



DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 575

[Docket No. NHTSA-2012-0180]

New Car Assessment Program (NCAP)

**AGENCY:** National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

**ACTION:** Request for comments.

**SUMMARY:** The U.S. New Car Assessment Program (NCAP) provides comparative information on the safety of new vehicles to assist consumers with vehicle purchasing decisions and encourage motor vehicle manufacturers to make safety improvements. To maintain the relevance and effectiveness of NCAP, NHTSA has periodically updated the program, most recently in model year 2011.

In response to the rapid development of vehicle safety technologies, especially in the area of crash avoidance, the agency is once again requesting public comments in order to help identify the potential areas for improvement to the program that have the greatest potential for producing safety benefits. This notice lists and describes potential areas of study for improving NCAP. The agency will use the comments it receives to aid it in developing a notice proposing near term upgrades to NCAP. The agency will also use the comments received in response to this notice to help it in developing a draft 5-year plan for the NCAP program outlining research that the agency plans to conduct as well as longer term upgrades it intends to pursue making to NCAP.

**DATES:** You should submit your comments early enough to ensure that Docket Management receives them no later than [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** Comments should refer to the docket number above and be submitted by one of the following methods:

- Federal Rulemaking Portal: <http://www.regulations.gov>. Follow the online instructions for submitting comments.
- Mail: Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Avenue, S.E., West Building Ground Floor, Room W12-140, Washington, DC 20590-0001.
- Hand Delivery: 1200 New Jersey Avenue, S.E., West Building Ground Floor, Room W12-140, Washington, DC, between 9 a.m. and 5 p.m. ET, Monday through Friday, except Federal Holidays.
- *Instructions:* For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the SUPPLEMENTARY INFORMATION section of this document. Note that all comments received will be posted without change to <http://www.regulations.gov>, including any personal information provided.
- *Privacy Act:* Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477-78). For access to the docket to read background documents or

comments received, go to <http://www.regulations.gov> or the street address listed above.

Follow the online instructions for accessing the dockets.

**FOR FURTHER INFORMATION CONTACT:** For crashworthiness issues, you may contact Ms. Jennifer N. Dang, Division Chief, New Car Assessment Program, Office of Crashworthiness Standards (Telephone: 202- 493-0598). For crash avoidance and advanced technology issues, you may contact, Mr. Clarke Harper, Crash Avoidance NCAP Coordinator (Telephone: 202-366-1810). For legal issues, you may contact Mr. Steve Wood, Office of Chief Counsel (Telephone: 202-366-2992). You may send mail to any of these officials at the National Highway Traffic Safety Administration, 1200 New Jersey Avenue S.E., NVS-100, West Building, Washington, DC 20590-0001.

**SUPPLEMENTARY INFORMATION:**

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## **I. Executive Summary**

The NHTSA's New Car Assessment Program (NCAP) provides vehicle safety information that enables consumers to compare the safety performance and features of new vehicles. This helps consumers in making their new vehicle purchasing decisions and encourages manufacturers to improve the safety aspects of existing vehicle designs and include new or better safety technologies in future vehicle designs. As recently as the 2011 model year (MY), NHTSA upgraded NCAP to increase the stringency of the criteria that must be met to achieve high safety ratings and to provide consumers with more vehicle safety information. These program enhancements created additional market forces to improve vehicle safety. In recognition that technology and manufacturers will catch up with the safety performance criteria in even the enhanced version of NCAP, the agency seeks to take additional steps to encourage even more vehicle safety improvements.

This notice discusses the various subject areas on which NHTSA is seeking comments and information with respect to their future potential as an enhancement to NCAP. Some of the

areas are supported by current research; others, if pursued, would require time and additional work by the agency. The agency seeks information and public comment about each area. Additionally, we seek suggestions regarding other program improvements not listed in this notice. We are seeking this information to help us plan future enhancements to the NCAP program that will create additional incentives for manufacturers to continually improve vehicle safety. We request information on such matters as safety benefits, field experience, test procedures, and progress in the development of crash avoidance technologies as well as crashworthiness activities. All of this information will be helpful in guiding us to develop future plans for NCAP improvements. At that time, we will again seek additional public comment.

The agency presents each area of interest in very brief and simple form (without going into details about benefits, tests, costs, or design concerns) in order to begin the process of identifying and prioritizing the potential areas for improving NCAP. The subjects discussed are also not listed in any particular priority order, nor should the list be construed as a final list of items for consideration. The agency welcomes comments on areas that are not listed in this notice, but are areas that commenters believe we should consider for future study and inclusion into NCAP.

This notice is the first step in a multi-step process of planning the next improvements to NCAP. After we receive comments, we will evaluate the status of all areas listed in this notice, plus any new areas that were provided by public comments. We will then use this information to develop a draft research plan and future proposals. Specifically, we plan to publish in the Federal Register a draft 5-year plan that may also include a draft proposal for near term upgrades to the NCAP program. This will be followed by a final 5-year plan and final decision notice on the near term upgrades, if appropriate.

