INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

April 10, 2007

The Honorable Nicole R. Nason
Administrator
National Highway Traffic Safety Administration
400 Seventh Street, SW
Washington, DC 20590

The New Car Assessment Program: Suggested Approaches for Enhancements;
Docket No. NHTSA-2006-26555

Dear Ms. Nason:

The Insurance Institute for Highway Safety (IIHS) appreciates the opportunity to comment on the report by the National Highway Traffic Safety Administration (NHTSA) on ways to enhance its New Car Assessment Program (NCAP). This letter elaborates on comments I made at the NHTSA public hearing on March 7, 2007.

When NHTSA began NCAP in 1978, it was the first government program in the world to provide consumers with objective information about how well vehicles would protect them in frontal crashes. Prior to the program the prevailing wisdom had been that federal regulation was the only way to get safety features in new vehicles. But in its early years NCAP identified important differences in the performance of new vehicles in 35 mi/h frontal crash tests into a rigid barrier. Major variations in the performance of restraint systems were identified, and media coverage of the results prompted automakers to improve designs quickly. Thus NCAP signified the start of the safety marketplace that is producing rapid improvements in vehicle designs. In this respect NCAP probably is the most important program NHTSA ever adopted.

Now this 30-year-old success story has lost much of its luster, and it needs revision if it is to maintain its pivotal role in vehicle safety improvements. In the case of the frontal test, revision is long overdue. The fact that frontal crash test ratings no longer identify important safety differences for consumers is not a new problem. IIHS made this observation to the agency in 1994 at a previous public meeting on NCAP (IIHS, 1994). Increasingly the same situation exists for NCAP's side impact test program and for its rollover ratings, which never have done much except to identify traditional SUVs with high ground clearances as being more rollover prone than lower-to-the-ground cars.

Others, including NHTSA, have acknowledged the shortcomings in the existing program. A 2005 Government Accountability Office (GAO) report emphasized that NCAP is "at a crossroad where it will need to change to maintain its relevance" (GAO, 2005). In October 2004 NHTSA asked the public for suggestions on how to improve the NCAP frontal test because Federal Motor Vehicle Safety Standard (FMVSS) 208, Occupant Crash Protection, had been amended to adopt a 35 mi/h frontal test, the same as in NCAP. IIHS and others submitted detailed comments in response to the October 2004 notice suggesting specific ways to improve the existing program (IIHS, 2004). Now, almost 2½ years later, NHTSA (2007) finally has released its January 2007 report, "The New Car Assessment Program Suggested Approaches for Future Program Enhancements."

The report is disappointing. Although it is a comprehensive review of the role the agency thinks it can play in the future to provide consumers with valid safety information, the proposals are limited. There is much to like about NHTSA's vision and analysis, but in the end the proposal will not do much to restore the sparkle to the diamond that was NCAP.

1005 N. GLEBE RD., ARLINGTON, VA 22201 TEL. 703/247-1500 FAX 703/247-1678 www.iihs.org

What is good about the proposal is that NHTSA recognizes the need for NCAP to continue to evolve and update the kinds of consumer information it provides. IIHS strongly supports the agency's intention to expand NCAP to include information about the availability of electronic stability control (ESC). We also support the inclusion of information about other crash avoidance features when the data on the real-world performance of these systems show they are effective in reducing crashes. IIHS supports the agency's suggestion that it might include our seat/head restraint evaluations in its consumer information program. IIHS believes these evaluations, developed by insurer-supported organizations around the world during the past several years, represent the current state of knowledge, and the agency's use of them would widen their availability to consumers.

