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Side Impact Protection, Notice of Proposed Rulemaking, 69 FR 27990 *et seq.*, May 17, 2004

I. Introduction and Summary.

Advocates for Highway and Auto Safety (Advocates) is pleased to submit the following comments supporting the National Highway Traffic Safety Administration's (NHTSA) proposal to upgrade the protection afforded passenger vehicle occupants when their vehicles suffer side impact crashes.¹ Advocates supports most of the features of this proposed rule because many of the amendments to Federal Motor Vehicle Safety Standard No. 214 advanced by the agency in this action will clearly increase the safety of the traveling public.

However, NHTSA has failed in several major ways to grasp important opportunities to further ensure prevention of injuries and deaths from side impact crashes. One important aspect of this failure is NHTSA allowing some unacceptable features of the current regulation to persist unchanged. One of the unacceptable parts of current Standard No. 214 is the agency's proposal to continue to allow the doors of impacted vehicles both in real-world crashes and in compliance tests using the proposed 10 inches wide rigid vertical pole to unlatch and open as long as these struck doors do not fully separate from their vehicles. When viewed against the agency's lowest level of regulatory compliance through the use of combination head-thorax 2-sensor bags for which NHTSA claims no ejection prevention benefits, this feature of the proposed regulation allows occupant ejections to continue in side impact crashes.² The failure of

¹ Although Advocates is aware that NHTSA's policy is to limit public comments on public dockets to 15 pages (49 CFR § 553.21), the high importance and complexity of this major agency regulatory proposal requires a detailed response addressing several technical areas of occupant protection that cannot be accommodated within the 15 pages limit. Advocates accordingly asks the agency to allow us to submit these comments that exceed the page limit.

² NHTSA notes that of the 5,400 ejection fatalities through front side windows alone, about 2,200 are from partial ejection and can occur even from partial ejection by belted occupants. 69 FR 27990. Doors that are

NHTSA to ensure anti-ejection measures in this rulemaking action strongly countermands the other, progressive aspects of the proposed rule.

NHTSA also fails to ensure adequate protection for rear seat occupants in the rulemaking proposal. Occupants of any size in rear seating locations are not guaranteed protection by dynamic systems in this rulemaking, neither thorax nor head protection. The proposed rule only requires front seat occupant protection indexed to 5th percentile female and 50th percentile male occupants. Manufacturers can comply with the use of the simplest air bag systems that only deploy for front seat occupants.

A corollary failure of the proposed rule in providing adequate rear seat occupant protection is the agency's proposal to continue the use of the current Moveable Deformable Barrier (MDB) test for side impact injury prevention for both front and rear seat occupants. Although NHTSA asks for comments on the need to change the design parameters of the MDB currently simulating most of the essential impact features of a mid-sized passenger car, the agency proposes no change in the MDB which it intends to keep as a separate compliance test in Standard No. 214 as currently set forth in the Code of Federal Regulations. This continuation of the *status quo* on MDB design and performance is unacceptable because it essentially consigns rear seat passengers to substantially inferior side impact protection for both their thoraxes and their heads.

The existing MDB test can only show rear passenger occupant protection needs for the thorax.³ It cannot demonstrate the impact effects of heavy, tall, stiff light trucks and vans (LTVs) directly causing head injuries in rear seat passengers, both for children and adults. Because NHTSA intends to require improved occupant protection from head trauma only for front seat occupants in this rulemaking proposal, this failure to show how large LTVs inflict head injuries on rear seat passengers is a major failure of this regulatory action.

Essentially, as we discuss later in more detail, NHTSA has foresworn required rear seat passenger protection provided by dynamic protection countermeasures. Continuing use of the existing Standard No. 214 test protocol for rear seat passengers along with adoption of the proposed oblique angle vertical pole impact only for the purpose of requiring air bags for front seat occupants, allows rear seat occupants to be protected with only static countermeasures such as padding. Although upper interior head impact injury prevention is still required by Standard No. 201 for rear seat passengers, rear seat occupants in this rulemaking proposal are essentially excluded from superior injury and lifesaving dynamic technologies for both upper and lower interior side impact protection. This exclusion has been proposed by the agency despite the fact that NHTSA itself amply documents both in the preamble and in the accompanying Preliminary Economic Assessment (PEA) (May 2004) that dynamic protection provided

allowed to open in side impacts with poles and trees will result in fatalities exceeding this quote figure because even belted occupants will be partially ejected outside the vehicle envelope, even striking the intruding fixed object hazards and inflicting severe and lethal head injuries.

³ Most importantly, this MDB test can be met with only the installation of padding rather than dynamic safety technologies.

by air bags prevents more serious injuries both to the thorax and to the head than can be provided by any currently implemented system of static countermeasures such as padding.

Accordingly, Advocates cannot support maintenance of the *status quo* for the MDB-based impact test in Standard No. 214 that only demonstrates rear seat occupant thorax injury responses to vehicle side impacts. Although NHTSA proposes adding a head injury measure to the current Standard No. 214 MDB test, the agency should consider a more demanding MDB design that appropriately simulates a tall, heavy, stiff LTV striking the sides of passenger vehicles. If NHTSA does not extend the proposed oblique pole test to rear seating areas in passenger vehicles, only a MDB-based test that actually results in head injury, including head injury that is produced by an intruding vehicle, is worthwhile in connection with adding a head injury measure and criterion to the current Standard No. 214 dynamic test. A test that uses a MDB simulating a tall, stiff, heavy LTV will effectively require manufacturer head impact countermeasures based on dynamic protection systems for rear seat passengers. Without this regulatory response to a clear area of need in injury prevention, NHTSA's combined approach in this rulemaking of a demanding pole test aimed, at a minimum, towards requiring air bags only for front seat occupants with the continuation of the existing Standard No. 214 MDB compliance test, effectively amounts to the agency simply turning a blind eye towards head injury prevention for rear seat occupants. Although a review of the agency's PEA makes it apparent that NHTSA has forged this regulatory proposal under stringent economic constraints, this cannot excuse the agency from such a wholesale abandonment of rear seat occupant protection to static countermeasures for head protection that NHTSA itself has shown to be inadequate to the task of preventing serious head trauma.

Perhaps even more serious is the agency's failure to protect children in side impact crashes. Even if manufacturers choose voluntarily to supply air curtain systems with thorax bags for front seat occupants and air curtains without thorax bags for rear seat occupants, these systems will not reach down far enough to prevent head injury in smaller children regardless of whether they are in front or rear seats.⁴ This increased potential for injury to small children that is unprotected even by air curtains also includes potential excursion of the heads of small children through side windows resulting in direct contact with impacting and intruding vehicles and fixed object hazards.

Although NHTSA has consistently counseled parents and other childcare guardians for years to place small children in rear seats, NHTSA has proposed the

⁴ "Children (0-12 years old) were excluded from the benefit analysis because the majority of the current head air bag systems would not span either forward or low enough, specifically the air chambers * * * to provide a sufficient contact surface with the head and other body regions." *Preliminary Economic Assessment: FMVSS No. 214 – Amending Side Impact Dynamic Test Adding Oblique Pole Test*, Office of Regulatory Analysis and Evaluation: Planning, Evaluation, and Budget, May 2004 (hereafter: PEA), p. V-6. As noted later in these comments, that failure to provide dynamic protection for children regardless of seating location (except for possible thorax bag protection in the right front passenger seat) combined with allowing struck doors to open in lateral impacts in the proposed pole test allows children to be subject to a much higher risk of ejection than adult occupants.

ultimate safety policy paradox in this rulemaking action by excluding small children from any side impact air bag protection in rear seating locations. This lack of protection for small children in side impact crashes is compounded by the agency's additional failure to ensure that small children at least have head protection even if they are placed in the right front passenger seat.

