a reduction in Standard No. 208's performance requirements may delay the introduction of superior alternatives. NHTSA does not believe a short-term

[29] All of these various other alternatives, i.e., dual level inflators, smart air bags, higher deployment thresholds, and the replacement of mechanical sensors by electronic ones, are permitted by the existing provisions of Standard No. 208. The Standard already provides considerable design flexibility for manufacturers. The Standard's automatic protection requirements are performance requirements and do not specify the design of an air bag. Instead, vehicles must meet specified injury criteria, including criteria for the head and chest, measured on properly positioned test dummies, during a barrier crash test, at speeds up to 30 mph.

While the Standard requires air bags to provide protection for properly positioned occupants (belted and unbelted) in relatively severe crashes, and very fast air bags may be necessary to provide such protection, the standard does not require the same speed of deployment in the presence of out-of- position occupants, or even any deployment at all. Instead, the standard makes possible the use of dual or multiple level inflator systems and automatic cut-off devices for out-of-position occupants and rear-facing infant restraints. Concepts such as dual level inflator systems and devices that sense occupant position and measure occupant size or weight are not new, and were cited by the agency in its 1984 rulemaking. NHTSA also notes that Standard No. 208 does not specify a vehicle speed at which air bags must deploy, and that thresholds could be raised substantially for most current vehicles without creating a Standard No. 208 compliance problem. Therefore, regulatory changes are not needed to permit manufacturers to implement these solutions.

temporary amendment would result in such a delay. Instead, such an amendment would provide maximum flexibility to the vehicle manufacturers to address the problem, while they work on better solutions. Moreover, the agency's forthcoming proposal for smart air bags will seek to ensure that air bags reach their full fatality and injury reducing potential.

NHTSA recognizes, however, that its proposal to permit or facilitate depowering of air bags is on a faster track than the rulemaking to require smart air bags. Under the agency's rulemaking schedule, it plans to issue a final rule concerning depowering before a final rule to require smart air bags. Given that NHTSA contemplates permitting depowering until smart bags are introduced, the question arises of how the agency should limit the duration of the temporary amendment for depowering. One approach would be to specify a several year duration and revisit the issue in the context of the rulemaking on smart air bags. NHTSA requests comments on this issue.

The agency notes that Public Citizen and CFAS requested that the agency require dual stage inflators quickly rather than wait for more advanced smart air bags. The agency believes there is a consensus that smart air bags are needed to fully address the problem of child fatalities. The ''first'' stage of a dual stage inflator would be similar to depowered air bags in reducing but not eliminating the possibility of serious injury or fatality to an out-of-position child. In its August 1996 proposal, NHTSA noted that if it does decide to require smart passenger air bags, its leadtime decision would have to take into consideration the differing leadtimes for the various kinds of smart bags under development, and the fact that the longest leadtimes will be those for the more advanced smart bags potentially offering the greatest net benefits. The agency also noted that, as a practical matter, the longer the time needed to develop and implement the most advanced smart bags, the greater the need would be to implement interim designs that would protect children automatically.

These same types of considerations are relevant to the Public Citizen/CFAS request. If the ultimate result is for the vehicle manufacturers to add smart air bags to their fleets, the agency believes that the quickest and most efficient way of accomplishing this task would be to go directly to smart air bags, which may include dual stage inflators.

NHTSA requests commenters to address how the agency should consider this factor in reaching a final decision on this proposal. The agency also requests the vehicle manufacturers to provide their latest timetables for implementing measures that will enable them not only to solve the problem of the adverse side effects of air bags, but also to meet the current unbelted requirements of Standard No. 208, i.e., 60 g chest acceleration, 1000 HIC, etc.

With respect to Advocates' recommendation that the agency not predicate major regulatory changes on anything less than clear and convincing evidence that a modification will improve safety, NHTSA agrees that caution should be exercised in making a regulatory change. This is why the agency initiated its test program to evaluate various issues related to addressing the problem of low speed air bag fatalities and injuries, including the potential safety benefits and trade-offs associated with depowering air bags. NHTSA also believes, however, that it has a duty to act to address this problem, and promote the long term interests of safety, even in the presence of the possibility of short-term tradeoffs and inevitable remaining uncertainties about the various approaches and alternatives.