## II. Background

The NHTSA's NCAP provides comparative information on the safety performance and features of new vehicles to assist consumers with their vehicle purchasing decisions, to encourage manufacturers to improve the current safety performance and features of new vehicles, and to stimulate the addition of new safety features. NHTSA established NCAP in 1978 in response to Title II of the Motor Vehicle Information and Cost Savings Act of 1972. Beginning in MY 1979, NHTSA began rating passenger vehicles for frontal impact safety based on injury readings from dummies during crash tests. The agency added crash tests and ratings for side impact safety beginning in MY 1997. A rating system for rollover resistance was added in MY 2001 based on a vehicle's measured static properties as reflected in a calculation known as the Static Stability Factor (SSF). Beginning in MY 2004, rollover resistance ratings were amended to present the rating, based on not only the SSF but also the results of a dynamic vehicle test.

On January 25, 2007, NHTSA published a Federal Register notice announcing a public hearing and requesting comments on an agency report titled, "The New Car Assessment Program (NCAP) Suggested Approaches for Future Enhancements."<sup>1</sup> Following the receipt of written comments and testimony at a March 7, 2007 public hearing, NHTSA published a notice on July 11, 2008, announcing specific changes to NCAP.<sup>2</sup> The agency made frontal and side crash ratings criteria more stringent by upgrading test dummies, establishing new injury criteria,

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<sup>1</sup> 72 FR 3473 (January 25, 2007) (Docket No. NHTSA-2006-26555-0006).

<sup>2</sup> 73 FR 40016 (July 11, 2008) (Docket No. NHTSA-2006-26555-0114).

adding a new side pole crash test, and creating a single overall vehicle score that reflects a vehicle's combined frontal crash, side crash, and rollover ratings.

In addition, the agency added information about the presence of advanced crash avoidance technologies in vehicles to NCAP. Technologies shown to have a safety benefit and that meet NHTSA's performance criteria are recommended to consumers on [www.safercar.gov](http://www.safercar.gov) where all NCAP ratings are posted. The agency implemented these NCAP enhancements beginning with MY 2011.

At the time of these upgrades, various technologies began to develop in the field of automotive safety, some of which have become concurrent programs that may affect the same target crashes as advanced crash avoidance technologies. For example, researchers are making progress on two approaches to detecting and avoiding various potential crashes that may result in long-term crash and injury reductions: vehicle-to-vehicle communications (V2V) and advanced vehicle automation that may lead to various forms of self-driving vehicles. At this time, it is too soon to know how quickly these various advances in crash avoidance will develop and whether they will complement each other or progress independently. If either or both of these streams of innovation come to fruition, they could complement each other and increase the crash avoidance potential. NHTSA will decide in 2013 what its next steps will be with regard to light vehicle V2V technology. The agency is also monitoring closely developments that could lead to self-driving cars. So, the agency has been carefully monitoring the progress of research programs that are on the horizon.

Motor vehicle manufacturers have made improvements to existing safety technologies since the notice upgrading the NCAP program was published in 2008. Since that time, new areas of innovation have emerged. Some of these technological innovations in vehicle safety have the

potential to offer substantial safety benefits. The agency is issuing this notice to solicit comment on which emerging safety technologies offer the greatest promise in terms of agency research and inclusion in NCAP. We are also soliciting feedback on possible ways for NCAP to provide better consumer information. Our next steps are to use information gathered from the public in response to this notice and data from our research efforts to develop a draft 5-year plan and potentially propose near-term enhancements to the program.

### **III. Comments Requested**

A brief summary of each of the safety and consumer information program areas under consideration is provided in the next section. We recognize that some of the following areas of study are better positioned to yield enhancements into NCAP sooner than others. Thus, depending on the amount of additional research that must be performed for some of the following areas of studies, we note that some areas could be considered for NCAP over the near term, and others would be need to be revisited as the research progresses. If there are areas that are not included in the list of areas from which enhancements to the NCAP could be possible, please identify those areas in your comments.

In general, there are four prerequisites for considering an area for adoption as a new NCAP enhancement. First, a safety need must be known or be capable of being estimated based on what is known. Next, vehicle and equipment designs must exist or at least be anticipated in prototype designs that are capable of mitigating the safety need. Third, a safety benefit must be estimated, based on the anticipated performance of the existing or prototype design. Finally, it



must be feasible to develop a performance-based objective test procedure to measure the ability of the vehicle technology to mitigate the safety issue.<sup>3</sup>

Below is a list of general questions that the agency requests commenters to answer for each of the subject areas summarized in this notice. Commenters are encouraged to use these questions as the basis for shaping their comments on each of the areas. Information provided by commenters will assist the agency in deciding which areas should be included in the agency's draft 5-year plan or possibly proposed as one of a number of near term enhancements to NCAP. The agency has the following general questions for each area of study described in the next section:

- Is there a safety benefit that could be obtained and that can be demonstrated in the form of projected lives saved and/or injuries prevented and crashes reduced?
- Are there objective test procedures or industry standards that would measure performance differences?
- Are the relevant vehicle safety improvements or technologies that would be encouraged sufficiently mature for mass production (i.e., product repeatability and reliability)?
- Is there research to support incorporating the area into NCAP?
  - Can a test procedure be developed that would enable the agency to comparatively rate the improvements or technologies encouraged by a suggested improvement to NCAP?

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<sup>3</sup> The agency's July 11, 2008 notice announcing enhancements to NCAP discussed how the agency applied these three factors to particular technologies when we decided to promote electronic stability control (ESC), lane departure warning (LDW), and forward collision warning (FCW) to consumers through NCAP. 73 FR 40016 (July 11, 2008).

