INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

July 1, 2008

The Honorable Nicole Nason
Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE, West Building
Washington, DC 20590

Petition for Rulemaking; 49 CFR 581 Bumper Standard

Dear Administrator Nason:

The Insurance Institute for Highway Safety (IIHS) petitions the National Highway Traffic Safety Administration (NHTSA) to amend the bumper standard (49 CFR § 581.3) to require compliance by light trucks, vans, and SUVs, which NHTSA collectively refers to as light trucks and vans (LTVs). The standard currently sets bumper performance requirements for passenger cars only.

It is legal to sell new LTVs in the United States without any bumpers, and this produces several undesirable consequences. Many LTVs provide virtually no protection for vital safety-related parts such as headlights and taillights, which often sustain damage in low-speed collisions. LTV owners have to pay for expensive repairs to fenders, grilles, and other parts that sustain unnecessary damage in low-speed collisions. And vehicle manufacturers who choose to equip their LTVs with bumpers do not have to make them compatible in height with car bumpers. LTV bumpers can be much higher than car bumpers, so they inflict excessive damage to the cars with which they collide at low speeds.

Crash test results and data from insurance claims demonstrate the safety and property damage consequences of allowing inadequate bumpers, or none at all, on LTVs. By applying car bumper requirements to LTVs, NHTSA would make bumpers more compatible across the range of passenger vehicles. This would enhance occupant safety and, at the same time, reduce costly damage to property in low-speed collisions.

Crash tests demonstrate bumper height mismatch

The purpose of a bumper is to protect the body of a vehicle and its safety-related parts from damage in low-speed collisions, which frequently occur in commuter traffic and parking lots. A bumper should take the brunt of the damage in such collisions, ideally limiting damage to the bumper system and keeping it away from the vehicle body. Yet IIHS crash tests show that LTVs incur extensive damage to safety-related components such as lights in low-speed collisions. The incompatibility between LTV and car bumpers can lead to excessive damage to cars that collide with LTVs.

New test series (2008): IIHS conducted a series of 4 tests in which midsize 4-wheel-drive SUVs going 10 mph struck the backs of stationary Hyundai Sonatas. The SUVs represent a wide range of real-world property damage liability claims experience. Three of the 4 SUVs (Hummer H3, Jeep Grand Cherokee, and Mitsubishi Endeavor) had some of the highest relative average loss payments under property damage liability coverage during 2005-07, while the Ford Explorer had below-average payments. The bumper bars on the H3, Endeavor, and Grand Cherokee are considerably taller than the car bumper zone specified in the federal standard (16-20 inches from ground), while those on the Ford Explorer have substantial overlap with the bumper zone (see Figure 1A).

Figure 1A
Bumper alignments of 4 midsize SUVs versus rear bumpers of Hyundai Sonatas

2008 Ford Explorer 2008 Hyundai Sonata

2008 Mitsubishi Endeavor 2008 Hyundai Sonata

2008 Jeep Gr. Cherokee 2008 Hyundai Sonata

2008 Hummer H3 2008 Hyundai Sonata

Figure 1B
Damage to Hyundai Sonatas and list repair costs to cars and SUVs after low-speed collisions

Explorer: $868 Sonata: $1,520

Endeavor: $1,129 Sonata: $3,891

Gr. Cherokee: $1,324 Sonata: $4,633

H3: $1,700 Sonata: $4,737

The test involving the Ford Explorer, with a front bumper geometrically compatible with the Sonata's rear bumper, resulted in the lowest repair costs for both car and SUV (see Table 1). The other 3 SUVs, which have higher front bumpers, overrode the backs of the Sonatas and produced extensive damage to both cars and SUVs (see Figure 1B). Damage to the Sonatas struck by the SUVs with higher bumpers included safety-related components. Taillights were broken, and trunks were exposed to exhaust gases. The Grand Cherokee and H3 also sustained headlight damage. In contrast, the Sonata struck by the Explorer did not sustain any safety-related damage.