E. Effective Date and Comment Period

The proposed amendment might be major and thus subject to Congressional review under the provisions in Title 5 of the United States Code concerning Congressional review of agency rulemaking. If the amendment is major, the agency requests comments on whether the amendment should be make effective immediately upon publication because it addresses an urgent safety problem, most particularly the death of young children. The proposed amendment would permit or facilitate the immediate depowering of air bags, thereby helping to reduce child fatalities from air bags. The proposed amendment would not impose any new requirements, but instead would provide additional flexibility to manufacturers in addressing this problem.

Given the importance of enabling manufacturers to address this urgent safety problem quickly, NHTSA is providing a shortened comment period of 30 days.

F. Relationship to Other Actions

NHTSA invites commenters to address whether and how any of the other actions being taken by the agency to address adverse effects of air bags should affect its decision concerning this proposal.

VI. Response to AAMA and CFAS Petitions

This notice constitutes a granting of AAMA's petition for rulemaking. The agency is proposing the AAMA sled test as one of the alternative amendments in this rulemaking. The agency will consider AAMA's request for rulemaking concerning out-of-position occupants in the context of the anticipated SNPRM concerning smart air bags.

The agency is addressing the request of Public Citizen and CFAS concerning deployment thresholds in the context of this rulemaking. Accordingly, it considers them to have been granted to the extent that this notice analyzes and discusses thresholds and subjects that material to public comment.

VII. Granting of Petition for Use of 5th Percentile Female Dummy

NHTSA has decided to grant a petition submitted by Anita Glass Lindsey on September 1, 1996, to amend Standard No. 208 to specify use of the 5th percentile female test dummy in testing vehicles for compliance with the standard's air bag requirements. The purpose of the amendment would be to provide greater assurance of the safety of short-statured women. The agency notes that the existing 5th percentile female dummy may need further refinement before it is suitable as a device for measuring air bag performance. Further, the simple addition of this dummy to the standard would not likely have a significant effect on air bag design or performance. To have such an effect, the addition would have to be coupled with the adoption of neck injury criteria. Currently, there are no neck injury criteria for the 50th percentile male dummy used in air bag testing, although proposed criteria are included in this notice.

The agency contemplates initiating a new rulemaking proceeding in the future to propose the adoption of the 5th percentile female dummy and to specify injury criteria, including neck injury criteria, suitable for that dummy.

VIII. Rulemaking Analyses and Notices

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

NHTSA has considered the impact of this rulemaking action under Executive Order 12866 and the Department of Transportation's regulatory policies and procedures. This rulemaking document was reviewed by the Office of Management and Budget under E.O. 12866, ''Regulatory Planning and Review.'' This action has been

determined to be ''significant'' under the Department of Transportation's regulatory policies and procedures. The action is considered significant because of the degree of public interest in this subject.

The proposed amendments would not impose any new requirements or costs, but instead permit or facilitate approximately 20 to 35 percent depowering of current passenger air bags. Any cost difference between baseline and depowered air bags would be negligible.

A full discussion of costs and benefits can be found in the agency's regulatory evaluation for this rulemaking action, which is being placed in the docket.

B. Regulatory Flexibility Act

NHTSA has considered the effects of this rulemaking action under the Regulatory Flexibility Act (5 U.S.C. § 601 *et seq.*) I hereby certify that the proposed amendment would not have a significant economic impact on a substantial number of small entities. NHTSA notes that the cost of new passenger cars or light trucks would not be affected by the proposed amendment.

The following is NHTSA's statement providing the factual basis for the certification (5 U.S.C. § 605(b). The proposed amendment would primarily affect passenger car and light truck manufacturers and manufacturers of air bags. The Small Business Administration's regulations at 13 CFR Part 121 define a small business, in part, as a business entity ''which operates primarily within the United States.'' (13 CFR § 121.105(a)).