Advocates also strongly disagrees with the agency's various injury thresholds in this proposed rule for head and thoracic trauma. The proposed Abbreviated Injury Scale (AIS) criteria are too generous, particularly when they are viewed in relation to the much more serious motor vehicle trauma outcomes for elderly occupants.⁵ Although NHTSA has adopted its injury probabilities for these body regions for middle-aged 5th percentile female and 50th percentile male occupants, these injury criteria allow severe trauma outcomes for occupants more than 65 years of age.⁶ The agency is keenly aware that many side impact crashes resulting in only moderate injuries to occupants in their 40s and 50s often result in severe, life threatening and fatal injuries in older occupants.⁷ Given the enormous demographic bulge of people over the age of 65 that comprises a huge increase in both the numbers and percentage representation of older Americans currently underway in our country, these injury criteria fail to ensure that the much larger, growing population of older citizens using passenger vehicles will be protected from serious and lethal injuries when their vehicles suffer side impacts. In its essence, this rulemaking proposal is not adequately future-oriented to accommodate the need for protecting a rapidly growing population of older Americans suffering motor vehicle crash trauma.

In addition, this inadequate protection of older passenger vehicle occupants from side impact death and injury is set out in even starker relief by the continuing reliance of NHTSA on only the AIS system of injury quantification. The AIS system is an extremely short-term medical evaluation of injury that often bears little relationship to long-term injury outcomes, including long-range functional capacity outcomes, particularly for vehicle occupants who are older than 65. The AIS system also ignores comorbidity and the deleterious effects of pre-existing health conditions on outcomes. It is very common for older vehicle occupants suffering blunt trauma also to have pre-existing health conditions. Although NHTSA in the early 1990s began an attempt to create a functional capacity index to measure long-term outcomes of motor vehicle trauma, that effort was essentially abandoned.

⁵ Advocates is already on record with NHTSA in previous rulemaking actions on side impact protection both for upper interior occupant trauma (Standard No. 201) and lower interior trauma (Standard No. 214) as arguing for more stringent injury prevention criteria for the head, thorax, and pelvis. *See, e.g.*, Advocates' comments dated April 14, 1993, submitted to NHTSA Docket No. 92-28, Notice 02 (58 FR 7506 *et seq.*, February 8, 1993).

⁶ Although NHTSA's logistic regression analyses using cadaver injury and anthropometric calculations in relation to ES-2 measurements indicated that "the age of the subject at the time of death had a significant influence on the injury outcome ($p < 0.05$)," the agency does not sufficiently appreciate the need to use this finding as a premise for explicitly addressing the risk severity for older occupants (>65 years of age) in proposing the maximum injury values of the instant proposed rule. *See* 69 FR 28003, footnotes 36 and 37.

This rulemaking continues to demonstrate the weakness of an injury prevention approach that takes no notice of comorbidity and long-term trauma outcomes. The AIS system as used by NHTSA in injury prevention rulemaking selects different levels and risks of short-term injury for different body regions without any unifying, coordinated view of motor vehicle injury outcomes based on real-world, long-term trauma effects. The AIS system applied to each body region produces no view of injury effects when multiple injuries are sustained and their interactive effects increase both the severity and the long-term debilitation of the victim. This regulatory approach produces a fragmented, artificial profile of occupant injury tolerance to different body regions in actual lateral collisions. For older vehicle occupants, this inadequate injury measurement approach is even more exaggerated. The minimum compliance values for head, rib deflection (nine broken ribs threshold),⁸ abdominal, spinal, and pelvic injury (including pubic symphysis) underestimate serious injury potential for the oldest motor vehicle occupants in side impact crashes. Advocates will provide selected documentation of how NHTSA fails in this regulatory proposal to accommodate the injury prevention needs of the oldest motor vehicle occupants in side impacts.

Although these are Advocates' main misgivings about the adequacy of this proposed amendment of Standard No. 214, we support all of the other central features of the proposal. Although we will address each of these features below, we want to state our strong support for the basic approach of the proposed rule that includes the use of a rigid, vertical pole for side impact test compliance. This approach ensures that a very severe test protocol will simultaneously produce benefits for both LTVs and for passenger cars when they are laterally struck. The use of a pole ensures that both LTVs and passenger cars must demonstrate their ability to better protect front seat occupants when deformation and intrusion occur over the entire height of these vehicles.

With regard to the proposed pole test, Advocates agrees with the use of a 75 degrees impact angle rather than a 90 degrees angle as currently provided in the optional side impact test included in Standard No. 201. It is clear from the agency's analysis in the preamble that this is a more severe test of vehicle and occupant response than a 90 degrees impact. Advocates also strongly supports increasing the side impact test speed from 18 mph currently used in Standard No. 201 to 20 mph. At 75 degrees of impact angle with a pole that has theoretically infinite rigidity, this is a very severe test of vehicle side impact protection capabilities.⁹

Advocates also supports the use of the newest iteration of the Eurosid test device (ES-2re) to simulate a 50th percentile male occupant and the agency's Side Impact

⁸ See 69 FR 28002, footnote 33.

⁹ In this connection, Advocates would like to stress here that NHTSA has not discussed in this rulemaking proposal the possibility that manufacturers might stiffen the sides of target vehicles, especially the sills of passenger cars with unibody construction, in coordination with the use of upper and lower interior air bags to meet agency injury criteria for the various parts of the human anatomy. NHTSA needs to address this issue in its next rulemaking action on amending Standard No. 214 because it is possible that stiffening the sides of vehicles to better resist intrusion can increase the overall linear or longitudinal stiffness of some vehicles that commensurately increases their potential to inflict more harm on partner vehicles in front-to-front collisions.

Dummy (SID-IIsFRG) for a 5th percentile female.¹⁰ Both of these improved anthropomorphic test devices promise more refined injury measures that approximate actual trauma suffered by human occupants in passenger vehicle side impacts. We also support the proposed new seating positions for the pole impact compliance test, particularly seat positioning further forward for the 50th percentile male dummy to demonstrate vehicle and occupant impact responses to lateral hits that occur forward of the B-pillar. Finally, Advocates strongly supports the expansion of Standard No. 214 to include all passenger vehicles up to 10,000 pounds gross vehicle weight rating (GVWR). This action is necessary in light of head injuries inflicted on occupants of LTVs in side impacts with other LTVs and with rigid, vertical fixed object hazards as portrayed by NHTSA in this rulemaking.

II. Pole Test.

Current Standard No. 214 uses a relatively short MDB with little ground clearance. The mass, weight, front height, bumper height, and ground clearance of the current MDB essentially replicate a mid-size passenger car. Accordingly, the test at 33.5 miles per hour (mph) of the MDB impacting the side of a passenger vehicle 6,000 pounds or less fails to adequately demonstrate the infliction of head injuries in real-world side impact crashes by taller vehicles and objects.

Similarly, the mandatory compliance portion of Standard No. 201 is also a relatively undemanding test whose injury ceiling of HIC1000 can be met simply by the use of various static protection countermeasures, particularly nonreboundable foam and yielding plastic surfaces for vehicle pillars, rails, and headers. Subsequent to the adoption of Standard No. 201's upper interior impact protection features, NHTSA responded to petitions from vehicle manufacturers to permit the use of alternative upper interior side impact protection measures that rely on the deployment of dynamic systems of inflated bags, curtains, or tubes. However, this test is still inadequate for showing the actual forces that inflict head injuries in side impact crashes, especially those due to intruding LTVs with tall front profiles and vertical fixed-object hazards such as trees and poles.

The upper interior optional pole test in Standard No. 201 does not model real-world side impacts with narrow fixed objects occurring at oblique angles and is also not a severe enough test. The test also does not show the severe impact results of tall, stiff "bullet" vehicles striking other vehicles laterally that result in localized vehicle deformation and intrusion requiring protection for a wide range of occupant sizes over a considerably larger area than demonstrated by the optional pole test. Also, the Standard No. 201 compliance test involving a Free Motion Headform (FMH) striking a variety of forward and lateral upper interior targets, which is an optional compliance test for manufacturers choosing to use upper interior dynamic head impact protection technologies, does not demonstrate any effects of impacting and intruding outside objects or vehicles and is essentially unrealistic. Advocates does not believe that the optional

¹⁰ However, as we discuss later, we have misgivings about the disparities in injury measurement capabilities between the two dummies. This lack of measurement parity weakens the agency's case for the risk levels proposed in this rulemaking such as the inability of the SID-IIsFRG to measure chest deflection.

compliance tests in Standard No. 201 when upper interior dynamic protection systems are used provide a sufficient basis for calculating head trauma as a result of real-world lateral impacts either by vehicles or by fixed objects.