Table 1
Damage repair costs, 10 mph front-into-rear crash tests

SUV into Hyundai Sonata	SUV damage	Safety damage	Sonata damage	Safety damage	Total damage
2008 Ford Explorer	$868	No	$1,520	No	$2,388
2008 Mitsubishi Endeavor	$1,129	No	$3,891	Yes	$5,020
2008 Jeep Grand Cherokee	$1,324	Yes	$4,633	Yes	$5,957
2008 Hummer H3	$1,700	Yes	$4,737	Yes	$6,437

Previous test series (2004): IIHS conducted a series of tests in which 5 cars going 10 mph struck the backs of stationary SUVs, all midsize models from the same manufacturers as the cars (IIHS, 2004). Then the test configuration was reversed, and the SUVs struck the cars. While the bumper alignment between the Ford Explorer and its paired Ford Taurus was good, the bumpers on the Volvo XC90 and Jeep Grand Cherokee were significantly higher than those on their partner cars. Figure 2 shows the front bumper alignment of 2 car-into-SUV pairs and 2 SUV-into-car pairs.

Figure 2
Bumper bar comparisons, 4 vehicle pairs

2004 Ford Taurus 2004 Ford Explorer

2004 Ford Explorer 2004 Ford Taurus

2004 Volvo S40 2004 Volvo XC90

2004 Jeep Gr. Cherokee 2004 Dodge Stratus

Results varied from a total of approximately $1,250 damage to both vehicles in the Explorer-into-Taurus impact to more than $6,000 total damage in tests of the Volvo S40 into the XC90 and Jeep Grand Cherokee into the Dodge Stratus (see Table 2). In these Volvo and Chrysler tests, the mismatched bumpers completely bypassed each other, resulting in underride and override and damage totals exceeding $6,000. The Explorer, with its lower bumper bar, not only sustained the least amount of damage but also inflicted less damage to its paired car than the other SUVs.

Table 2
Damage repair costs, 10 mph front-into-rear crash tests

Car into SUV	Car damage	Safety damage	SUV damage	Safety damage	Total damage
Ford Taurus into Explorer	$1,784	Yes	$824	No	$2,608
Chevrolet Malibu into TrailBlazer	$3,163	Yes	$937	No	$4,100
Dodge Stratus into Jeep Grand Cherokee	$3,256	Yes	$1,279	No	$4,535
Nissan Altima into Murano	$4,507	Yes	$1,188	No	$5,695
Volvo S40 into XC90	$4,984	Yes	$1,096	No	$6,080
SUV into car	**SUV damage**	**Safety damage**	**Car damage**	**Safety damage**	**Total damage**
Ford Explorer into Taurus	$701	No	$555	No	$1,256
Volvo XC90 into S40	$1,695	No	$2,361	No	$4,056
Chevrolet TrailBlazer into Malibu	$1,851	No	$2,316	No	$4,167
Nissan Murano into Altima	$2,517	Yes	$2,485	Yes	$5,002
Jeep Grand Cherokee into Dodge Stratus	$2,848	Yes	$3,281	No	$6,129

Note: Except for Altima (2005 model), cars and SUVs are 2004 models; repair costs reflect July 2004 parts and labor prices.

New bumper requirements for LTVs would not reduce the utility of these vehicles

In two previous denials of petitions to apply bumper requirements to LTVs, NHTSA has said these vehicles need more ground clearance than cars, and requiring bumpers at the height of those on cars would reduce the utility of the LTVs (Office of the Federal Register, 1984, 1991). On its website, NHTSA says it decided "not to regulate bumper performance or elevation for these vehicle classes (minivans, utility vehicles, or light trucks) because of potential compromise to the vehicle utility in operating on loading ramps and off-road situations" (NHTSA, 2008).

However, results of two IIHS test series (see above) contradict NHTSA's stated reasons for not regulating LTV bumpers. Ford has managed to equip the Explorer with front bumpers designed to interact well with those on cars and produce less damage in low-speed impacts without compromising the ability of this vehicle to operate on loading ramps and off road.

Another indication that equipping LTVs with good bumpers need not compromise the utility of these vehicles involves LTVs of the 1970-80s, which commonly were used for work purposes despite their lower stances compared with many of today's LTVs. The highest bumpers on the older models were about 19 inches from the ground, which still was low enough to overlap somewhat with the car bumper zone of 16-20 inches. In contrast, the bottom edges of the bumpers on many of the newer LTVs IIHS has measured are more than 20 inches from the ground. At this height, they would miss the car bumper zone entirely. The bumper heights of other LTVs IIHS has measured, at 18-20 inches from the ground, overlap less than half of the car bumper zone.