- Are there data to support a robust estimate of the potential safety benefits (in terms of crashes prevented and lives saved/injuries prevented)?
- Would the suggested areas of study be ones for which NCAP could create the market forces necessary to encourage the adoption of particular vehicle safety improvements or technology?
  - In what manner should the consumer information about the suggested areas of study be presented so as to create the market forces necessary to encourage the relevant safety improvements or technologies?
- Would the potential change or addition to NCAP result in consumers getting timely and meaningful information?

We note that there are three areas on which the agency has already separately sought public comment or is engaged in research: Crash Imminent Braking (CIB) and Dynamic Brake Support (DBS),<sup>4</sup> the Vehicle-Child Restraint System (CRS) Fit Program,<sup>5</sup> and the Monroney label consumer research. In the case of both CIB/DBS and the Vehicle-CRS Fit Program, the agency has already separately sought comment, and the deadline for the receipt of comments has passed. The agency is now reviewing the comments. The agency is currently conducting consumer research on the Monroney label. A Federal Register notice seeking public comment on possible future changes to the Monroney label will be published when that research is complete. Given these ongoing efforts, the agency is not seeking through this notice to obtain

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<sup>4</sup> 77 FR 39561 (July 3, 2012) (Docket No. NHTSA-2012-0057-0002).

<sup>5</sup> 76 FR 10637 (February 25, 2011) (Docket No. NHTSA-2010-00062-0001) and 76 FR 16472 (March 23, 2011) (Docket No. NHTSA-2010-00062-0003) correcting comment period deadline.

additional comments on these three areas. The agency urges commenters to address areas other than the three areas mentioned above.

The next two sections discuss potential areas of study for improving safety and providing better consumer information.

#### **IV. Subject Areas Under Consideration for Possible Inclusion or Refinement**

##### *a. Crash Avoidance and Post-Crash Technology Areas Under Consideration*

In this section, the agency has included the advanced crash avoidance or advanced driver assistance technologies that we believe are the most common crash avoidance approaches being discussed today by either the automotive industry or the agency. We have also included post-crash technology.

##### *i. Warning Technologies*

###### *1. Blind Spot Detection*

The agency has been studying blind spot detection (BSD) technology.<sup>6</sup> Blind spots are areas toward the rear and the side of the vehicle that are not visible to the driver in any mirror or that are not within the peripheral vision of the driver. BSD systems warn drivers of the presence of vehicles that are in adjacent lanes, but cannot be seen because those vehicles are in their vehicle's blind spots. The usual circumstance in which warnings are provided is when a driver is steering into an adjacent parallel lane and cannot see that there is a moving vehicle, such as another car or a motorcycle, in that lane moving at approximately the same speed and slightly behind the driver's vehicle.

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<sup>6</sup> Swenson, et al., "Safety Evaluation Of Lane Change Collision Avoidance Systems Using The National Advanced Driving Simulator," 19<sup>th</sup> International Technical Conference on the Enhanced Safety of Vehicles, 2005, Paper 05-0249.

Typically, radar sensors in a BSD system detect vehicles, including motorcycles, in adjacent lanes. When a driver starts to make an intentional or unintentional lane change, an alert is activated to warn the driver of the presence of a vehicle or vehicles that are in adjacent lanes and in the vehicle's side blind spot. The driver is warned using audio, visual or haptic warnings. As currently designed, BSD systems only warn the driver; they do not initiate automatic evasive maneuvers.

Blind spot detection systems are already being installed in some vehicle models as optional equipment. These systems are not regulated, nor are the warning systems standardized. The degree of sensitivity as to when to warn the driver is at the discretion of each vehicle manufacturer. We are not aware of any performance tests that exist for this technology. If commenters suggest blind spot detection as an area for incorporation in NCAP, the agency would be particularly interested in comments regarding methods of comparatively evaluating BSD systems (e.g., the detection reliability, the driver interface, etc.) and estimation of safety benefits.

## *2. Advanced Lighting*

The subject of adding advanced frontal lighting to NCAP has been discussed for almost a decade.<sup>7</sup> Advanced frontal lighting can provide enhanced nighttime visibility. For example, advanced headlights currently available in production vehicles can aid drivers who are turning their vehicles by swiveling and providing more light in the direction in which the vehicle is turning.

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<sup>7</sup> "Summary Report of NHTSA's Forward Lighting Research Program," DOT HS 811 007, July 2008.

We note that some advanced lighting technologies in production in other parts of the world are not currently permitted in the U.S. It is not the intention of this notice to promote or solicit comments on lighting systems that do not meet the current applicable Federal motor vehicle safety standards (FMVSSs). However, comments are requested on potential advanced frontal lighting systems that would meet FMVSS No.108, “Lamps, reflective devices, and associated equipment.” What are the potential systems and are there data that quantify the potential safety benefits?

*ii. Intervention Technologies*

*1. Lane Departure Prevention*

Lane departure prevention, or automatic lane-keeping, builds upon (or expands the safety potential of) lane departure warning systems by providing steering and/or braking input to the vehicle to correct unintentional drifting across lane markers. If commenters suggest lane departure prevention as an area for incorporation in NCAP, the agency would be particularly interested in comments regarding methods of comparatively evaluating such systems. In addition, comments are requested on the comparative benefits of lane departure systems that automatically intervene versus systems that issue warnings only.