SBA's size standards are organized according to Standard Industrial Classification codes (SIC). SIC Code 3711 ''Motor Vehicles and Passenger Car Bodies'' has a small business size standard of 1,000 employees or fewer. SIC Code 3714 ''Motor Vehicle Parts and Accessories'' has a small business size standard of 750 employees or fewer. NHTSA believes air bag manufacturers would fall under SIC Code 3714.

For passenger car and light truck manufacturers, NHTSA estimates there are at most five small manufacturers of passenger cars in the U.S. Because each manufacturer serves a niche market, often specializing in replicas of ''classic'' cars, production for each manufacturer is fewer than 100 cars per year. Thus, there are at most five hundred cars manufactured per year by U.S. small businesses.

In contrast, in 1996, there are approximately nine large manufacturers manufacturing passenger cars and light trucks in the U.S. Total U.S. manufacturing production per year is approximately 15 and a half million passenger cars and light trucks per year. NHTSA does not believe small businesses manufacture even 0.1 percent of total U.S. passenger car and light truck production per year.

For air bag manufacturers, NHTSA does not believe that there are any small manufacturers of air bags. A separate subsidiary (of a large business) set up to manufacture air bags would not be considered a small business because of SBA's affiliation rule under 13 CFR § 121.103.

C. National Environmental Policy Act

NHTSA has analyzed this proposed amendment for the purposes of the National Environmental Policy Act and determined that it would not have any significant impact on the quality of the human environment.

D. Executive Order 12612 (Federalism) and Unfunded Mandates Act

The agency has analyzed this proposed amendment in accordance with the principles and criteria set forth in Executive Order 12612. NHTSA has determined that the proposed amendment does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

In proposing this amendment to permit or facilitate depowering, the agency notes, for the purposes of the Unfunded Mandates Act, that is pursuing the least cost alternative. As noted above, any cost difference between current and depowered air bags is expected to be negligible. This alternative was tentatively selected by NHTSA because depowering would prevent many of the air bag related fatalities that have been occurring and can be implemented more quickly than the other alternatives. Further, depowering is the measure that industry itself has been recommending as a means for preventing those fatalities.

E. Civil Justice Reform

This proposed amendment would not have any retroactive effect. Under 49 U.S.C. 30103, whenever a Federal motor vehicle safety standard is in effect, a State may not adopt or maintain a safety standard applicable to the same aspect of performance which is not identical to the Federal standard, except to the extent that the state requirement imposes a higher level of performance and applies only to vehicles procured for the State's use. 49 U.S.C. 30161 sets forth a procedure for judicial review of final rules establishing, amending or revoking Federal motor vehicle safety standards. That section does not require submission of a petition for reconsideration or other administrative proceedings before parties may file suit in court.

IX. Request for Comments

Interested persons are invited to submit comments on this proposal. It is requested but not required that 10 copies be submitted.

All comments must not exceed 15 pages in length (49 CFR 553.21). Necessary attachments may be appended to these submissions without regard to the 15-page limit. This limitation is intended to encourage commenters to detail their primary arguments in a concise fashion.

If a commenter wishes to submit certain information under a claim of confidentiality, three copies of the complete submission, including the purportedly confidential business information, should be submitted to the Chief Counsel, NHTSA, at the street address given above, and seven copies from which the purportedly confidential information has been deleted should be submitted to the NHTSA Docket Section. A request for confidentiality should be accompanied by a cover letter setting forth the information specified in the agency's confidential business information regulation. 49 CFR Part 512.

All comments received by NHTSA before the close of business on the comment closing date indicated above will be considered, and will be available for examination in the docket at the above address both before and after that date. To the extent possible, comments filed after the closing date will also be considered. Comments received too late for consideration in regard to this action will be considered as suggestions for further rulemaking action. Comments will be available for inspection in the docket. The NHTSA will continue to file relevant information as it becomes available in the docket after the closing date, and recommends that interested persons continue to examine the docket for new material.