There also are technological means of increasing ride height when needed for off-road use. Some Land Rover and Audi models are equipped with electronic air suspension systems that switch on to raise the vehicle ride height. Technologies such as these are an effective solution to the conflict between ride-height requirements for vehicle use on and off road.

LTVs encompass a wide range of vehicle styles that did not exist when the bumper standard first was applied. Vehicles based on unit-body car designs like the Chrysler PT Cruiser and Chevrolet HHR (see Figure 3) are becoming common. Many of these vehicles obviously are not designed for "operating on loading ramps and off-road situations." Instead they join the variety of passenger-carrying vehicle styles.

Figure 3
Unit-body designs


2008 Chrysler PT Cruiser


2008 Chevrolet HHR

Real-world crash outcomes confirm high cost to consumers of bumper mismatch

IIHS surveyed damage to vehicles at 5 drive-in insurance claim centers in the Washington, DC, metropolitan area during November 2001-February 2002 (McCartt and Hellinga, 2003). The survey addressed the types and amounts of damage sustained in relatively minor front and rear crashes (see Table 3). A major finding was that bumper underride occurred more frequently in car-into-LTV crashes. Damage to safety-related components also was significantly greater in the car-into-LTV crashes.

Table 3
Survey of damage to vehicles at 5 drive-in claim centers

	Car into car	Car into minivan	Car into pickup	Car into SUV
Percent of cases with underride	21	30	58	67
Repair costs without underride	$750	$780	$955	$802
Repair costs with underride	$1,083	$1,584	$1,543	$1,378
Percent cost increase	44	103	62	72
Percent of cases with damage to lights	27	39	70	47

Bumper improvements would complement compatibility improvements in serious crashes

At NHTSA's request, IIHS began working in 2003 with vehicle manufacturers on a voluntary program to improve vehicle-to-vehicle compatibility in serious front-to-front and front-to-side crashes. As part of this program, the manufacturers agreed to require the energy-absorbing front structures on cars and LTVs to overlap during collisions. LTVs built after September 1, 2009 will be designed according to 1 of 2 geometric designs. Either the primary front energy-absorbing structures will overlap at least 50 percent with the federally mandated bumper zone for cars, or a secondary energy-absorbing structure will be added to LTVs, connected to the primary ones, to achieve full overlap with the bumper zone.

IIHS estimated the benefits of the voluntary agreements by studying the real-world crash experience of 2000-03 LTVs involved in collisions with cars during calendar years 2001-04 (Baker et al., 2008). The researchers compared the experiences of LTVs that already met the height-matching criteria and those that did not. The estimated benefit of lower front energy-absorbing structures was a 19 percent reduction

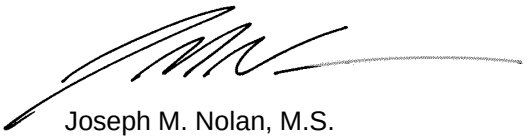
in fatality risk among belted car drivers in front-to-front crashes with LTVs. The fatality risk reduction in front-to-side crashes also was 19 percent.

Besides these safety benefits in high-speed crashes, compliance with the design alternatives to meet the voluntary compatibility agreements makes it easier to equip LTVs with improved bumpers. To comply with the agreements, manufacturers are adding structure to their LTVs that can be used as attachment points for more damage-resistant bumpers that are more compatible in height with car bumpers. This will mean less damage and lower repair costs from low-speed collisions.

Conclusion

IIHS urges NHSTA to amend the federal bumper standard to apply the requirements to LTVs. The data show significant safety and property damage problems caused by the agency's failure to apply the standard to these vehicles. As the design of the Ford Explorer indicates, LTVs can be equipped with bumpers that are compatible in height with those on cars without reducing utility. Improving the geometric compatibility between cars and LTVs will not only enhance safety but also lower costs for consumers involved in low-speed collisions.

Sincerely,



Joseph M. Nolan, M.S.
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