Advocates agrees with NHTSA that a new test that simultaneously demonstrates real-world crash forces in side impacts for both upper and lower interior occupant protection is needed because, taken together, the existing Standards, Nos. 201 and 214, are inadequate. Existing Standard No. 214 does not contemplate head injury and head protection, and the mandatory compliance scheme of Standard No. 201 does not replicate actual, severe side impact forces and vehicle intrusion that result in serious head injuries in side impacts. 69 FR 27990-27991.

NHTSA has proposed in this notice the use of a vertical, 10 inch diameter pole that will impact the front doors of passenger vehicles up to 10,000 pounds (4,536 kg) GVWR at 75 degrees and at 20 mph. The agency emphasizes that the majority of real-world lateral impacts with fixed object hazards do not occur at 90 degrees but in a range of oblique angles. *Id.* at 27990. In such oblique impacts, occupants are exposed both to longitudinal as well as lateral forces, unlike a 90 degrees impact. *Id.* The pole would have the same specifications as the one currently used in the optional vehicle-to-pole test specified in FMVSS No. 201. *Id.* at FR 27997-27998. The 5th percentile SID-II_sFRG would be positioned with the seat at its furthest forward travel and the 50th percentile ES-2re positioned at mid-track as currently required in Standard No. 214.¹¹ *Id.* at FR 27998.

Advocates strongly supports this compliance protocol. We do not support the agency's alternative consideration of a less demanding 18 mph test. *Id.* at 27997. The proposed test at 75 degrees at 20 mph with two different sized dummies in two different seating positions will ensure that responsive occupant protection systems for both smaller and larger adults must be dynamic designs (air bags) and also cover a wider area than many current generation air bag designs in order to meet the head and thorax protection needs of different sizes of adults. Also, an 18 mph test even at an oblique angle of impact might allow static systems of occupant protection to continue to be implemented by manufacturers because injury effects would be substantially reduced in comparison with a 20 mph test.

Advocates, however, continues to object to the exclusion of vehicles with no or removable doors from the newly proposed test compliance requirements. Vehicle manufacturers are allowed under this proposed exemption to simply avoid providing adequate side impact protection by producing vehicles with no or removable doors.

¹¹ Advocates agrees with the use of the Standard No. 214 seating position rather than the Standard No. 201 seating position for the ES-2re dummy because the oblique angle of the proposed vertical pole test ensures that most of any benefit that would be supplied from the B-pillar in preventing intrusion would be subtracted by a 75 degree impact angle. In this regard, although the agency had difficulty in consistently replicating dummy kinematics in a more severe, oblique angle impact such as 60 degrees, Advocates would support an impact angle more severe than 75 degrees. *See* 69 FR 27998-27999. This would ensure further reduction, if not complete nullification, of any benefit of the B-pillar in preventing pole intrusion when the ES-2re is used.

Advocates opposes exclusion of these vehicles both for thoracic and head injury measures in the final rule. We also oppose elimination of thoracic injury protection for convertibles. *Id.* at 27996 (fn17).

As we discussed in our introduction (*supra*), Advocates does not agree with restricting the pole test to only the reduction of front seat occupant injury. Either NHTSA must also require rear seat impacts with the new pole test or it must modify the current Standard No. 214 MDB so that both thorax and head injury is shown for rear seat occupants as well, and dynamic protection countermeasures implemented to prevent serious and lethal injuries, especially head trauma and chest deflection.

III. Dummies.

Advocates will not provide a detailed summary here of the design and performance features of the SID-IIsFRG and ES-2re dummies that NHTSA proposes to use in the 20 mph, 75 degrees impact angle pole test. However, we are compelled at the outset to state our misgivings over the lack of chest deflection measurement capability for the 5th percentile SID-IIsFRG female dummy because older, female drivers are overrepresented in this size range and can suffer especially severe and lethal chest injuries both with the proposed pole test as well as in the current Standard No. 214 MDB test.¹² *Id.* at 27992. This would become an especially acute issue given NHTSA's proposed improvements to the MDB test that would make it more stringent in providing chest protection for both 50th and 5th percentile occupants, including rear seat passengers.

Apart from this uncertainty about the 5th percentile dummy, Advocates supports the use of the two dummies especially because of the promise they have in ensuring superior front seat side impact protection even with the use of the simplest, two-sensor combination thorax-head air bags. Using two different sized dummies in two different seating positions (far forward and mid-track) will ensure that a wider range of adults are provided front seat side impact head and thorax protection. We also agree that the agency's modifications to the ES-2 to reduce rib binding with the backs of the front seats provide more realistic chest deflection measurements and avoid the previous flat-topping of sustained peaks. *Id.* at 27800. The resulting ES-2re has increased biofidelity.

Although NHTSA provides no discussion of its use of a different dummy architecture and performance response with its proposed 5th percentile SID-IIsFRG in relation to development of a dummy based on the ES-2re, Advocates believes that the agency eventually will have to move to the use of a unitary design for the anthropomorphic test devices in Standard No. 214. Advocates would appreciate a discussion of any agency's plan to consider a reduced scale ES-2re for representing 5th percentile female occupants or whether NHTSA is considering a modification to the SID-IIsFRG to somehow add chest deflection capabilities. Advocates would also like the

¹² See below Advocates' discussion of the very high morbidity and mortality rates for older vehicle occupants that result from chest deflection producing rib fractures. Also, older women are especially prone to high rates of osteoporosis that make them particularly susceptible to serious blunt trauma that result in life-threatening fractures that produce only moderate injuries in younger occupants.

agency to address the potential of using a child dummy developed to simulate an approximately 10 years old child in the rear seating position with the MDB test which Advocates also believes should be modified to represent a tall, stiff, heavy LTV weighing approximately 3,800 – 4,000 lbs. NHTSA currently has no test compliance means of determining side impact head and thorax injury for children in rear seating positions, especially children who no longer use child safety seats and who are beginning to use rear seats without boosters. Advocates does not believe that the agency should rely only on voluntary testing efforts by manufacturers to determine what responses should be required to increase side impact protection for children in outboard rear seating positions.

IV. Injury Criteria.

Advocates does not support any of the proposed injury criteria risk levels which we regard as allowing excessively high rates and severity of injuries in real-world side impacts. A baseline deficiency in NHTSA's proposed AIS risk levels for side impact injury for each of the body regions addressed in the preamble and accompanying PEA is the almost exclusive reliance by the agency on anthropomorphic test device (dummies) impact measurements and cadaver testing without sufficient comparison with actual patient trauma medicine outcomes. Most importantly, none of the major injury criteria in this proposal is evaluated for its predicted effects on AIS3+ injuries for vehicle occupants 65 years of age and older. Although NHTSA has normalized its side impact test findings to middle-age passenger vehicle occupants, this still dramatically underestimates the adverse effects of blunt trauma on occupants older than 65 in side impact crashes. The recently released AAA Foundation Study, *Older Driver Involvement in Injury Crashes in Texas – 1975-1999*¹³ found that the relative likelihood of death in intersection crashes for drivers 65 years of age and older was 1.78 times that of drivers aged 55-64 when crash type, population, sex, light conditions, and intersection relation were controlled for. Older drivers are especially susceptible to severe injury and death from side impact crashes because, apart from their increased morbidity and mortality in such crashes, they are overinvolved in right-angle intersection collisions. About one-third of the fatalities of older drivers occur at intersections, and this figure alarmingly jumps to more than 50 percent for drivers over the age of 80.¹⁴

Taylor *et al.* (2002) portrayed the toll of trauma for older patients and showed that they suffered much more severe consequences from the same sources of traumatic injury than younger patients.¹⁵ Age greater than 65 was associated with up to a threefold increased mortality risk in mild (Injury Severity Score (ISS) <15, 3.2 percent versus 0.4 percent), moderate (ISS \geq 15-29, 19.7 percent versus 5.4 percent), and severe traumatic

¹³ Lindsay I Griffin, III, *Older Driver Involvement in Injury Crashes in Texas – 1975-1999*, AAA Foundation for Traffic Safety, Washington, D.C., February 2004.