What is disappointing is that these and other agency proposals are unlikely to have the same effect on vehicle designs as the first NCAP crash tests. These actions will not drive safety innovation — they mainly recognize the new technology that increasingly is available in new vehicles. The safety marketplace, fueled by IIHS and other consumer information programs, and by manufacturers' voluntary commitments to adopt new safety features, has resulted in the rapid introduction of new safety technologies such as head protection side airbags and ESC. All of this activity has taken place in the absence of any federal standards requiring the technologies. Head protection side airbags and ESC will be standard equipment in virtually all passenger vehicles well before NHTSA requires their installation and, most likely, well before NHTSA adopts tests in NCAP to encourage it. (IIHS estimates that 49 percent of 2007 models have head protection side airbags and 51 percent have ESC standard.) Meanwhile NHTSA is not conducting consumer tests that challenge vehicle designs in the way the original front and side tests did. In fact, the proposal to improve vehicle crashworthiness falls far short of what NHTSA could and should achieve.

Frontal test

The failure to drive future vehicle designs in significant ways is particularly apparent in NHTSA's proposal to enhance frontal crash protection. In its report NHTSA (2007) concentrates on the addition of thigh, hip, knee, and lower leg injury measures to reduce injuries to these body regions. In the longer term NHTSA says it could evaluate the feasibility of assessing injury risk to the leg below the knee and explore the meaningfulness of moderate-speed impacts. Although IIHS supports efforts to reduce injuries to the hip and lower legs — injuries that are costly to treat and often require long recovery times — NHTSA's analysis misses the mark. Despite NCAP's full-frontal test and IIHS's frontal offset test, there still were more than 15,000 occupant deaths in frontal crashes in 2005. It is important to concentrate on reducing these deaths by focusing on tests that will address the primary remaining causes of fatalities in frontal impacts. In this regard NHTSA and IIHS are in similar situations. The frontal offset test, started by IIHS more than 15 years after NCAP's first frontal tests, also has achieved much of its benefit. All recent vehicles tested by IIHS achieve at least acceptable ratings. It is time for both organizations to move on, but how do we decide the next step? IIHS believes the continued presence of 15,000 deaths in frontal crashes — more than 11,500 to front-seat occupants in 2005 — compels us to focus on these deaths.

IIHS has been conducting research to identify the types of crashes still resulting in fatalities among vehicles that have been rated good in our frontal offset test. As described in more detail in Appendix A, IIHS examined National Automotive Sampling System (NASS) files to identify crashes in which recent model vehicles that earned good ratings had fatalities to belted front-seat occupants. Results indicate that fatal crashes involved the following types of impacts: narrow object (e.g., trees), large truck underride, narrow overlap (vehicle was struck outside its main longitudinal structure), wide overlap (30-40 percent overlap) with higher estimated delta V than IIHS frontal offset test, and low severity where driver factors such as age and weight may have contributed. IIHS will continue this research to determine what additional tests should be added to our crashworthiness evaluation program.

Because an impact with a narrow object is one type of crash that continues to kill occupants in frontal crashes, one possible way to address these deaths is the addition of a frontal pole impact to NCAP. In our December 2004 comments to NHTSA regarding changes in the NCAP frontal test, IIHS (2004) noted:

> Although not among NHTSA's proposals, there is another important frontal crash configuration that is not being addressed by any test. Impacts into narrow objects like poles, posts, and trees make up a significant number of serious real-world crashes. Analysis of crashes in NASS shows that impacts into these types of objects accounted for about 10 percent of all frontal crashes during 1995-2003 and nearly one-quarter of crashes resulting in serious injuries. Similarly, Fatality Analysis Reporting System (FARS) data indicate that more than 20 percent of fatal frontal crashes are into fixed narrow objects. Offset tests more closely simulate impacts with narrow objects than do full-width tests, but the specific structural and restraint issues important in this type of crash are not necessarily being evaluated. A narrow-object NCAP test could have an important impact on real-world vehicle crashworthiness and would almost certainly give consumers a wide range of results to inform their purchasing decisions.

In its report NHTSA (2007) includes an analysis of injuries by frontal crash mode, showing that frontal pole impacts are a significant source of injury. IIHS has been conducting a series of pole impact tests to determine whether to add this test configuration to our consumer information program. When our testing is complete, we will determine whether the use of this test will lead to meaningful improvements in vehicle designs. We will, of course, share test results with NHTSA so the agency can determine whether to add this test configuration to its NCAP test series. Whether or not a frontal pole test would be a meaningful addition to NCAP, IIHS again urges NHTSA to concentrate its research efforts on identifying meaningful tests that will address the remaining sources of serious injuries and fatalities in frontal impacts.

