INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

December 28, 2007

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Road Safety and Motor Vehicle Regulation Directorate
Transport Canada
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Ottawa, Ontario K1A 0N5

"Notice Requesting Comments on the Intention to Amend Section 215, Bumpers, of the Motor Vehicle Safety Regulations," Canada Gazette, Part I, 2904, October 13, 2007

Dear Mr. Coons,

The Insurance Institute for Highway Safety (IIHS), an insurer-funded nonprofit research organization in the United States, would like to offer comments on the notice cited above. IIHS's work is cited in the notice, and we believe our experience in bumper testing, test development, and vehicle compatibility can be useful to Transport Canada in determining if and how to change bumper standards in Canada.

IIHS also recognizes that Transport Canada's decision in this matter will affect vehicles in the US market, as makeup of the vehicle fleets is similar in both countries. IIHS recently conducted a quick review of bumper system designs for several top selling vehicles in both the US and Canadian markets that showed the bumper systems to be identical (Chevrolet Cobalt, Chevrolet Impala, Ford Focus, Honda Civic, Toyota Camry, and Toyota Corolla). These vehicles accounted for approximately 21 and 26 percent of passenger cars sold annually in the United States and Canada, respectively, in 2006. A more complete review no doubt would find a significant portion of vehicles sold in the United States also comply with the higher energy Canadian bumper tests.

IIHS agrees it is difficult, if not impossible, to quantify how often unrepaired damage to safety systems as a result of low-speed collisions contribute to subsequent crashes. Nevertheless, IIHS studies of insurance claims clearly show that in low-speed frontal crashes, headlamps are damaged or repaired much more frequently than bumpers themselves (Aylor et al., 2005). Because some damaged headlamps still may be operable, with damage affecting only mounting and alignment, some of these vehicles may go unrepaired, especially those with headlamp costs in excess of $1,000. Certainly this situation will only be made worse by eliminating or severely weakening the existing bumper standards.

As discussed below, IIHS is concerned that some of the other justifications for altering or eliminating the bumper standard may not be valid. We also are concerned that the significant frontal crash compatibility benefits derived from the federal bumper zone are being overlooked.

Bumper strength

Throughout the notice, Transport Canada suggests that increased bumper strength is required to reduce damage to safety-related equipment. This is not the case. Bumper geometry — height from ground, width, and vertical span — also are important contributors to effective low-speed damage protection, especially in crashes with light trucks that are not subject to federal bumper standards. IIHS studies of insurance claim data and crash tests between light trucks and cars clearly demonstrate the underride/override problems associated with disparate bumper heights in the passenger vehicle fleet (IIHS, 2004). As cited in the notice, these findings led toward the development of a new series of bumper tests by IIHS and the Research Council for Automobile Repairs (RCAR) that more closely mimics the underride/override patterns observed in real-world crashes (IIHS, 2007). Inexplicably, neither the extension of the bumper standard to include light trucks nor the adoption of the new RCAR bumper tests

is proposed in the notice to amend the federal bumper standard. Either of these options would greatly reduce the frequency of underride/override crashes and the consequent excessive damage to safety equipment.

Bumper weight

The notice suggests that bumpers affording good protection against damage in low-speed crashes must be heavy. This is not true. IIHS has been conducting bumper tests since 1969 and, as part of the program, measures the weight of the bumper systems. Our test protocols changed in 2004, but data up to 2004 show no correlation between bumper system weight and repair costs in the IIHS series of 5 mi/h bumper tests (Table 1).

Table 1
Summary of bumper weights and cost to repair

	Front bumper weight (kg)	Rear bumper weight (kg)	Front flat	Rear flat	Front angle	Rear pole	Front total	Rear total	Total
Moderately Priced									
2000 Toyota Avalon	11.8	15	$361	$426	$707	$628	$1,068	$1,054	$2,122
2000 Nissan Maxima	13.2	13.2	1,090	353	451	779	1,541	1,132	2,673
2002 Acura TL	13.5	14.9	346	476	971	1,088	1,317	1,564	2,881
2002 Audi A4	18.5	14.5	0	0	532	403	532	403	935
2003 Infiniti G35	11.3	11.6	683	1,896	1,489	2,051	2,172	3,947	6,119
2003 Saab 9-3	8.6	9.2	181	533	1,029	1,338	1,210	1,871	3,081
2004 Acura TSX	15.7	11.2	589	599	1,328	1,582	1,917	2,181	4,098
2004 Nissan Maxima	12.5	12.6	416	369	964	702	1,380	1,071	2,451
Inexpensive									
2004 Chevrolet Malibu	13.8	13.1	$404	$907	$1,385	$1,152	$1,789	$2,059	$3,848
2001 Dodge Stratus	11.1	13.3	295	202	688	1,694	983	1,896	2,879
2003 Honda Accord	13.5	12.2	374	302	459	371	833	673	1,506
2003 Mazda 6	15.2	14	152	530	404	300	556	830	1,386
2004 Mitsubishi Galant	13.7	14.3	404	153	852	719	1,256	872	2,128
2002 Nissan Altima	12.1	11	294	636	1,738	700	2,032	1,336	3,368
2000 Nissan Altima	15.9	16.9	467	20	438	843	905	863	1,768
2000 Saturn L Series	17.3	13.7	0	159	446	335	446	494	940
2000 Subaru Legacy	15.6	21.8	340	101	679	357	1,019	458	1,477
2004 Suzuki Verona	14.1	13.9	459	566	964	813	1,423	1,379	2,802
2002 Toyota Camry	10.9	13.3	279	397	773	796	1,052	1,193	2,245
Luxury									
2004 Acura TL	16.7	12	$364	$452	$1,439	$784	$1,803	$1,236	$3,039
2000 BMW 328i	13.8	15	0	1,080	807	767	807	1,847	2,654
2002 Jaguar X-Type	15	11.3	1,335	796	2,595	2,627	3,930	3,423	7,353
2002 Lexus ES 300	11.4	13.4	238	580	612	576	850	1,156	2,006
2002 Lexus IS 300	8.7	5.3	928	417	1,342	1,177	2,270	1,594	3,864
2001 Mercedes C 320	12.4	17.8	735	1,208	1,039	2,843	1,774	4,051	5,825
2002 Saab 9-5	16	11.6	735	1,060	1,570	1,300	2,305	2,360	4,665
2002 Volvo S60	12	7	901	348	893	1,884	1,794	2,232	4,026