¹⁴ "Older Drivers Have Some Problems Negotiating Intersections," *Traffic Tech*: NHTSA Technology Transfer Series, No. 197, April 1999.

¹⁵ In fact, there is stark differential between return to "normal" life after trauma, especially polytrauma, for older as compared with younger persons. Young and Ahmad (1999) showed that there was a strong increase in mortality in hospitalized elderly trauma patients which, in most cases, was mainly due to multi-organ failure. However, only eight percent of older individuals who survived polytrauma returned to independent living one year later.

injury (ISS \geq 30, 47.8 percent versus 21.7 percent) compared with patients less than 65 years of age. In fact, this study goes beyond NHTSA's acknowledgement of an association between age and injury outcomes, and confirms age itself as an independent predictor of mortality in trauma after stratification for injury severity. This is the largest study of older trauma patients ever undertaken, involving a prospective collection of 26,237 blunt trauma patients admitted to all trauma centers in one state over a 24 months period in 1996-1997.

The AIS approach to injury as a basis for policy decisionmaking has several well-known drawbacks. Not only are long-term health outcomes ignored, particularly in relation to any evaluation based on functional capacity indices, but even short-term comorbidity is not accounted for in this trauma metric. This is especially true of elderly blunt trauma victims who often have more, and more serious, pre-existing health conditions that produce interactive effects on injury morbidity and mortality. Pre-existing health conditions, particularly for the elderly, play no part in agency safety policy choices based on the immediacy of AIS application in quantifying injury severity.

It is clear that NHTSA has failed in this proposal to adequately consider the separate injury effects of all of its proposed injury criteria on the oldest vehicle occupants, those 65 years of age and greater.¹⁶ Advocates regards all of the injury severity levels proposed by NHTSA as percentage risks indexed to AIS 3+ severity levels to be too high for all motor vehicle occupants, especially for older occupants.

Head Injury. NHTSA proposes a HIC₃₆1000 for head injury, the same standard as currently required to be met in Standard No. 201. Use of HIC₃₆1000 allows a 52 percent risk of AIS 3+ injury. *Id.* at 20002. Advocates regards this as far too high, and we again propose the use of HIC₃₆800 as we did several years ago when the agency proposed upper interior head impact protection in Standard No. 201.¹⁷ HIC800 should reduce the risk of AIS3+ injury to approximately 35 percent, a level that may still be too high. There is no substantive reason for the agency not to propel improved side impact dynamic protection technologies rather than settle for existing systems used by manufacturers in light of the fact that “[a]t a vehicle delta-V of 20 mph, an average HIC scored of 502 was measured with the [ES-2re] dummy positioned per the 201 seating

¹⁶ That population is growing at a highly disproportionate rate. As pointed out in *The Mobility Needs of Older Americans: Implications for Transportation Reauthorization* (The Brookings Institution, July 2003), the number of older Americans will double over the next 25 years. In 2000, 35 million Americans, or 12.4 percent of the total U.S. population, were over age 65, and almost 4.5 million, or 1.6 percent of the total population, were over age 85. However, by 2030, there will be more than 74 million Americans over 65 and 9 million over age 85. It is clear that these senior Americans will rely on personal vehicles for the great majority of their transportation needs and that they frequently will be both drivers and passengers in cars and LTVs.

¹⁷ See the comments of Advocates, dated April 14, 1993, to NHTSA Docket No. 92-28, Notice 02 (58 FR 7506 *et seq.*, February 8, 1993), esp. pp. 6 – 9. Advocates' support for HIC800 was based on NHTSA's own preliminary argument for this level because of the increased susceptibility of the side of the human head to severe injury as compared with the front of the head at a given impact speed. Current New Car Assessment Program head injury scores as well as NHTSA's own HIC scores in testing conducted for this rulemaking proposal demonstrates that HIC800 should be easily attainable by vehicle manufacturers.

procedure and 338 from the 214 seating procedure.” PEA, p. V-25. Advocates believes that NHTSA could lower the HIC ceiling for the proposed pole test to HIC800 and that manufacturers could easily comply. This reduced HIC ceiling for compliance would strongly reorder AIS injuries further towards AIS1 and AIS 2 injuries and away from AIS3+.¹⁸

Chest Injury. The agency proposes a rib deflection criterion of no more than 1.65 inches for its 50th percentile male chest deflection criterion, a figure that corresponds to a 50 percent risk of an AIS3+ injury.¹⁹ *Id.* NHTSA argues in a footnote that a 1980s International Standards Organization (ISO) working group pointed out that a 42mm (1.65 inches) rib deflection would correspond to a 50 percent risk of nine rib fractures. According to a physician from Renault Motors, internal organ injuries would be more likely to occur if the number of rib fractures were greater than nine. The agency itself emphasizes that the rib deflection criterion it has chosen to propose is based solely on cadaver-based injury measures for lower AIS-quantified injuries and that no transformation was made between the EuroSID-1 and cadaver test data. *Id.* (fn 33).

Advocates addresses chest deflection, as measured by consequent rib fracture, in some detail here as a representation of how NHTSA proposes values for the risks of injuries in side impact crashes that are too high for all occupants, but most especially for older occupants.²⁰ This discussion exemplifies similar analyses that could be performed for the other injury measures in the proposed rule in terms of real-world trauma medicine and outcomes for trauma patients.

Advocates regards the agency’s rib deflection criterion cited above as far too tolerant of serious injury. That criterion is unsustainable as an agency policy choice in light of findings derived from real-world trauma medicine, especially for older Americans. For older vehicle occupants, the risk of serious injury will in fact be far higher than NHTSA’s middle-age average of 50 percent risk of AIS 3+ injury. Several recent studies have shown that morbidity from rib fractures due to blunt trauma increases rapidly after age 45. Rib fractures in older trauma victims, a seemingly minor injury, have frequent devastating outcomes for these patients. Holcomb *et al.* (2003) performed a retrospective cohort study involving all blunt trauma patients great than 15 years of age with rib fractures, excluding those with AIS scores great than 2 for abdomen and head, who were admitted to an urban Level I trauma over a 20 months period. A number of major outcomes parameters specifically included the number of rib fractures, as well as intrathoracic injuries, pulmonary complications, number of ventilator days, and length of stay in the intensive care units. Patients were grouped by increasing age ranges,

¹⁸ NHTSA acknowledges that many victims of side impact head trauma would be saved by upper interior air bags but would suffer nonfatal injuries. PEA, p. V-31 and *see* Table V-20. HIC800 would almost entirely eliminate AIS4 injuries and substantially reduce AIS3 injuries from its projected 10 percent representation in vehicle-to-pole crashes.

¹⁹ NHTSA is not proposing a chest deflection limit for the 5th percentile dummy because it is uncertain about the accuracy of the deflection measurements provided by oblique loading conditions. 69 FR 20006.

²⁰ Rib fractures are very common in blunt trauma victims, perhaps as much as 10 percent of hospital admissions. *See* G. Jurovich, M.D., *National Study on Costs and Effectiveness of Trauma Care*, n.d.

including those 45 years of age and older with one to four rib fractures, and those 45 years of age and older with more than four rib fractures. In this analysis stratified by age cohort, the investigators found that patients over 45 years of age who had more than four rib fractures were much more severely injured and at substantially increased risk of adverse outcomes.

Similarly, Bergeron *et al.* (2003) found that older trauma patients with rib fractures had a substantially elevated risk of pneumonia and death. After older patients were admitted with rib fractures following blunt trauma to tertiary care trauma centers over the period of 1993 to 2000, those 65 years of age or older had much longer hospital stays and a much greater need for mechanical ventilation. Mortality for the oldest cohort was 19.5 percent versus 9.3 percent for all younger age groups. The oldest cohort also had dramatically increased comorbidity as compared with the younger patients, 61.1 percent versus 8.6 percent. The conclusion of the authors was that patients aged 65 years or older had five times the odds of dying when compared to those less than 65 years of age, demonstrating that mortality risk from rib fracture is tremendously increased as the ages of blunt trauma victims progress through middle into old age.