Those persons desiring to be notified upon receipt of their comments in the rules docket should enclose a self-addressed, stamped postcard in the envelope with their comments. Upon receiving the comments, the docket supervisor will return the postcard by mail.

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, Rubber and rubber products, Tires.

In consideration of the foregoing, NHTSA proposes to amend 49 CFR Part 571 as follows:

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for Part 571 of Title 49 would continue to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117, and 30166; delegation of authority at 49 CFR 1.50.

Alternative One

Amendments to Regulatory Text That is Currently in Effect

2. Section 571.208 would be amended by revising S6.1.3 and S6.2.3 to read as follows:

§ 571.208 Standard No. 208, Occupant crash protection.

* * * * *

S6.1.3 The resultant acceleration at the center of gravity of the upper thorax shall not exceed 60 g's, except for intervals whose cumulative duration is not more than 3 milliseconds. However, for vehicles manufactured after [date 30 days after publication of final rule in the FEDERAL REGISTER] and before [date would be selected for final rule], the acceleration limit is 80 g's, instead of 60 g's.

* * * * *

S6.2.3 The resultant acceleration calculated from the output of the thoracic instrumentation shown in drawing 78051–218, revision R incorporated by reference in part 572, subpart E of this chapter shall not exceed 60 g's, except for intervals whose cumulative duration is not more than 3 milliseconds. However, for vehicles manufactured after [date 30 days after publication of final rule in the FEDERAL REGISTER] and before [date would be selected for final rule], this acceleration limit is 80 g's, instead of 60 g's.

* * * * *

3. Section 571.208 would be amended by adding Appendix A at the end of the section to read as follows:

Appendix A to § 571.208, Standard No. 208

For vehicles manufactured after [date 30 days after publication of final rule in the FEDERAL REGISTER] and before [date would be selected for final rule], NHTSA will consider engineering analyses indicating that a vehicle will pass the unbelted test requirements with an air bag as sufficient to establish that the vehicle's manufacturer exercised due care to ensure that the vehicle conforms with the requirement, even in the absence of confirming crash testing.

Amendment to Regulatory Text That Would Become Effective September 1, 1997

4. Section 571.208 would be amended by revising S6.3 to read as follows:

§ 571.208 Standard No. 208, Occupant crash protection.

* * * * *

S6.3 The resultant acceleration calculated from the output of the thoracic instrumentation shown in drawing 78051–218, revision R incorporated by reference in part 572, subpart E of this chapter shall not exceed 60 g's, except for intervals whose cumulative duration is not more than 3 milliseconds. However, for vehicles manufactured after [date 30 days after publication of final rule in the FEDERAL REGISTER] and before [date would be selected for final rule], this acceleration limit is 80 g's, instead of 60 g's.

* * * * *

Alternative Two

5. Section 571.208 would be amended by revising S3 to read as follows:

S3. *Application.* This standard applies to passenger cars, multipurpose passenger vehicles, trucks, and buses. In addition, S9., *Pressure vessels and explosive devices,* applies to vessels designed to contain a pressurized fluid or gas, and to explosive devices, for use in the above types of motor vehicles as part of a system designed to provide protection to occupants in the event of a crash. Notwithstanding any language to the contrary, any vehicle manufactured after [date 30 days after publication of final rule in the FEDERAL REGISTER] and before [date would be selected for final rule] that is subject to a dynamic crash test requirement conducted with unbelted dummies may meet the requirements specified in S13 instead of the applicable unbelted requirement.

6. Section 571.208 would be amended by adding S13 through S13.2 to read as follows:

S13 *Alternative unbelted test for vehicles manufactured before [date would be selected for final rule].*