*2. Crash Imminent Braking (CIB) and Dynamic Brake Support (DBS)*

The agency has been studying forward collision advanced braking technologies that provide various types of automatic braking in response to an impending crash. Such technologies show promise for enhancing the safety of vehicles by helping drivers to avoid crashes or by reducing the effects of crashes. Forward collision advanced braking technologies, in particular Crash Imminent Braking (CIB) and Dynamic Brake Support (DBS), are designed to address the most prevalent type of two-vehicle collision: front-to-rear collisions.

In a July 3, 2012 request for comments notice,<sup>8</sup> NHTSA preliminarily estimated the annual number of lives saved for DBS alone would be 3 to 19 lives and CIB alone would be 38 to 63 lives, upon full market penetration of these technologies.<sup>9</sup> As indicated earlier, today's notice is not asking for a repeat of comments submitted in response to the July 3, 2012 notice.

### *3. Automatic Pedestrian Detection and Braking (Frontal and Rearward)*

Pedestrian detection and automatic braking are systems that are aimed to avoid or minimize pedestrian impacts and injuries. Such systems can provide both frontal and rearward pedestrian detection and automatic braking. Systems are already in production for low speed front and rear pedestrian impact prevention in some vehicle models.

These technologies use sensing systems similar to that are used for vehicle and lane marker detection. Different technologies are currently being implemented and different test procedures are being developed worldwide, although some test procedure complexities still exist. One example of a test procedure complexity is the need for a crash avoidance test dummy that would provide a radar and/or camera recognition signature that approximates that of a human and is durable enough to withstand any testing impacts. Comments are requested on methods of addressing and resolving these complexities.

#### *iii. Crash Notification Technologies*

Automatic Collision Notification (ACN) is a vehicle system that detects severe crashes and their location and automatically notifies a public safety answering point (PSAP) or a 9-1-1 call center either directly or through a third party. Crashes are detected by various vehicle

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<sup>8</sup> 77 FR 37951 (July 3, 2012) (Docket No. NHTSA-2012-0057-0002).

<sup>9</sup> "Forward Looking Advanced Braking Technologies Research Report," (Docket No. NHTSA 2012-0057-0001).

sensors, and an ACN system notification typically occurs in crashes severe enough to result in air bag or seat belt pretensioner deployment. The location of the crash is transmitted using a global positioning system (GPS) technology. The notification that ACN systems can provide allows for earlier arrival of emergency personnel.

Advanced Automatic Collision Notification (AACN) systems evolved from ACN systems. The additional data elements AACN systems can transmit include, but are not limited to, prediction of injury severity, crash delta-V (velocity change during the crash), direction of impact, safety belt status, air bag deployment status, number of impact events, and the occurrence of a rollover. The Centers for Disease Control (CDC) convened a series of meetings of the National Expert Panel on Field Triage to consider the potential contributions of AACN. The panel concluded that AACN shows promise in improving health outcomes for severely injured crash patients by: predicting the likelihood of serious injury in vehicle occupants; decreasing response times by emergency medical personnel; assisting with field triage destination and transportation decisions; and decreasing time to definitive trauma care.

However, the data elements and the algorithms for predicting injury are not currently standardized. NHTSA and the CDC are currently exploring a wide range of issues relating to AACN and evaluations of potential standards for data transmission and injury severity prediction and considerations for system specifications and evaluations. An agency decision regarding next steps for AACN is planned for 2013.<sup>10</sup>

*b. Crashworthiness Areas Under Consideration*

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<sup>10</sup> “NHTSA Vehicle Safety and Fuel Economy Rulemaking and Research Priority Plan 2011-2013,” 76 FR 17808 (March 31, 2011) (Docket No. NHTSA-2009-0108).

*i. Rear Seat Occupants*

In recent years, improvements that have been made to the front seat crash environment have significantly decreased the risk of injuries and fatalities for front seat occupants involved in frontal crashes. While exposure and injury rates for rear seat occupants overall are still relatively low, there is an emerging need to further understand the rear seat environment in recent model year vehicles, particularly in consideration of lighter and more compact vehicle designs. Comments are requested on the availability of any data that illustrate whether safety benefits can be realized through encouraging additional safety improvements and/or technologies including rear seat belt reminders targeted at protecting the rear seat environment.

One possibility is to dynamically test rear seats and seat belts in our frontal crash tests to evaluate their safety performance. Initially, this could be pursued with the 5<sup>th</sup> percentile adult female Hybrid III dummy. The agency plans to begin exploring the feasibility of testing with a 5<sup>th</sup> percentile Hybrid III dummy in the rear seat of frontal NCAP tests and the feasibility of developing an associated rating system. Comments are requested as to other potential approaches.

*ii. Silver Car Rating System for Older Occupants*

As the U.S. population shifts in coming years, more vehicle drivers and passengers will be 65 and older. Typically, older vehicle occupants are less able than younger occupants to withstand crash forces when they are involved in a crash. Therefore, the agency is conducting workshops and developing comprehensive vehicle and behavioral strategies to improve older driver crash protection.