Other investigators have found that rib fracture alone is an accurate marker of injury severity in older patients. Stawicki *et al.* (2004) examined the relationship between the number of rib fractures and mortality, injury severity, and medical resource consumption in older individuals admitted to trauma centers. Mortality for older patients 65 or older was nearly double that of patients younger than 65 (20.1 percent versus 11.4 percent). Mortality rates rose in linear fashion with an increasing number of rib fractures for both age groups and were always significantly higher in older trauma patients. This was especially acute for older patients with rib fractures who also had pre-existing health problems, a common condition among older Americans. The effect of pre-existing conditions on patient mortality was inversely related to the number of rib fractures and was most pronounced for patients with four or more rib fractures. The authors concluded that the number of rib fractures is an easy to use and apparently accurate surrogate measure of overall injury severity and ultimate outcomes for older trauma patients.

Bulger *et al.* (2000) determined the extent to which advanced age influences morbidity and mortality after rib fractures by defining the relationship between the number of rib fractures and mortality for older trauma patients (65 years of age or greater). They conducted a retrospective cohort study of older patients with rib fractures admitted to a Level I trauma center over a 10-year period. Outcomes included pulmonary complications, number of ventilator days, length of intensive care unit (ICU) and hospital stay, and mortality. The authors controlled for similar mean numbers of rib fractures for those patients 65 years of age and for older patients and for all those less than 65. The number of ventilator days, ICU days, and length of hospital stay were found to be longer for older patients. Pneumonia occurred in 31 percent of older versus 17 percent of younger (18 to 64 years of age) patients. Also, mortality and pneumonia rates increased in direct relation to the number of rib fractures with an odds ratio of 1.19 for death and 1.16 for pneumonia for each additional rib fracture. Overall, the investigators found that older patients who sustain blunt chest trauma with rib fractures have twice the mortality

and thoracic morbidity of younger patients with similar injuries. The main finding of the study was that for each additional rib fracture in the older patients, mortality increases by 19 percent and the risk of pneumonia by 27 percent.

Although NHTSA in the preamble of this rulemaking proposal points out that the severity of injury outcomes is directly affected by age, the agency normalized thoracic injury scores to an average occupant age of 56 years, an age that is inadequate for predicting the severity of thoracic trauma in side impacts for older vehicle occupants. That age index leads the agency to propose AIS3+ risk percentages that clearly will disproportionately take the lives of, and inflict much more serious injuries on, occupants 65 years of age and older. NHTSA asks for comments on a chest deflection standard range of 35 to 44 mm (1.38 – 1.73 inches). The lowest figure of 1.38 inches corresponds to a 40 percent risk of AIS3+ injury. Advocates regards even this figure as far too accepting of serious injuries to older occupants, and, as a result, we cannot support any figure within the range proposed.

Advocates regards the lack of chest deflection measurement by the SID-IIsFRG to be a real drawback in this rulemaking proposal. Although no detailed discussion is conducted by the agency on the comparative merits of the SID-IIs in lieu of the SID-IIsFRG, Advocates does not understand why the agency has foregone the use of the SID-IIs which is capable of measuring chest deflection. Chest deflection measurements are crucial to establishing injury criteria that protect small-statured females, especially those that are great than 65 years of age, from rib fractures, a marker for trauma-induced mortality.

Pelvic Injury. NHTSA is proposing a pelvic force limit of no more than 6,000 N or 1,349 pounds which the agency calculates as a 25 percent risk of AIS3+ injury. 69 FR 28003. The ES-2re can measure both pelvic acceleration – the current basis of the pelvic injury criterion in Standard No. 214 – but is also capable of measuring force at the pubic symphysis, the pelvic region where most pelvic injuries occur through fracture of the pubic rami.²¹

Although the 25 percent AIS 3+ injury risk appears low, particularly in comparison with the higher risk levels for the agency's other proposed injury measures, it in fact is probably still too high for vehicle occupants 65 years of age and older suffering side impact trauma resulting in pelvic fracture. Because pelvic fracture is a much more serious injury, one that is often lifethreatening to older individuals, such as older women with advanced osteoporosis,²² Advocates believes that the risk level of this injury measure is still being proposed at an unacceptably high level.²³

²¹ However, the SID-IIsFRG cannot measure force at pubic symphysis, one of the shortcomings that Advocates finds problematic in the agency's proposal to use two different dummies for the 50th and 5th percentile male and female population, respectively, that do not have the same or directly comparable data corridors. *Id.*

²² NHTSA acknowledges that small stature occupants have higher rates of pelvic injuries than medium stature occupants. 69 FR 28006.

²³ The inadequacy of this risk level proposed by the agency stands out in even starker relief given NHTSA's acknowledgement that "thorax air bags may not be effective in reducing pelvic injuries" but in fact "may increase the injury probability when measured with the SID-H3 test dummy." In addition,

O'Brien *et al.* (2002), for example, studied the age-related outcomes of patients after blunt pelvic injury. The investigators identified patients admitted with pelvic fractures over a five-year period. The data retrieval included AIS scores among several data categories that also included ICU length of stay, hospital length of stay, and mortality. Patient data were then stratified by age for comparison into two groups of less than 55 years of age and greater than 55 years of age.

O'Brien *et al.* found that the only predictor of mortality was age, even after accounting for gender and other measures such as shock and AIS scores for head, chest, and abdomen. The most common injury mechanism was motor vehicle injury. The most common fracture pattern in both groups was lateral compression. The elderly group was admitted to the ICU at a 40 percent greater rate. The elderly group also had a much higher incidence of pre-existing conditions, with a diagnosis, for example, of cardiovascular disease and of diabetes that was more than four times the frequency of the less than 55 years of age group. Mortality for the older cohort was nearly five times the rate of the younger group. The older group was much more likely to have suffered pelvic fracture involving lateral compression, they had longer hospital stays, and they died much more frequently despite frequent, aggressive resuscitation.

Older individuals suffering pelvic fracture are at a much higher risk of death. Even those who survive often have much more serious and debilitating conditions that have severely adverse impacts on quality of life and produce increased comorbidity. The proposed injury level for pelvic fracture takes no notice of older occupant pelvic injury-related mortality, comorbidity, and long-term functional capacity decrements. Accordingly, Advocates regards the proposed figure, especially in relation to the other serious thorax injury for older occupants, rib fractures, as together demonstrating the agency's inadequate attention to the specific outcomes of motor vehicle side impact trauma for older occupants.

Lower Spine Injury. Advocates takes no specific position on the proposed limit for lower spine acceleration of 82g and a 50 percent risk of AIS3+ for the 50th percentile dummy and a 60 percent risk for the 5th percentile female dummy, although we believe that interaction of lower spine acceleration with the potential for pelvic fracture in older vehicle occupants implies that these risk levels are excessive. However, we do strongly support the agency's reasoning that lower spine acceleration should be resultant force values rather than simply lateral acceleration. 69 FR 28003. Nevertheless, because Advocates is not persuaded that the two dummies proposed for use in a revised Standard No. 214 accurately demonstrate resultant loads as they occur in humans even when purely lateral loads are applied, we cannot judge the extent to which the proposed 82g limit relates to real-world occupant lower spine acceleration leading to injuries in side impact crashes.

We also note that the agency quantifies the injury risk of an 82g lower spine acceleration limit as a 60 percent risk of an AIS3+ injury for a 5th percentile female occupant suffering side impact at the speed and angle of the proposed pole test. NHTSA claims that that its “research has found that the resultant lower spine acceleration might over-predict injury risk at certain levels, or in other words, have a high ‘false positive’ rate.” *Id.* at 28007. Accordingly, NHTSA has raised the AIS3+ injury risk from 50 percent for the 50th percentile male dummy to 60 percent for the 5th percentile female dummy because adopting the same, lower risk figure for the 5th percentile dummy would limit lower spine acceleration for the SID-IIIsFRG to 62g, a level that the agency argues would be too low for vehicles to meet. *Id.* at 28007. Although NHTSA shows vehicle SID-IIIsFRG lower spine acceleration figures for 2000-2003 passenger car makes and models that range from 70g to 101g (Table 5), none of these vehicles had the more sophisticated air bags that the agency intends to be produced to make Standard No. 214 more safety-stringent. Consequently, the agency’s claim that a 62g limit is unattainable is, in fact, speculative and conclusory without specific support from tests conducted with the types of side impact air bags that this rulemaking intends to foster.