S13.1 *HYGE Sled—Crash Simulation Test.* Applying the appropriate conditions of S8, mount the vehicle, or a sufficient portion of the vehicle to be representative of the vehicle structure, on a dynamic test platform at the manufacturer's design attitude, so that the longitudinal center line of the vehicle is parallel to the direction of the test platform travel and so that movement between the base of the vehicle and the test platform is prevented. The test platform is instrumented with an accelerometer and data processing system having a frequency response of 60 Hz channel class as specified in SAE Recommended Practice J211 (MAR 95), ''Instrumentation for Impact Tests.'' The accelerometer sensitive axis is parallel to the direction of test platform travel. The test is conducted at any velocity change up to and including 30 mph with acceleration of the test platform shown by the curve in Figure 6. An inflatable restraint is to be activated at 25 ±2 ms after initiation of the acceleration shown in Figure 6. The test dummy specified in S8.1.8, placed in each front outboard designated seating position as specified in S11, shall meet the injury criteria of S6.1, S6.2, S6.3, S6.4 and S6.5 of this standard.

13.2 *Neck injury criteria.* A vehicle certified to this alternative test requirement shall, in addition to meeting the criteria specified in S13.1, shall meet the following injury criteria for the neck in the unbelted sled test:

(a) Flexion Bending Moment—190 Nm. SAE Class 600.

(b) Extension Bending Moment—57 Nm. SAE Class 600.

(c) Axial Tension—3300 peak N. SAE Class 1000.

(d) Axial Compression—4000 peak N. SAE Class 1000.

(e) Fore-and-Aft Shear—3100 peak N. SAE Class 1000.

7. Section 571.208 would be amended by adding Figure 6 to read as follows:

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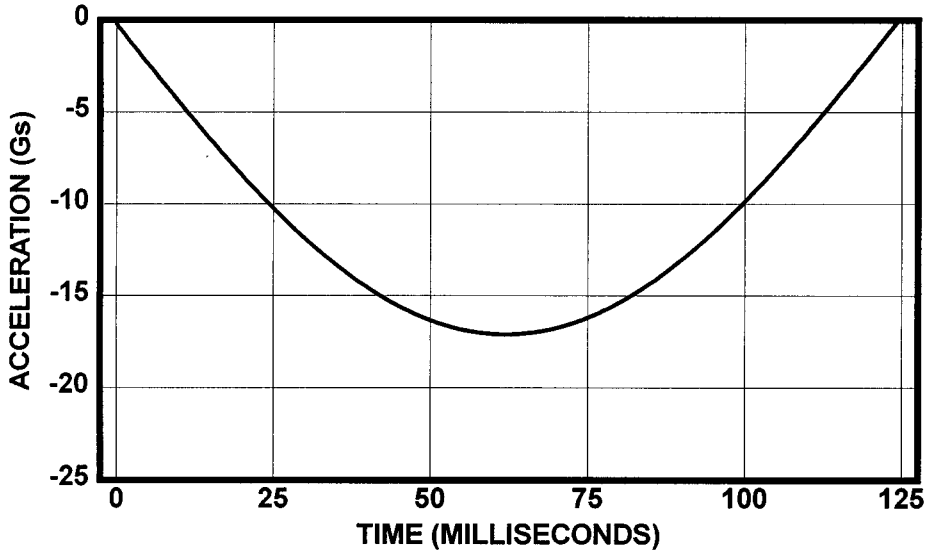

FIGURE 6. Sled test pulse.

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L. Robert Shelton,

Associate Administrator for Safety Performance Standards.

Appendix—Past Public Comments Related to Depowering Air Bags

Note: This appendix will not appear in the Code of Federal Regulations.

While NHTSA has not issued a specific proposal concerning depowering air bags, it did request comments on this subject in both the November 1995 request for comments and the August 1996 NPRM. This section provides a summary of comments relating to depowering (or downloading) air bags, including comments recommending alternative short-term approaches. The agency notes that the views expressed on the November 1995 request for comments may in some instances be dated, since considerable research has been conducted in this area since then.

A. November 1995 Request for Comments

A number of commenters addressed the issue of depowering air bags, primarily in the context of either a recommendation that Ford made to reduce the test speed for Standard No. 208's unbelted test from 30 mph to 25 mph, or the possibility of raising the limit on chest g's from 60 to 80. The agency specifically requested comments on the possibility of such an increase. A number of commenters, including many vehicle manufacturers (Chrysler, Ford, BMW, Volkswagen, Porsche, and Toyota), an air bag supplier (Autoliv Development AB), and IIHS, expressed support for Ford's recommendation. These commenters stated that this change would allow a reduction of approximately 30 percent in the kinetic energy required in the air bag system, and that lower kinetic energy in the air bag would lower the risk of air bag-induced injuries to vehicle occupants.