Side impact test

NHTSA suggests including the pole test proposed in FMVSS 214, Side Impact Protection, as a way to encourage manufacturers to more quickly fit new vehicles with head protection side airbags. In reality, head protection side airbags already are standard equipment in 49 percent of 2007 model year passenger vehicles, due in part to IIHS's side impact test program and in part to automakers' voluntary agreement with NHTSA to improve vehicle compatibility in side impacts with pickups and SUVs. Thus by the time the agency could implement a pole test in NCAP, say for 2008 models, the vast majority of vehicles already will have head protection side airbags. We wonder why NHTSA did not give greater priority to adopting or modifying the IIHS side impact barrier, which was developed to better represent the risk of pickups and SUVs to passenger car occupants in side impacts. As the agency notes, these vehicles account for much of the risk in side impacts, and the agency's pole test does not address many aspects of this risk.

The need to improve the existing side impact barrier used in NCAP is well known. In 1989 NHTSA issued an amendment to FMVSS 214 to require the use of a side impact test to simulate a passenger car striking the side of another vehicle in a 33 mi/h impact. NHTSA adopted the same moving deformable barrier (MDB) used in NCAP but increased the test speed to 38 mi/h. The same passenger car MDB still is in use today, even though the mix of vehicles on the road has shifted dramatically since the amendment was issued, with pickups and SUVs increasing in the vehicle fleet. NHTSA is well aware that the fleet has shifted and that its side impact barrier no longer is representative. For example, in its March 1999 Report to Congress on the status of its plans to harmonize and upgrade its side impact regulation, NHTSA said that the "smaller and lighter EUMDB [European moving deformable barrier] is not representative of the current US vehicle fleet and may not lead to increased safety benefits. The US moving deformable barrier (USMDB) is also not representative of recent trends in striking vehicles most likely to cause

serious injury in the United States" (NHTSA, 1999). In its strongly critical April 2005 review of NCAP, GAO (2005) noted, "The usefulness of the current tests has been eroded by changes in the vehicle fleet that have occurred since the program began. Today there are many more large pickups, minivans, and SUVs than existed 27 years ago, and this has created a new safety hazard from the incompatibility between large and small vehicle and rollover crashes, which are not fully addressed by current NCAP tests." Since adoption of the original side impact barrier in 1989, NHTSA has not proposed any upgrades to the barrier. In fact, NHTSA's January 2007 report on possible changes to this NCAP program says more research is needed to determine what changes in the barrier are needed.

As mentioned previously there is a ready alternative to the inadequate NHTSA side impact barrier. In 1999 IIHS began developing a barrier with the height and shape of the front end of a pickup or SUV. The research showing the relevancy of the new barrier was shared with NHTSA and the highway safety community in both private and public forums, and in 2003 IIHS began using the barrier in its consumer information test program. Use of this barrier addresses two important issues not captured by the agency's barrier. The IIHS barrier represents the ride height and hood height of a pickup or SUV, so the head of a passenger car driver struck by the barrier is at substantial risk of injury, and the rocker panel of the tested vehicle, which is engaged by the agency's barrier, is overridden. To reduce the injury risks associated with the geometric characteristics of pickups and SUVs, automakers must increase the intrusion resistance of the sides of their vehicles and install side airbags that provide head protection. NHTSA could begin using the IIHS barrier tomorrow in NCAP's side impact test. This would bring additional pressure on automakers to improve intrusion resistance across a wider range of vehicles than IIHS can quickly test.