V. Moveable Deformable Barrier (MDB).

Advocates strongly disagrees with the agency’s proposed decision to continue the use of the current MDB in Standard No. 214. Use of the current design cannot adequately demonstrate the need for rear seat passenger head protection even with the use of the SID-IIIsFRG 5th percentile female dummy. Moreover, the current MDB test can be met for thorax protection solely with padding. *Id.* At 28009. We agree with the substitution of the ES-2re as the 50th percentile male dummy, especially for rear seat use, because of its superior chest deflection measurement capabilities. However, continued use of the current MDB and a regulatory ceiling for compliance testing set at 6,000 pounds will not ensure that manufacturers provide adequate rear seat head protection for occupants of vehicles at or below this threshold, and it cannot ensure that manufacturers will provide adequate thorax protection for occupants of larger LTVs exceeding 6,000 pounds GVWR when they are laterally struck by other large LTVs. This proposal again demonstrates NHTSA’s willingness in order to reduce manufacturer compliance costs at the expense of equitable side impact safety protection for target vehicle rear seat passengers with regard to head injury when their vehicles are laterally struck by taller, heavier LTVs. This is not a responsible public health position for the agency to take in this rulemaking.

Similarly, we do not support the use of the same injury ceilings for various body regions that NHTSA has proposed for compliance with the new 20 mph, 75 degrees pole test. We stress again that these injury levels are too indulgent of high rates of serious injury, especially for older occupants. The agency’s tables of test results in this rulemaking action show that almost all vehicles can meet substantially lower injury criteria, especially for HIC. We see no reason why the agency cannot establish HIC800 for the maximum test compliance value. Similarly, given the extraordinary severity of chest deflection with consequent rib fractures for the morbidity and mortality of older occupants, Advocates regards the agency’s chest deflection criterion for the continued use

of the current MDB as an agency failure to demand manufacturer improvements in protecting occupants, particularly older occupants, from serious chest injuries involving rib fracture.

As Advocates argued several years ago in our comments to the NHTSA rulemaking proceeding extending dynamic testing requirements using a MDB to LTVs less than 6,000 pounds GVWR, the agency should increase the height of the MDB to approximate most of the front-end characteristics of height and stiffness, and of the total mass, of larger LTVs, especially pickup trucks and SUVs. Advocates still strongly urges the agency to consider the use of a MDB that is much taller than the current Standard No. 214 iteration with a front profile geometry that essentially replicates a large LTV,²⁴ and also to proportionally raise the front end ground clearance and bumper height of this revised design so that many LTVs and all passenger cars are struck above their sills at much higher points at the doors/sides than is the case with the present design. Such a MDB design used to test side impact protection would more closely represent rear-world impacts by large LTVs that result in severe injuries and death to occupants. Most importantly, this test will ensure much better rear seat occupant safety countermeasures by vehicle manufacturers in side impacts, including better protection for children.²⁵

If NHTSA decides to confine the new pole test to only front seat occupants, an action that cannot guarantee rear seat occupant protection, then the agency has a responsibility to commensurately upgrade the MDB test to ensure comparable safety countermeasures for target vehicle rear seat occupants in side impacts inflicted by large vehicles. However, if NHTSA extends the oblique pole test to rear seating areas, the value of continuing any MDB test is cast into doubt, even one adding a head injury criterion and using a MDB design along the lines suggested above.

Without this necessary action, NHTSA will have essentially accepted disfranchisement of rear seat occupants of equivalent protection that the agency is at pains in this rulemaking to provide for front seat occupants. Advocates does not regard this as a defensible posture for the agency – the American people rightly expect NHTSA to provide equivalent occupant protection in its rulemaking actions for all vehicle occupants regardless of seating position. If the agency refuses to accommodate such a reasonable expectation, it runs the risk of reducing its credibility with the American people. NHTSA correctly perceived the inequity of such an approach several years ago when it decided, after tentatively proposing not to provide upper interior head impact protection for rear seat occupants in its notice offering to add upper interior protection to Standard No. 201, nevertheless to provide equivalent head impact protection for all

²⁴ See Advocates' comments to NHTSA Docket No. 88-06, Notice 23, August 15, 1994, p. 5. The taller, heavier, and perhaps stiffer LTV-based MDB should also be heavier, ranging up to 3,800 – 4,000 pounds. This is not a novel suggestion by Advocates – NHTSA itself tested and considered MDBs up to 4,000 pounds with a range of heights, including those simulating the front end geometry of large LTVs. See, *Preliminary Economic Assessment: Notice of Proposed Rulemaking for Light Trucks, Buses, and Multi-Purpose Passenger Vehicle Dynamic Side Impact Protection, FMVSS No. 214*, National Highway Traffic Safety Administration, Office of Regulatory Analysis, Plans and Policy, June 1994.

²⁵ NHTSA points out in this rulemaking notice that up to 12 percent of occupant fatalities in motor vehicle crashes are to rear seat passengers.

occupants for the entire passenger vehicle interior.²⁶ That action clearly establishes a precedent for the agency to emulate in this rulemaking:

So long as the cost per equivalent life saved is reasonable, NHTSA believes that a vehicle *should offer the same level of protection to all occupants, regardless of the occupant's choice of seat.*

*In addition, the agency believes that the decision whether to regulate rear seating areas must take into consideration any special populations at risk. It is particularly **necessary** to protect children, who are often seated in the rear and who will be susceptible to head injuries unless the rear seating areas are included in this rule. For all vehicles, 37 percent of injuries and fatalities in rear seating areas are children ranging up to 17 years.*

60 FR 43031, 43046 (August 18, 1995) (emphasis supplied).

If NHTSA fails to duplicate this action taken for Standard No. 201 in the current rulemaking proposal for Standard No. 214, the agency will send a clear signal to Americans that it cares more for cost containment for vehicle manufacturers²⁷ than for ensuring that all vehicle occupants, regardless of seating position, are provided equivalent protection in side impact crashes.²⁸ In addition, given this quoted rationale for adding rear seating areas to the coverage of Standard No. 201 for upper interior head impact protection, the agency must be aware that simply pronouncing the dictum that “We . . . have sought to contain the costs of this rulemaking” is a facile position for NHTSA to assume given its progressive stance in Standard No. 201 rulemaking nine years ago. If the agency nonetheless decides not to provide equivalent protection in side impacts for rear seat occupants, especially for children, it must provide safety reasons independent of manufacturer cost arguments and also decisively distinguish this new rationale for exclusion from its prior reasoning that the occupants of such rear seating areas must be

²⁶ See 60 FR 43031, 43045-43046 (final rule for NHTSA Docket No. 92-28, Notice 01), August 18, 1995. In that final rule, NHTSA pointed out that the cost for an equivalent life saved in cars was \$0.3 - \$0.4 million for front seating positions while the cost for rear seat lives saved was \$1.7 - \$2.1 million in each instance. Similarly, for LTVs the cost for front seat lives was \$0.7 - \$0.8 million in each instance, but \$24.2 - \$26.8 million for each rear seat life saved. *Id.* at 43045. However, the agency emphasized that this substantial difference between cars and LTVs was based on a discrepancy between fatality and injury data for front and rear seating areas because the data, at that time, showed only 13 deaths in rear seating areas of LTVs, a figure that NHTSA was confident would rise considerably in the future because of the growing passenger vehicle fleet percentage representation of LTVs. Since LTVs have far outstripped passengers in fleet proportion since this rulemaking action more than nine years ago, NHTSA has an obligation to explain whether saving lives in rear seating areas is now more supportable, especially for LTVs.