GM commented that it agreed with the theory of the Ford recommendation and said that it was ''directionally correct.'' However, GM said that it has not been shown that a reduction in the unbelted test speed to 25 mph would allow manufacturers to reduce the kinetic energy in air bag systems enough to influence the actual frequency of air bag-induced injuries to vehicle occupants. Nissan went further, saying that it would not anticipate any major changes in air bag deployment specifications because of a reduction in the unbelted test speed from 30 to 25 mph. Nissan suggested that the unbelted test speed would have to be reduced to 20 mph to reduce the risk of air bag-induced injuries in the real world.

BMW enthusiastically supported the concept of raising Standard No. 208's chest g limit, but suggested that the limit be raised to 75 g's. If this were done, BMW said it would attempt to recertify all of its vehicles with less aggressive air bags within one year.

GM said an 80 g limit would not appear likely to permit any appreciable reduction in inflator output, so GM doubted it would reduce significantly the potential for air bag-induced injuries. Ford said such a change might permit reductions in air bag aggressivity, but to a much less significant extent than under its recommendation. Chrysler stated that it could not comment on an 80 g limit because it had no data to analyze the effects of such a change.

In a presentation to the agency and supplemental comment submitted after the comment closing date, GM suggested an alternative regulatory change that it argued would be effective at reducing air bag-induced injuries. GM suggested keeping the unbelted testing speed at 30 mph, but adopting a crash pulse to ''better reflect'' the crash pulse in real world crashes and using a sled test for unbelted testing. This concept ultimately became the basis of the petition for rulemaking submitted by AAMA in August 1996.

No manufacturer argued that depowering air bags would totally solve the adverse effects associated with children. In commenting on the November 1995 request for comments, GM provided the results of a depowered air bag inflator study. Based on that study, GM concluded that depowered inflators are ''directionally correct,'' but that deactivation is needed to meet injury assessment reference values for passengers who are at or near the instrument panel. This was said to be particularly true for children, because of their lower injury tolerance.

Not all commenters believed that Standard No. 208 should be changed. Takata Corporation (Takata), an air bag manufacturer, argued that restraint

system technology that has recently become available, combined with further improvements that are scheduled to be available within the next 24 months (i.e., by approximately the beginning of 1998), will significantly reduce air bag injuries without the need for any changes to Standard No. 208. Takata stated that it is concerned that the process of developing improved technology to eliminate air bag injuries will be delayed if Standard No. 208 is changed in response to the present concerns.

Advocates opposed reducing Standard No. 208's unbelted test speed. That organization claimed that there are several flaws in the Ford recommendation. According to Advocates, altering the inflation rate of air bags may only address a portion of the problem, may not make any difference at all, or may even create other safety concerns. Advocates also stated that the Ford recommendation is based entirely on static computer modeling that is limited to a single variable, air bag inflator rise rates, and that the recommendation is modeled on only an adult driver. Advocates stated that NHTSA should be reluctant to predicate major regulatory changes on anything less than clear and convincing evidence that a modification will improve safety.

Center for Auto Safety (CFAS) submitted a comment in August 1996 expressing a variety of concerns about the Ford recommendation, and arguing that other means of reducing air bag aggressivity should be used before manufacturers resort to decreasing the inflation rates. CFAS also stated that initial analysis of the limited data available strongly suggests that if NHTSA does anything, it should set a minimum threshold speed below which an air bag should not deploy.