Rear test

NHTSA (2007) noted in its report that the public felt vulnerable in rear impacts. It said one alternative would be to include internet links from the agency's website to IIHS ratings of seat/head restraints. Since 1995 IIHS has been rating seat/head restraint designs based on their geometry, with the goal of encouraging automakers to install head restraints that are taller and closer to the backs of occupants' heads, thus reducing the risk of whiplash-related injuries. Starting in 2004 IIHS added a dynamic test simulating an impact in which a stationary vehicle is struck from the rear at 20 mi/h by a vehicle of the same weight. Providing a link for people visiting NHTSA's website would give them important information about the relative ability of different seat/head restraint designs to provide protection in typical rear-end crashes. IIHS urges NHTSA to include the results of our rear impact tests on its website.

Rollover crashes

In the discussion of future rollover NCAP enhancements, NHTSA concentrates on the effectiveness of ESC to reduce rollover-related crashes. The safety marketplace is pushing the installation of ESC, which should be standard equipment on virtually all light passenger vehicles well ahead of the effective date of NHTSA's proposed standard. By concentrating on ESC, NHTSA has fallen into the trap of assuming that crash avoidance improvements are necessary and sufficient solutions to reduce deaths in rollover crashes. But many such deaths will continue to occur in a vehicle fleet equipped with ESC. Rollover was the most harmful event in the deaths of 7,789 occupants of cars, pickups, and SUVs in 2005. Even if ESC could have prevented half of these fatalities, almost 4,000 deaths would have remained. Last year NHTSA proposed a long overdue increase in the performance requirements of FMVSS 216, Roof Crush Resistance. The regulatory analysis for the proposal suggested relatively small benefits for increased roof strength. However, that analysis was conservative in the extreme. It assumed that increased roof strength would have no benefits for unbelted occupants, ejected occupants, or occupants who sustained injuries coded as more severe than the roof-contact injury. As IIHS suggested in 2001, NHTSA needs to

conduct additional research on the issue of roof crush, and we believe the research would justify the addition of a roof crush metric to NCAP (IIHS, 2001).

Crash avoidance technology

IIHS agrees that NHTSA should encourage the installation of crash avoidance technologies by providing consumers with information about which vehicles have these technologies. We also agree that it is difficult "to determine real-world effectiveness and safety benefits of new technologies" before they are widely introduced in the marketplace. At present IIHS encourages NHTSA not to rate vehicle crash avoidance technologies but simply to provide consumers with information about which vehicles have different types of technologies. For example, we do not have enough real-world experience to let consumers know whether one type of ESC system is more effective than another. However, studies by NHTSA (Dang, 2004), IIHS (Farmer, 2006), and the Highway Loss Data Institute (2006) have shown the overall effectiveness of ESC in reducing crashes and insurance losses under collision coverage. It is important to provide consumers with information on which vehicles have ESC because we know it reduces losses, even though we cannot currently identify which systems are the most effective. As pointed out earlier, automakers are voluntarily moving forward to equip their vehicles with ESC, and NHTSA can help by providing consumers with information about which vehicles have this lifesaving technology.

Combined safety score

NHTSA lays out several possible approaches to generating a score that combines the front and side impact test results into a single rating. Although a combined safety rating initially sounds desirable, it has one undesirable effect — an all-encompassing single rating may allow some poor performance qualities to be hidden under the umbrella rating. The goal should be to encourage consumers to look for a vehicle that has a high or the highest rating in every performance category. The easiest way to do that is to provide consumers with all of the scores and allow them to make the judgment as to which vehicle to purchase.

Summary

In its initial years NCAP drove improved crashworthiness in vehicles and created the marketplace for safety improvements. Now the safety marketplace is moving faster than NCAP. This outcome could scarcely have been foreseen in the early years of NHTSA, when safety advocates and automakers were nearly always in confrontation and the automaker mantra was "safety doesn't sell."

The current marketplace competition is exactly what we in the public health sector have been fighting for. However, this success has complicated NHTSA's role in consumer information programs. The agency now describes its plan for addressing these complications, and it is comprehensive — from upgrading front and side crash tests to including crash avoidance features to deriving combined scores. IIHS endorses the agency's efforts to include crash avoidance metrics, especially ESC, in its NCAP assessments. NHTSA's plan is disappointing, however, in that it contains no proposals that are likely to greatly affect vehicle crashworthiness designs in the near future. Unfortunately, the relatively timid proposal from NHTSA may be the best that can be done until additional research is completed.