²⁷ “We . . . have sought to contain the costs of this rulemaking.” 69 FR 28011.

²⁸ NHTSA itself in the 1995 Standard No. 201 final rule argued the case for adding rear seat upper interior head impact protection to Standard No. 201 that exceeded simple benefit-cost calculations:

While the costs per equivalent life saved still vary according to seating position, the conclusive factor in determining whether to regulate a particular seating position should not be the existence of such variations, *but the reasonableness of the cost for that particular position.* Calculating the cost per equivalent life saved would never yield the same figures for each seating position. * * * [C]ost based on the degree of occupancy in each seating position will almost certainly lead to uneven estimates of cost per equivalent life saved.

60 FR 43046 (emphasis supplied).

protected.²⁹ We also emphasize here that circumstances concerning rear seat occupancy have changed fairly dramatically in the intervening nine years because of the disproportionate growth in the U.S. population over 65 years of age, a demographic cohort that now has much higher representation in vehicle rear seat occupancy, a trend that will continue unabated over the next two to three decades. This is exactly the “special population at risk” for which NHTSA in 1995 recognized that it had a special moral obligation to provide equivalent safety against head injury. That moral obligation, formerly invoked by NHTSA in connection with the same topic of upper interior head impact protection, has been pushed aside solely on cost grounds in the instant rulemaking notice proposing amendments to Standard No. 214.

Accordingly, Advocates believes that it is untenable for NHTSA to continue to maintain the use of the current Standard No. 214 MDB. It must be increased in height, stiffness, and perhaps also in mass, and occupants of all sizes must be protected from injury in the rear seats that is inflicted by tall, stiff, heavy LTVs. Advocates strongly supports the use both of the ES-2re and of the SID-IIs in both front and rear seating positions with a more demanding MDB test, but we also ask the agency to actively pursue the use of a child dummy as a require anthropomorphic test device in a revised MDB test. As we suggested earlier, given the superior biofidelity of the agency’s upgraded ES-2re, it may be desirable to consider a scaled version of the EuroSid dummy representing a 10 years old child for use in a more demanding MDB test. This child dummy would be used in addition to the 50th percentile ES-2re and the 5th percentile SID-IIsFRG/SID-IIs for rear seat placement and front seat passenger seat placement.

If the agency nonetheless chooses to continue the use of the current MDB of Standard No. 214, it must extend the proposed new pole test to the sides of passenger vehicles adjacent to rear passenger seating areas. Unfortunately, NHTSA rejects this alternative also on the basis of a terse rationale provided without elaboration: “[Y]ears of testing in FMVSS No. 201 have yielded substantial information about meeting pole test

²⁹ In fact, NHTSA’s action to reverse its initial proposal to exclude rear seating areas from upper interior head impact protection was also a wise decision in light of the statutory mandate that directed the agency in Section 2503(5) of the Intermodal Surface Transportation Assistance Act of 1991 (ISTEA) (also *see* Section 2502(b)(2)(B)(iii), (C)) to provide enhanced passenger vehicle upper interior head impact protection. Congress clearly sought to limit the discretion accorded NHTSA in conducting rulemaking to establish upper interior head impact standards and went out of its way to specially emphasize its concern with establishing a standard for upper interior head impact protection for passenger vehicle occupants. Among other abridgements of agency discretion, the conferees in the legislative history accompanying Section 2305(5) asserted that, “with exception of the head injury protection issue, the conferees do not predetermine the outcome of these rulemakings.” Joint Explanatory Statement of the Committee of Conference, House Report 102-404, November 27, 1991, p. 397. Part of the predetermination of the character of the head injury rulemaking exercise was a demarcation of the specific areas of passenger vehicles that were subject to any agency promulgated standard. Section 2305(5) without additional qualification clearly denominates rails and pillars as required subjects of agency attention in the standards-setting process. Traditional principles of statutory construction dictate here an understanding of legislative intent in the provision proper as mandating the construction of a head injury protection standard for both front and rear passenger seating areas. Simply stated, NHTSA did not have the agency discretion to unilaterally truncate the unambiguous scope of the statutory mandate to the agency by excluding rear seating areas from passenger head protection from impact trauma with the rails and headers in those locations.

requirements in [the front] seat. Less information is known about the rear seat.” 69 FR 28011.

It is apparent that this argument fails at the threshold. NHTSA has prepared the groundwork for applying a new, more demanding pole test conducted at a higher impact speed, at an oblique angle, and for all passenger vehicles, including those from 6,001 to 10,000 pounds GVWR, by extrapolating the fundamental concept of the pole test optionally available in Standard No. 201 for using dynamic protection systems in side impacts. It has also actually conducted such pole tests for front seat occupants, as documented in detail in the materials supplied in the docket. Any knowledgeable reader would now ask why the agency did not also conduct such tests for the rear seating areas of passenger vehicles? Unfortunately, it appears that, having not conducted such tests, NHTSA made a choice some time ago to forswear equal side impact injury protection for rear seat occupants.

Excluding rear seat occupants from the same protection being afforded to front seat occupants in this rulemaking proposal by refusing either to strengthen the MDB-based test or to apply the front seating area oblique pole test to rear seat occupants is not a morally acceptable or defensible stance for NHTSA especially in light of its prior action in the early 1990s. Similarly, failing to protect children from head injury even in the front seat pole test in this rulemaking action is also an unconscionable position that Advocates does not believe the agency can adequately defend.

VI. Struck Door Opening.

NHTSA proposes to continue unchanged the current requirement of Standard No. 214 that prohibits any side door struck by the MDB from separating completely from the test vehicle and to extend that prohibition to the proposed new oblique pole test. *Id.* At 28011.

Advocates strongly opposes this tentative decision. The agency, as described in several places in our comments above, has not provided adequate protection against partial and complete occupant ejection if it allows children under 12 to submarine head protection systems, including air curtains, intended for adults, and it has failed to provide adequate anti-ejection countermeasures even for adults if it permits occupant ejection by allowing struck doors to unlatch.³⁰ This regulatory outcome is a direct result of NHTSA’s dilatory action to require manufacturers to use a fail-safe latch design that prevents doors from opening in frontal, side, rear, and rollover crashes. Although the agency initiated what appeared to be a vigorous program of innovative design and performance in the early 1990s to dramatically strengthen door latches to prevent them from flying open in all crash modes, that effort disappeared and has not been

³⁰ This failure to ensure that struck doors do not open is especially crucial given the agency’s acknowledgement that the sensor algorithms that would be needed to ensure deployment of dynamic protection systems in target vehicle side impacts under the proposed 20 mph oblique pole test would not produce any benefits in separate or subsequent rollover crashes: “No benefits are claimed for ejections in rollovers, since the test does not require a rollover sensor to deploy the bags in rollovers.” PEA, p. E-3.

resurrected.³¹ It is clear that many people have died in the intervening years as a direct result of the agency failing to take timely action to prevent door unlatching. The industry practice that was prevalent in the 1960s, based on a Society of Automotive Engineers design principle, was left undisturbed by NHTSA at the inception of its regulatory actions in the late 1960s, and it is the same design that is used today to the detriment of public safety.

NHTSA recently did an abrupt about-face on the value of anti-ejection glazing, a countermeasure that clearly can save many lives, and issued a final report stating that other safety measures would suffice to gain the same or superior benefits that could be provided through the implementation of advanced glazing.³²

Advocates has searched the instant rulemaking proposal and its accompanying materials for that equivalent or superior countermeasure that will prevent the ejection of all vehicle occupants. Clearly, in many side impact crashes, especially those with narrow fixed object hazards, the use of the permitted combination head-thorax bags, even if widened to better comport with the use of an oblique pole impact angle, can still permit partial occupant excursion through open portals.³³ Moreover, permitting struck doors to unlatch can also allow partial or even complete occupant excursion, especially with head-thorax bags used in lieu of side curtains. Finally, NHTSA admits that even air curtains as currently designed – and permitted to continue in use by the agency’s inadequate treatment of child safety in this regulatory action – will not drop down far enough to keep children from submarining them. Even worse, given the agency’s abandonment of equivalent side impact protection for rear seat occupants, including children, by not requiring the new pole test also to be conducted at vehicle rear seating areas, the combination of no upper interior air bags and unlatching side doors in rear seating areas is effectively a death sentence for both adults and children who can be partially ejected even if belted or completely ejected if unbelted.