Mercedes Benz suggested that, as a short-term solution, the agency consider higher deployment thresholds, as well as the use of weight sensors (a type of smart air bag) for passenger air bags. Mercedes noted that it currently uses a 12 mph delta V threshold for unbelted occupants, and an 18 mph delta V threshold for belted occupants. That company indicated that it could use the 18 mph delta V threshold for all occupants. Mercedes asserted, however, that this would not currently be permitted by Standard No. 208. [1]

[1] Mercedes did not explain the basis for this assertion. The Standard does not expressly prohibit such a threshold. Further, with appropriate interior design, including energy absorbing materials, it should be possible to meet the Standard's performance criteria.

B. August 1996 NPRM

As discussed above, subsequent to the agency's publication of the August 1996 NPRM, but before the comment closing date, AAMA submitted a petition for rulemaking concerning depowering air bags. AAMA requested that NHTSA immediately announce, by means of a ''direct final rule,'' an amendment to Standard No. 208 to replace the current 30 mph unrestrained dummy barrier crash test requirement with a ''standard 30 mph unrestrained dummy sled test'' requirement. The petitioner contended that the standard's current requirement ''directly dictates the level of the air bag's inflator power and it is the level of inflator power that unnecessarily increases the risk of injury to vehicle occupants during air bag deployment.''

AAMA and each of its member companies cited the AAMA petition in their comments on the August 1996 NPRM and urged that the agency favorably respond to the petition.

The Association of International Automobile Manufacturers (AIAM) stated that until smart air bag systems are available and become widespread in the fleet, it believes that Standard No. 208 should be changed to modify or eliminate the 30 mph unbelted occupant protection requirement so that air bags could be made less aggressive. That organization stated that not only would this allow less aggressive air bags with less risk to out-of-position occupants, but also it would allow manufacturers to provide better occupant protection for belted occupants through such things as a combination of depowered air bags and other restraint system enhancements. AIAM stated that unbelted occupants would still have the benefits of air bag protection and a lowered risk of out-of-position injury in many frontal crashes.

Honda stated that it believes the passenger air bag system in its vehicles is presently one of the least aggressive relative to the air bags on other cars in North America. That company stated, however, that still lower inflator output is necessary to ensure reduction of the aggressiveness of the passenger air bag. Honda stated that if Standard No. 208 were amended to eliminate unbelted testing or to reduce the crash test speed, inflator output could be adjusted accordingly, reducing the risk of air bag induced injury to out-of position or unbelted occupants.

Takata stated again that it strongly urges NHTSA not to tamper with the 30 mph unbelted barrier test as a short-term expedient to reduce the risk of air bag injuries to children. That company stated that it does not believe this would produce a sufficient reduction in the risks to children to jeopardize the proven life saving benefits of air bags in high speed crashes.

The Insurance Institute for Highway Safety (IIHS) stated that although changes in the unbelted test requirements in Standard No. 208 alone will not eliminate all the air bag related fatalities, less aggressive inflators have the potential to reduce the risk for infants and children as well as for adults. That organization stated that as other air bag technology evolves to permit variable levels of protection based on crash severity and occupant characteristics, it will be possible to further enhance protection for unbelted occupants over a wide range of crash severities. IIHS stated that, in the meantime, the first and immediate step NHTSA could take would be to make appropriate changes to Standard No. 208 that would allow manufacturers to reduce the energy in current air bag systems.

The National Association of Independent Insurers (NAII) stated that it believes changing the unbelted test requirements in Standard No. 208 to permit less aggressive inflators should be a central part of NHTSA's efforts to encourage smart systems, and cited concerns expressed by IIHS.

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49 CFR Part 595

[Docket No. 74–14; Notice 107]

RIN 2127–AG61

Air Bag Deactivation

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: As part of its efforts to address the problem of the adverse effects of current air bag designs on children and certain adults, NHTSA is issuing this proposal to make it possible for vehicle owners to have their air bags deactivated by vehicle dealers and repair businesses.

Specifically, the agency is proposing to allow dealers and repair businesses, upon written authorization of a vehicle owner, to deactivate either the passenger-side air bag, the driver-side air bag, or both. Dealers and repair businesses are statutorily prohibited from making Federally required safety equipment inoperative, but NHTSA may exempt them from the prohibition in appropriate circumstances. In order to