Pedestrian protection

The notice also asserts there are tradeoffs between bumper designs for good damageability and pedestrian protection. IIHS is unaware of any scientific studies showing any tradeoff exists and believes many of the tenets of good bumper design are consistent with good pedestrian lower leg performance. For example, tall bumper beams that help prevent underride/override in low-speed collisions also should be beneficial for pedestrian impacts because they distribute forces on a human leg more evenly over a wider area. The notice indicates bumpers are too stiff for pedestrians, but this assumes no design

changes are possible to the vehicles to add pedestrian-friendly absorbers to a good bumper beam. IIHS urges Transport Canada not to make a final judgment on this issue without credible scientific evidence showing adverse safety tradeoffs between bumper damageability protection and pedestrian protection.

A recent report from the Motor Insurance Repair Research Centre (Thatcham) in the United Kingdom suggests there is no relationship between damageability and pedestrian-friendly bumpers. Thatcham released results of 10 km/h front bumper tests of many European model vehicles. The Thatcham tests were conducted using the new RCAR bumper damageability test protocol, the same now used by IIHS in its consumer information test program. Four of the vehicles tested by Thatcham received three stars in EuroNCAP for pedestrian protection, yet their performance in the bumper tests varied widely. The Suzuki Swift damage was €2,879, the Honda CR-V was €2,021, the Vauxhall Corsa was €1,782, and the Toyota Auris, the best front performer of any vehicle tested regardless of pedestrian star rating, had only €1,022 damage as a result of the test. These data clearly indicate a huge range of damageability performance for similar pedestrian scores and suggest bumpers can be engineered to meet both objectives (Thatcham, 2007).

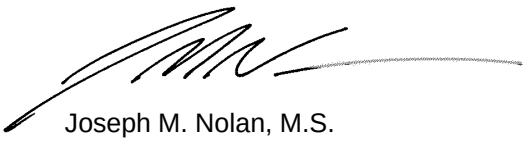
Compatibility

In 2003 IIHS joined with auto manufacturers to develop voluntary guidelines to improve the crash compatibility between light trucks and cars. Auto manufacturers recognized the safety challenges associated with underride/override in moderate- to high-speed crashes between light trucks and cars and adopted a set of voluntary design guidelines to ensure significant front crash structure exists on light trucks in the typical car bumper zone. The US federal bumper zone for cars, 16-20 inches from the ground, was adopted as the target zone because the bumper tests require cars to have significant structure in this zone. These voluntary guidelines were signed into a Memorandum of Understanding (MOU) between the automobile industry and Transport Canada in 2006, yet the notice does not address the significant safety benefits of these guidelines or the implications of altering the bumper standards on these benefits. IIHS studied frontal crashes between light trucks and cars using the Fatality Analysis Reporting System and estimated a 19 percent reduction in driver fatality rates for partner cars in collisions with light trucks that met the agreed guidelines, compared with light trucks that did not (Baker et al., in press). Eliminating or severely weakening bumper strength requirements undermines these voluntary commitments and the related MOU in Canada.

Summary

Eliminating or weakening the bumper standard in response to unproven assertions about effects of the standard on vehicle weight and pedestrian protection will result in excessive damage in low-speed collisions, diminished opportunity to improve compatibility between light trucks and cars, and, perversely, allow vehicles to sustain more safety-related damage in low-speed collisions. Among the options stated in the notice, IIHS recommends that Transport Canada keep the existing bumper standard unchanged. If any change is to occur, Transport Canada should consider expanding the bumper standard to include many of the sport utility vehicles and pickups that collide with cars on Canadian roads.

Sincerely,



Joseph M. Nolan, M.S.
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