A “silver car” rating system in NCAP could be developed as a tool for providing crash safety information for older consumers. Such a rating system could be presented in addition to



the primary five-star NCAP rating system. Ultimately, older consumers could use NCAP silver car rating information to help them select and purchase vehicles that would be potentially safer for them. For example, inflatable seat belts or technologies that help prevent low speed pedal misapplication may have potential benefits for older occupants. Comments are requested as to what types of modifications to the current test procedures or test thresholds would enable the program to specifically measure the crash forces that would be imparted to elderly vehicle occupants. Are there aspects of vehicle performance, currently not evaluated by NCAP that would particularly address the needs of older vehicle occupants?

*iii. Pedestrian Protection*

Pedestrian fatalities and injuries from motor vehicle crashes remain a relatively high number in the United States. In fact, pedestrian deaths (4,280) accounted for 13 percent of all traffic fatalities in motor vehicle traffic crashes in 2010.<sup>11</sup> This is a 4 percent increase from the number reported in 2009.<sup>12</sup> The agency is developing a rulemaking proposal based on Global Technical Regulation (GTR) No. 9, “Pedestrian Safety.” We are testing and evaluating the headform hood impact procedure. We are also evaluating the Flex-PLI legform in support of a decision on its incorporation into GTR No. 9. Comments are requested as to (1) whether the agency should consider incorporating future pedestrian crashworthiness requirements into NCAP, (2) what areas of light vehicles (e.g., bumpers, hoods, etc.) the agency should focus its efforts, and (3) how the agency should consider the crashworthiness requirements on vehicles with automatic pedestrian and braking systems. The agency is not requesting comments from

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<sup>11</sup> National Highway Traffic Safety Administration Traffic Safety Facts – 2010 Data (DOT HS 811 625).

<sup>12</sup> National Highway Traffic Safety Administration Traffic Safety Facts – 2009 Data (DOT HS 811 394).

this notice for the regulation process. As mentioned previously, the agency will use comments it receives from this notice to develop a notice proposing near term upgrades to NCAP and a draft 5-year plan for the NCAP program outlining research that the agency plans to conduct as well as longer term upgrades it intends to pursue making to NCAP.

*iv. Improved Test Dummies and Injury Criteria*

*1. New Test Dummies: WorldSID, THOR, Hybrid III 95<sup>th</sup> Percentile Male*

As part of its international harmonization efforts under the auspices of the United Nations Economic Commission for Europe World Forum for Harmonization of Vehicle Regulations (WP.29), the agency has been working with the Informal Working Group on Side Impact Dummies under Working Party on Passive Safety (GRSP) to develop a new family of side impact crash test dummies (known as the WorldSID dummies). These test devices are representative of the 50<sup>th</sup> percentile male and 5<sup>th</sup> percentile female. The goal in developing these dummies is to create worldwide harmonized test devices for side impact with enhanced injury assessment capabilities and improved durability, repeatability, and reproducibility.

Over the past several years, NHTSA has conducted an evaluation of the WorldSID 50<sup>th</sup> percentile male dummy. This evaluation has included, among other things, an assessment of the dummy's biofidelic response, its long-term durability, and the repeatability and reproducibility of test results. NHTSA is working with the international biomechanics community in a cooperative research effort to complete the development and evaluation of the WorldSID 5<sup>th</sup> percentile female dummy. Upon completion, responses from the WorldSID 50<sup>th</sup> male and 5<sup>th</sup> percentile female dummies under comparable conditions will be compared to those from the ES-2re and SID-IIs dummies, respectively, which are currently specified for use in FMVSS No. 214, "Side impact protection," as well as in NCAP side impact tests.

In addition, the agency has been working on completing the development of the THOR 50<sup>th</sup> percentile male and 5<sup>th</sup> percentile female advanced frontal crash test dummies. Recent enhancements to the 50<sup>th</sup> percentile male dummy included modification to the head, neck, thorax, abdomen, pelvis, femur and knee. Injury risk curves and injury criteria for the dummy are under development. Work is planned to adapt updates made for the 50<sup>th</sup> percentile male dummy into the THOR 5<sup>th</sup> percentile female dummy. Agency decisions are planned in 2013 and 2014 for the THOR 50<sup>th</sup> percentile male and 5<sup>th</sup> percentile female dummies, respectively.

Finally, the agency is considering testing vehicles with a frontal test dummy that represents a large male as part of the NCAP effort to provide consumers with a broad spectrum of vehicle evaluation data. This dummy, referred to as the 95<sup>th</sup> percentile adult male Hybrid III dummy, represents a six foot two inch (6'2") tall male weighing 223 pounds. Although this dummy is not currently specified in NHTSA's regulations, this dummy has been used for research studies and developmental testing for decades. Inclusion of the 95<sup>th</sup> percentile adult male dummy and its corresponding injury criteria in a consumer information program could provide larger consumers with information more applicable to their protection while riding in a vehicle. This would also encourage vehicle manufacturers to expand their crash protection envelopes to cover a broader range of occupant sizes.

Comments are requested on the suitability of incorporating the aforementioned test dummies into NCAP. What effect would the incorporation of a particular test dummy have on the vehicle ratings? What other test dummy designs should the agency consider?