Advocates regards NHTSA’s tentative decision to allow doors to continue to unlatch in side impacts to be indefensible, especially given its demurral on upgrading the MDB test or applying the new oblique pole test to the rear seating area. The potential for continuing, high rates of deaths and injuries from ejection is compounded by the failure of the agency to consider mandatory upper interior dynamic side impact anti-ejection measures for rear seat occupants. The agency needs to consider expeditiously the use of

³¹ NHTSA again addressed the need for reform of the design and performance of door locks, latches, and retention components just last year. Docket No. NHTSA-03-14395 (68 FR 5333 *et seq.*, February 3, 2003). Advocates filed comments with this docket on March 5, 2003, urging the agency to accelerate its attention to this major safety topic in light of the continuing high losses that occur from occupant ejection through open doors. However, no proposal to change the antiquated design currently permitted in NHTSA regulation has yet appeared. Moreover, NHTSA proposed a no door opening requirement as part of its advanced air bag rulemaking, but deleted such a requirement from the final rule. *See* 63 FR 49958, 49972 (September 18, 1998).

³² *See* Wilke, *et al.*, *Ejection Mitigation Using Advanced Glazing: Final Report*, NHTSA, August 2001.

³³ Advocates notes parenthetically that side impact air curtains as the intended effect of this proposed rule only need to remain inflated for several milliseconds and cannot supply protection against ejection in rollover crashes or in crashes involving several sequential impacts.

a combination of advanced side window glazing, of rapid improvements in side door latch design and performance to prevent opening under impact, and of stringent rear seating side impact test requirements that will ensure that occupants in any seating position are not ejected in side impacts.

VII. Federal Motor Vehicle Safety Standard No. 201 Pole Test.

NHTSA proposes to amend Standard No. 201 so that addition of the proposed oblique pole test to Standard No. 214 for certification would satisfy compliance with Standard No. 201's optional pole test for using dynamic protection systems. *Id.* at 28012. Advocates agrees that a vehicle meeting the new, more stringent pole test in Standard No. 214 would also easily meet the optional pole test of Standard No. 201. We see no need to require additional testing with the 18 mph, 90 degrees angle pole test of Standard No. 201. However, we support the agency's tentative decision that the Free Motion Headform test at 12 mph must continue to be conducted for head impact points near the stowed head protection systems. *Id.*

VIII. Harmonization.

Advocates agrees with NHTSA that the proposed oblique angle pole test for side impact addresses safety problems that are not duplicated elsewhere in the world due our unique admixture of passenger vehicle types in the U.S. because of the popularity of large pickup trucks, vans, and sport utility vehicles. *Id.* at 28013. Issues of vehicle safety compatibility are pressing in the U.S. and should be dealt with by NHTSA actions that safeguard the U.S. vehicle occupant population. We strongly support the agency's effort to forge an approach in this rulemaking notice that responds to U.S. domestic vehicle occupant safety needs and not to default to European side impact test protocols that represent safety problems that do not involve the serious problem of large LTVs as bullet vehicles in side impacts with smaller passenger vehicles. As NHTSA accurately reports, the European side impact tests also do not respond to side impact protection in vehicle crashes with rigid, vertical fixed object hazards.

IX. Proposed Leadtime and Phase-In.

NHTSA proposes a three-year phase-in of the proposed requirements for the oblique pole test. The agency provides for "illustrative" purposes a compliance trigger date for such a phase-in beginning in 2009 and culminating in 100 percent fleet compliance by 2011. *Id.* at 28014-28015. NHTSA proposes no phase-in for complying with the proposed changes in dummy use for the MDB-based test in current Standard No. 214. The MDB test changes would be required four years after adoption of a final rule. *Id.* at 28015.

Advocates has no objection to the three-year phase-in, which is reasonable, and we support full compliance without a phase-in for the revised MDB test.³⁴ However, we cannot support the tentative compliance years indicated by NHTSA for the new pole test and for the amended MDB test. Delaying full compliance until 2009-2011 for the oblique pole test and until 2009 for the amended MDB test defers benefits for too long. The agency has made it apparent in its detailed presentation of test results in this rulemaking notice using the new pole test on a wide variety of vehicles that the great majority can comply almost immediately with the proposed changes. Advocates also believes that the majority of vehicles can comply quickly even with more stringent injury criteria that we have urged the agency in these comments to adopt, especially HIC800 and a chest deflection criterion that will result in far fewer rib fractures. As a consequence, we believe that NHTSA should accelerate the compliance schedule to 2007-2009 for the new, oblique pole test and to 2009 for a revised Standard No. 214 pole test. This action would save additional thousands of lives and prevent tens of thousands serious to severe injuries. In the alternative, if the agency were to adopt an earlier trigger date for starting compliance, Advocates would support a more protracted phase-in of four years for the new pole test (20 percent (2007), 40 percent (2008), 70 percent (2009), 100 percent (2010)) and a two-year phase-in of a revised MDB test (50 percent (2007), 100 percent (2008)), particularly if the agency adopts Advocates' suggestions for a more demanding MDB design.

X. Conclusion.

Advocates regards the central approach of this rulemaking initiative on side impact protection to be directly responsive to our proposal in a petition for rulemaking filed with the agency in July 1998 that NHTSA granted in 1999. Advocates argued in that petition that the agency had created a disparate side impact protection regime that artificially divided upper from lower interior side impact protection by posing different compliance requirements that in neither instance supplied the level of protection that was needed, especially by means of dynamic protection systems, for both the heads and the thoraxes of victims of side impacts. We also advanced the concept of a pole test as the desirable approach for a unitary regulatory response to this pressing need to dramatically improve side impact protection. Finally, we argued that an improved EuroSid dummy could improve the accuracy of injury measurement which, in turn, would increase the precision of the countermeasures that NHTSA could require to enhance side impact protection, reduce deaths, and reduce injury severity for side impact survivors.

In those essential respects, Advocates is gratified that NHTSA in this rulemaking notice has responded so favorably to our petition. Unfortunately, however, our enthusiasm for the agency's proposed actions is strongly curbed by several major, glaring inadequacies in the details of this notice:

- The pole test is not required for rear seating areas.

³⁴ However, we re-emphasize that Advocates supports the new pole test to also be used for rear seating areas or for the agency to adopt a much more stringent MDB test that actually measures head injury.

- The revised MDB test does not ensure that dynamic head protection technologies will be provided for rear seat occupants.
- The revised MDB test does not ensure that adequate side impact protection will be provided for rear seat passengers in large LTVs more than 6,000 pounds GVWR.
- Children in any seating position have no head injury protection.
- NHTSA does not ensure that children and rear seat passengers are not ejected in side impacts because:
 - ▶ the agency fails to require rear seat side impact air curtains,
 - ▶ fails to require air curtains that prevent children under 12 years of age from being ejected, and,
 - ▶ fails to prevent struck doors from opening in such crashes to permit partial or complete ejection.

Yet the agency has rejected the use of advanced side window glazing that could prevent many ejections especially of children and rear seat passengers who will not have air curtains to help prevent ejection.

- Injury criteria indulge vehicle manufacturers to the detriment of preventing many serious injuries that could be abated – especially for occupant more than 65 years of age – if the agency would adopt more stringent values to reduce these injury risks.

Advocates regard these failures as evidence of agency resolve to pursue manufacturer cost containment instead of optimizing safety for occupants in side impact crashes. If NHTSA adopts our suggestions for strengthening its proposal and also accelerates compliance, it will have saved many lives and prevented enormous numbers of serious, often permanently debilitating, injuries that the current proposal will continue to allow. The main features of this proposed rule are innovative and directionally correct, but NHTSA needs to use this watershed opportunity to increase the protection of all occupants in side impacts in the ways we have indicated in the foregoing comments.

Respectfully submitted,

ORIGINAL SIGNED

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