Although comprehensive, NHTSA's NCAP report also is an indictment of the agency's research efforts in recent years. Such research has not been directed at answering the challenging questions related to improving front, side, or rollover crashworthiness. Or the research has been misled by faulty assumptions, such as that a pole test is necessary to drive effective head protection in side impacts or

that increased roof crush strength is effective for only a small number of rollover occupant fatalities. It is likely that both assumptions are wrong.

NHTSA needs to reinvigorate its research on crashworthiness features. The agency needs to understand how people are dying in crashes in vehicles designed to do well in current tests and whether other tests would encourage new vehicle designs that prevent these deaths.

NHTSA must not become complacent about crashworthiness issues just because crash avoidance features like ESC, and perhaps lane departure warnings, are beginning to show promise. Until we actually know that vehicles will not crash, we must continue to improve their designs to protect occupants when they do crash.

Sincerely,

Adrian K. Lund, Ph.D.
President

cc: Docket Clerk, Docket No. NHTSA-2006-26555

References

Dang, J.D. 2004. Preliminary results analyzing the effectiveness of electronic stability control (ESC) systems. Report no. DOT HS 809 790. Evaluation Note. Washington, DC: US Department of Transportation.

Farmer, C.M. 2006. Effects of electronic stability control: an update. *Traffic Injury Prevention*. 7:319-24.

Government Accountability Office. 2005. Vehicle safety: opportunities exist to enhance NHTSA's New Car Assessment Program. Report no. GAO-05-370. Washington, DC.

Highway Loss Data Institute. 2006. Electronic stability control. *HLDI Bulletin*, Vol. 23, No. 1. Arlington, VA.

Insurance Institute for Highway Safety. 1994. Comment to the National Highway Traffic Safety Administration concerning the New Car Assessment Program, Public Meeting Comments; NHTSA Docket no. 79-17, Notice 40, November 14, 1994. Arlington, VA.

Insurance Institute for Highway Safety. 2001. Comment to the National Highway Traffic Safety Administration concerning vehicle roof crush resistance; Docket no. NHTSA 1999-5572, Notice 2, December 19, 2001. Arlington, VA.

Insurance Institute for Highway Safety. 2004. Comment to the National Highway Traffic Safety Administration concerning proposed changes to the frontal New Car Assessment Program; Docket no. NHTSA-2004-18765, December 13, 2004. Arlington, VA.

Insurance Institute for Highway Safety. 2007. Letter to the National Highway Traffic Safety Administration supporting two petitions for reconsideration of the SID-IIs final rule (December 14, 2006) asking the agency to update the SID-IIs illiac wing design; Docket no. NHTSA-25442, February 8, 2007. Arlington, VA.

National Highway Traffic Safety Administration. 1999. Report to Congress; Status of NHTSA plan for side impact regulation harmonization and upgrade. Washington, DC. US Department of Transportation.

National Highway Traffic Safety Administration. 2007. The New Car Assessment Program suggested approaches for future program enhancements. Report no. DOT HS 810 698. Washington, DC. US Department of Transportation.

Appendix A

Crash configurations and fatalities in vehicles with good IIHS ratings for frontal crashworthiness

IIHS staff reviewed the National Automotive Sampling System data files in an effort to understand how people still are being killed in frontal crashes of vehicles designed for good frontal crashworthiness. The criteria used in selecting cases were that a vehicle had to earn a good rating in the IIHS frontal offset test, the vehicle had to be a recent model year (2000 or later), and a belted front-seat occupant sustained fatal injuries.

The review identified 24 cases that met the selection criteria. IIHS then grouped the cases by crash configuration to identify the types of crash tests that might represent these crashes. Two cases fall in multiple categories.