*2. New injury criteria: BRIC, SID-IIs Thoracic and Abdomen, Lower Leg*

The agency has been researching a new brain injury measure known as the Brain Injury Criteria (BRIC),<sup>13</sup> to protect vehicle occupants against brain injury with an emphasis on injuries that are rotationally-induced. BRIC utilizes instrumentation in the dummy headform to collect head rotational data that is ultimately used to predict injury risk. NHTSA is currently collecting headform rotational data in NCAP tests to gain an understanding of the new vehicle fleet performance. Predicted injury risk in the fleet testing will then be compared to real-world injury risk based on available field data. Such a criterion could be applied to the various NCAP crash testing programs (i.e., frontal, side pole, side moving deformable barrier).

The agency is also considering the merits of including thoracic and abdominal rib deflection injury criteria for the small female side impact dummy (i.e., the SID-IIs). Incorporating such criteria could encourage safety improvements that would mitigate injuries to body regions not currently regulated by safety standards or evaluated by the side NCAP rating scheme. The current SID-IIs crash test dummies are equipped for measuring these data and the agency collects and monitors them for all side NCAP crash tests. However, at the present time, NCAP simply adds footnotes to the vehicle safety rating information to inform consumers when excessive values are recorded.

The agency may also consider the merit of adding a lower leg injury criterion for the 50<sup>th</sup> percentile male Hybrid III dummy in the frontal NCAP rating scheme to drive vehicle countermeasures that would mitigate driver lower leg injuries and the associated societal cost. The THOR-Lx and THOR-FLx lower leg retrofit kits for use on the 50<sup>th</sup> percentile male and 5<sup>th</sup>

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<sup>13</sup> Takhounts et al., “Kinematic Rotational Brain Injury Criterion (BRIC),” 22<sup>nd</sup> International Technical Conference on the Enhanced Safety of Vehicles, 2011, Paper 11-0263.

percentile female adult Hybrid III dummies, respectively, are instrumentation tools under agency evaluation that would be used to measure the lower leg injury criterion.

Comments are requested as to whether there are other injury criteria that the agency should consider. Would the existing test dummies be sufficient for the suggested injury criteria? How should the agency incorporate ratings based on the new injury criteria in the manner that is useful to the consumer?

### *3. Refined Injury Criteria: Nij*

Since the introduction of the frontal neck injury criterion, Nij, over a decade ago, the agency has been monitoring the correlation between Nij and real-world crash data. Specifically, we are looking at relevant neck injury field risk in frontal NCAP-type crashes using National Automotive Sampling System – Crashworthiness Data System (NASS-CDS) data. Furthermore, the agency has been analyzing existing biomechanical data and various neck injury risk curve alternatives. We are also assessing the role of these neck injury risk curves on recent NCAP test data (model years 2011-2012).<sup>14</sup>

### *v. New Test Protocols for Electric Vehicles*

A growing number of electric vehicles that are or will be available in the market use lithium-ion (Li-ion) batteries for propulsion power. Because Li-ion battery technology is relatively new to the automotive industry, safety standards specific to the use of this technology in automotive applications are still under development. Although NHTSA is unaware of any real-world crashes involving Li-ion battery-powered vehicles that have resulted in a safety

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<sup>14</sup> This activity is related to comments raised during the previous NCAP upgrade (i.e., regarding the non-zero offset in the Nij curve used to calculate injury risk for the purposes of computing star ratings).

concern, the agency is focused on understanding the potential safety risks stemming from crashes involving these vehicles.

In the near term, the agency plans to research additional test protocols that will be run in addition to the existing FMVSS No. 305, “Electric-powered vehicles: electrolyte spillage and electrical shock protection,” and NCAP test procedures of electric vehicles using Li-ion-battery propulsion systems.<sup>15</sup> The agency plans to examine the potential safety hazards associated with the health, stability, and functionality of the battery system after a vehicle is involved in a crash. Specifically, the protocol will examine the vehicle’s ability to structurally protect the battery in a crash and the health of the battery and associated components. The information gathered from this evaluation will build on the agency’s ongoing electric vehicle safety efforts and will help lay the groundwork for future research and/or regulation.

*vi. Other Strategies*

*1. Comparative Barrier Testing for Frontal Rating*

Star ratings for vehicles of widely differing masses and type cannot be directly compared using the full frontal rigid barrier crash test. The full frontal rigid barrier crash test represents a crash between two vehicles of similar weight and geometry. Thus, frontal crash test ratings of two vehicles cannot be compared unless those vehicles are in the same class and within 250 pounds of one another. Similarly, since the Overall Vehicle Score encompasses the frontal rating, the Overall Vehicle Scores of two vehicles cannot be compared unless the two vehicles have similar mass. Thus, there is a desire to provide consumers with a more useful tool for their

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<sup>15</sup> This effort is to improve our current post-crash laboratory test procedures for batteries to ensure that our test labs have the most current and complete safety protocols.

vehicle purchasing decisions, (i.e., one that consumers can use to compare directly the safety of vehicles of widely varying weights and types). Potential changes may include changing the frontal barrier test configuration to provide a better safety comparison given the weight disparity among vehicles in the U.S. fleet.

## *2. Advanced Child Dummies, Family Star Rating*

The agency is aware that consumers often wish to know which vehicles are the safest for their children. Thus, providing a crashworthiness rating for vehicles based on the protection they offer to both front seat adult occupants and rear seat child occupants would support consumer interests. Earlier this notice discussed adding a 5<sup>th</sup> percentile adult female Hybrid III dummy to the rear seat of frontal NCAP tests. An expansion of this concept would be to explore the potential for adding advanced child dummies to one or more of its crashworthiness test modes and explore the feasibility of providing consumers with a “family star rating.” NHTSA plans to use data obtained from the agency’s biomechanics research to support the development and evaluation of an advanced 6-year-old child frontal impact dummy, followed by the 3- and 10-year-old child frontal impact dummies.<sup>16</sup>

### *c. Potential Changes to the Rating System*

#### *i. Adjustment of Baseline Injury Risk*

Safety ratings under the enhanced NCAP that went into effect for MY 2011 are based on how a vehicle’s risk of injury reflected in NCAP tests compares to a baseline injury risk of approximately 15 percent for all crash types. The baseline injury risk was derived from agency crash data for MY 2007 and 2008 vehicles. In the July 11, 2008 Federal Register notice

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<sup>16</sup> NHTSA’s Biomechanics Research Plan, 2011-2015 (DOT HS 811 474).

announcing the NCAP enhancements, the agency indicated that it would periodically review the crash performance of the vehicle fleet, as reflected by NCAP test data. Now is an appropriate time for such a review.

In the short time since the enhanced NCAP was implemented, the frontal and side crash test ratings of NCAP tested vehicles have improved. Crash data from newer model year vehicles could be used to reassess the baseline injury risk that is currently used to determine the respective crashworthiness safety ratings for the frontal and side crash test programs. Additionally, the rollover contribution to the baseline injury risk has changed due to the introduction of ESC in all new vehicles as of September 1, 2011. Rollover risk could be recalculated in the near future based on new data and a vehicle fleet equipped with ESC. (This is discussed further in the next section.)

*ii. Update of the Rollover Risk Curve*

The agency established a criterion in 2001 that reflected the risk of a rollover in a single-vehicle crash based primarily on two vehicle characteristics: the vehicle width at the tires and the height of the vehicle's center of gravity. The rollover risk derived from these measurements, known as a vehicle's Static Stability Factor (SSF), was based on 226,117 real-world crashes.<sup>17</sup> In 2003, the agency added a dynamic test to the rollover evaluation and updated the risk curve for the SSF model. This 2003 rollover risk was based on 293,000 single-vehicle crashes.<sup>18</sup> The SSF and the dynamic test created a slightly modified rollover risk rating for MY 2004 and newer vehicles. Subsequent to the creation of the SSF and dynamic test evaluations, manufacturers

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<sup>17</sup> 68 FR at 59290 (October 14, 2003) (Docket No. NHTSA-2001-9663; Notice 3).

<sup>18</sup> 68 FR at 59258 (October 14, 2003) (Docket No. NHTSA-2001-9663; Notice 3).



began a progressive conversion of the light vehicle fleet from a fleet with no anti-rollover technology to one equipped with ESC. Since September 1, 2011, all new light vehicles sold in the United States have been required to be equipped with ESC.<sup>19</sup>

In the 2008 NCAP upgrade notice, the agency stated that it would recalculate the risk of rollover and reformulate the rollover rating system to reflect the vehicle fleet change. However, since the accumulation of crash data for ESC-equipped vehicles has been progressing slowly, we have delayed the reformulation of the rollover rating system until a time when more crash data are available.

*iii. Carry Back Ratings*

Under the existing NCAP protocols, new model year vehicles that have no design changes from the previous model year can have their NCAP ratings carried over to the new model year. Every year, after reviewing annual submissions from the vehicle manufacturers, NHTSA determines which vehicle ratings should be carried over to the new model year without retesting. The issue of whether a particular rating should be carried over is considered independently for each aspect of performance tested under the NCAP program. For example, it is possible that, between model years, a model was changed in such a way as to make it appropriate for the model to have its frontal crash ratings carried over, but not its side crash ratings carried over. NHTSA uses carry over ratings to avoid the time and expense of unnecessary re-testing and to increase the percentage of new vehicles that have NCAP ratings each year. We are also considering a similar approach for advanced crash avoidance

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<sup>19</sup> Multi-stage manufacturers and alterers were permitted to delay complying with the ESC requirement until September 1, 2012.

technologies. In other words, if the previous model year vehicle is equipped with an identical advanced technology system that received credit for meeting NHTSA's performance criteria, the current model year would also be given similar credit.

NHTSA is considering whether it would be appropriate to carry back ratings, i.e., apply the ratings of test vehicles produced in the new model year to similar vehicles produced in previous model year(s), but that were not rated. In other words, vehicle models that were tested in the new model year, but were not changed from and rated in the previous model year could have the new model year ratings applied to previous model year(s). Doing this would depend on whether the new model year design is identical<sup>20</sup> to the previous model year design. Similar to the carry over ratings policy, the carry back policy would provide increased consumer information.