Excluded cases
Three of the cases could not be represented by any reasonable crash test. One case involved a vehicle that fell off an open drawbridge. A second case involved a vehicle that became airborne as it left the roadway before striking trees with its front and roof. The third case involved an airborne snowmobile that struck the driver as it crashed through the windshield.

Medium/heavy truck crash with underride: 5
- Three vehicles underrode the backs of heavy truck trailers.
- Two vehicles were struck in the front by a medium or heavy truck, with underride a major factor.

Narrow object crashes: 5
- Two vehicles struck utility poles, but these were not the only crash events in these cases. One of the vehicles struck a brick wall prior to the pole impact, whereas the second vehicle rolled over after the pole impact.
- Two vehicles struck trees with diameters of approximately 50 cm, engaging 30-40 percent of the vehicle front and apparently loading one of the longitudinal members in one case. In one case the vehicle caught fire after the tree impact, which may have contributed to the fatality.
- One vehicle left the road and struck two trees, one obliquely with the side of the vehicle and one with the front of the vehicle. It is unknown how these two impacts contributed to the fatality.

Narrow overlap crashes: 5
Five cases involved offset impacts with objects that appeared to load the vehicles outboard of the main longitudinal structures.
- Four vehicles struck other vehicles.
- One vehicle was involved in two narrow offset impacts to the same side of the vehicle front, an impact with a brick wall followed by a utility pole.

Wide overlap crashes: 4
Four vehicles were in offset crashes in which one of the main longitudinal structural members appeared to carry substantial load. Apparent overlap ranged from 30 to 40 percent.
- Three vehicles struck other vehicles with calculated changes in velocity (delta V) of 76-97 km/h.
- One vehicle struck a large tree that appeared to load one of the longitudinal structural members.

Low severity crashes: 4
Four cases were fatal crashes at lower speeds (calculated delta Vs of 30-37 km/h) where age, obesity, or other factors appeared to contribute to injury. All four cases were offset impacts with other vehicles.

The following list identifies each NASS case.

Case number	Description	Delta V (km/h) if known*	Crash configuration(s)
2003-11-18	Snowmobile crashed through windshield	n/a	Excluded
2005-9-64	Vehicle airborne into trees with front, roof	n/a	Excluded
2005-82-18	Vehicle fell off open drawbridge	n/a	Excluded
2000-11-130	Head-on impact with heavy truck	n/a	Truck underride
2002-9-43	Impact into rear of tractor trailer	n/a	Truck underride
2004-82-16	Impact into rear of tractor trailer	n/a	Truck underride
2004-43-253	Head-on impact with heavy truck	n/a	Truck underride
2003-42-61	Impact into rear of heavy truck	n/a	Truck underride
2004-43-343	Impact into 50 cm tree, postcrash fire	37	Narrow object
2002-45-39	Oblique side impact with tree, front impact with second tree	84	Narrow object
2005-49-205	Impact with utility pole followed by rollover	n/a	Narrow object
2004-9-62	Impact into 50 cm tree	70	Narrow object, wide overlap
2004-50-32	Right front impacts with wall then pole	n/a	Narrow overlap, narrow object
2001-81-117	Left front impact with vehicle	45	Narrow overlap
2004-73-241	Left front impact with vehicle	48	Narrow overlap
2002-9-131	Left front impact with vehicle	53	Narrow overlap
2005-45-142	Left front impact with vehicle	70	Narrow overlap
2001-75-113	Left front impact with vehicle	76	Wide overlap
2005-74-138	Left front impact with vehicle	97	Wide overlap
2002-47-39	Left front impact with vehicle	84	Wide overlap
2004-79-49	Left front impact with vehicle	30	Low severity
2004-50-147	Right front impact with vehicle	35	Low severity
2005-4-119	Left front impact with vehicle	36	Low severity
2005-45-196	Right front impact with vehicle	37	Low severity

*The calculated changes in velocity (delta V) for narrow overlap cases likely are less accurate due to the small damage width being used to calculate the energy loss.