## **V. Ideas Under Consideration for Providing Better Consumer Information**

### *a. Focus Group Testing on Advanced Technologies*

As part of the 2008 upgrade of NCAP, the agency performed focus group testing on the desire for advanced crash avoidance technology information. At that time, consumers indicated that they wanted to know if specific beneficial advanced technologies were provided on specific vehicle models. To that end, the agency identified three beneficial advanced technologies: electronic stability control, lane departure warning, and forward collision warning and placed a description of and recommendation for each of them on the agency's website [www.safercar.gov](http://www.safercar.gov). For each of these technologies, the agency specified minimum performance criteria. If a vehicle

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<sup>20</sup> Identical vehicle models are those that have not been redesigned with structural changes and are equipped with similar safety equipment (i.e., restraint systems, air bags, crash avoidance sensors, algorithms, etc.) from one model year to the next.

model is equipped with one of the technologies and if the manufacturer self-certifies that the model meets the minimum performance criteria for that technology, the agency places a symbol illustrating that technology next to the entry for that model on [www.safercar.gov](http://www.safercar.gov).

Given the passage of time and rapid pace of electronic communications, the agency is planning to revisit how consumers would like advanced technology information presented to them. In 2013, we plan to conduct focus group testing to determine if consumers would like alternative methods of having advanced technology information communicated and if ratings of advanced technologies, rather than the current approach of recommending advanced technologies, are preferred.

*b. Comprehensive Consumer Research on the Monroney Label*

NHTSA plans to conduct comprehensive consumer research on the design and use of the NCAP safety ratings portion of the Monroney label.<sup>21</sup> Through this research, the agency will explore where consumers look for safety information and how consumers use the Monroney label when making their vehicle purchasing decisions. It will also evaluate the Monroney label content comprehension and identify potential tradeoffs involved in alternative approaches. The results of this research will help guide effective changes to the safety ratings section of the Monroney label, and identify potential communication approaches to use in a consumer education program.

*c. Vehicle-CRS Fit Program*

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<sup>21</sup> Information Collection Request for the Consumer Research Program on the Monroney label (ICR Number 201112-2127-001), [www.reginfo.gov](http://www.reginfo.gov).

As indicated in Section III of this notice, the agency has already separately sought public comment regarding the Vehicle-CRS Fit program in a Federal Register “Request for comments” notice published on February 25, 2011.<sup>22</sup> Thus, the agency is not seeking through this notice to obtain additional comments on this program. This proposed voluntary program is intended to have vehicle manufacturers evaluate CRSs for compatibility with a specific vehicle model based on a set of objective criteria. Vehicle manufacturers would provide NHTSA with a list of recommended CRSs that they have determined fit in their vehicles, and NHTSA would in turn publish that information. The agency plans to spot-check the CRS-vehicle combinations to ensure they actually comply with the requirements of the new voluntary Vehicle-CRS Fit program. A final decision notice for this program is currently being developed.

*d. Child Seat Ease of Use Rating Program Upgrade*

In response to Section 14(g) of the Transportation Recall Enhancement, Accountability and Documentation (TREAD) Act, NHTSA established a yearly Ease of Use assessment program for add-on child restraints. Since the program was established, the most notable improvements are ones that have been made to child restraint harness designs, labels and manuals. On February 1, 2008, the agency enhanced the program by including new rating features and criteria, adjusting the scoring systems, and using stars to display the Ease of Use ratings.

The agency is now considering additional improvements to the Ease of Use Program to address added CRS features that are not currently assessed, but may have an effect on usability. Additionally, it may be necessary to strengthen the current rating criteria since manufacturers

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<sup>22</sup> 76 FR 10637 (February 25, 2011) (Docket No. NHTSA-2010-00062-0001).

continually make improvements to their products. Comments are requested on what additional CRS features should be addressed and what aspects of the current rating criteria should be strengthened.

## **VI. Public Participation**

### *How do I prepare and submit comments?*

Your comments must be written and in English. To ensure that your comments are filed correctly in the docket, please include the docket number of this document in your comments. Your comments must not be more than 15 pages long (49 CFR 553.21). NHTSA established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments.

Please submit one copy (two copies if submitting by mail or hand delivery) of your comments, including the attachments, to the docket following the instructions given above under ADDRESSES. Please note, if you are submitting comments electronically as a PDF (Adobe) file, we ask that the documents submitted be scanned using an Optical Character Recognition (OCR) process, thus allowing the agency to search and copy certain portions of your submissions.

### *How do I submit confidential business information?*

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Office of the Chief Counsel, NHTSA, at the address given above under FOR FURTHER INFORMATION CONTACT. In addition, you may submit a copy (two copies if submitting by mail or hand delivery), from which you have deleted the claimed

confidential business information, to the docket by one of the methods given above under ADDRESSES. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in NHTSA's confidential business information regulation (49 CFR Part 512).

*Will the agency consider late comments?*

NHTSA will consider all comments received before the close of business on the comment closing date indicated above under DATES. To the extent possible, the agency will also consider comments received after that date.

You may read the comments received at the address given above under ADDRESSES. The hours of the docket are indicated above in the same location. You may also see the comments on the Internet, identified by the docket number at the heading of this notice, at <http://www.regulations.gov>.

Please note that, even after the comment closing date, NHTSA will continue to file relevant information in the docket as it becomes available. Further, some people may submit late comments. Accordingly, the agency recommends that you periodically check the docket for new material.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477-78) or you may visit <http://www.dot.gov/privacy.html>.

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Associate Administrator for  
Rulemaking

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[Signature page for Request for Comments, New Car Assessment Program]

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