

DEPARTMENT OF TRANSPORT

MOTOR VEHICLE SAFETY ACT

Notice requesting comments on the intention to amend section 215, "Bumpers," of the Motor Vehicle Safety Regulations

Notice is hereby given that the Department of Transport is considering amending Canada's regulatory requirements governing bumpers and is soliciting written comments from all interested parties on the potential changes.

Summary

The Department of Transport is evaluating the need to amend its current bumper requirements by introducing changes that would either rescind the Canadian bumper standard entirely or align the bumper impact test speeds with those of the United States and require or allow compliance with the lower leg requirements of the future global technical regulation (gtr) on pedestrian safety currently under development. This gtr will come into effect when, and if, it is adopted by the World Forum for Harmonization of Vehicle Regulations (WP.29) under the auspices of the United Nations Economic Commission for Europe (UNECE).

During the review process, the Department will ensure that the current level of safety is maintained. While out of our control, we can, however, give consideration to the effects of regulation on cost and availability benefits to consumers.

Introduction

The Department is seeking comments on various bumper requirement options in order to help determine which requirements governing bumpers would be more beneficial to consumers, rather than those presently in effect. The intent of the review is not to reduce safety in any way, but to investigate harmonization options which will allow manufacturers to continue to meet future bumper requirements, while ultimately reducing costs and possibly increasing vehicle model availability to consumers.

The objective of the Canadian bumper standard, which applies to front and rear bumpers, is to prevent or reduce the damage to safety-related components in systems such as the lighting, fuel, suspension, steering, propulsion, cooling and exhaust systems of passenger cars in low-speed collisions. Ultimately, the standard is aimed at reducing the number of fatalities and injuries associated with motor vehicle collisions, which would occur because of prior damage to those systems. It also establishes a range of bumper heights to reduce the risk of underride and override in the event of a collision.

The present bumper standard applies only to passenger cars, which are one of several prescribed classes of vehicles under the *Motor Vehicle Safety Act* (MVSA). This is also the case for the similar U.S. and European standards, which are the two other main world requirements for bumpers on motor vehicles. The Canadian bumper standard differs from those of the United States and Europe by having slightly different test procedures but, more importantly, the Canadian standard includes a significantly higher test speed. The Department has observed that U.S. or European market specification vehicles do not necessarily comply with the Canadian bumper standard.

Regulatory diversity between countries can limit the range of vehicle models marketed in any given country and may act as an impediment to the development of vehicle models. Alternatively,

it may increase the unit cost of such vehicles, depending on the number of modifications or model variants that the manufacturer needs to produce to market the vehicle platform globally. This is why the Department needs to ensure that there is a demonstrated net benefit to Canadians if pursuing a non-harmonized approach.

In the case of the bumper standard, it has proven difficult to estimate the number of fatalities and injuries associated with motor vehicle collisions which occur because of prior damage to a safety-related component in a low-speed collision, and the extent to which the higher Canadian test speed has yielded safety and economic benefits.

In the intervening years since the introduction of the bumper standard, not only have vehicle designs changed significantly but the classes of vehicles used by Canadians have also changed. When the standard was introduced in 1972, most Canadians drove passenger cars, whereas today, many Canadians drive multi-purpose passenger vehicles (MPVs) and trucks; thus, the number of vehicles that must meet the bumper standard has continued to decrease each year.

One of the new challenges for bumper designs is to better protect pedestrians during low-speed collisions. There is significant interest around the world in introducing requirements to limit the injuries to pedestrians. Work is nearing completion on a gtr being completed under the auspices of UNECE.

Finally, to improve vehicle fuel efficiencies, manufacturers attempt to design bumper systems that are lighter in mass and offer superior aerodynamic profiles. This objective has resulted in a significant change in bumper designs from the heavier steel designs of the past to lighter more aerodynamic composite designs, which incorporate pedestrian safety features on modern passenger cars.

The Department's purpose in publishing this notice is twofold: first, to summarize the evolution of the Canadian bumper standard since it was first introduced in 1972, including the explanation for why the Canadian bumper standard is currently in disharmony with the U.S. and European requirements; and second, to outline the various options to rectify this and provide an opportunity for the Canadian public and other stakeholders to comment on potential amendments.

Background

The Department introduced its regulation on passenger car bumpers on July 26, 1972. The regulation comprised an 8-km/h frontal impact and a 5-km/h rear impact into a fixed collision barrier, under which damage to specific safety-related components involving structural components as well as principal operating systems were prohibited.

The regulation was amended on September 26, 1973, to add a pendulum-type impact test. In addition, the rear impact test speed into a fixed collision barrier was increased to 8 km/h.

On December 10, 1975, a new amendment to the bumper standard was completed to add a detailed test procedure for the pendulum-type impact test. The test included an impact speed of 4.8 km/h being applied to one corner of each bumper between specific heights. Those heights were later rounded off on April 25, 1979, in order for the Canadian bumper standard to be fully harmonized with those of the United States.

However, in 1979, the United States initiated a rulemaking action to amend its bumper requirements and the U.S. standard began diverging from the Canadian standard. To complement the existing no damage requirement to safety-related parts, the U.S. government added new criteria that prohibited property damage to all exterior vehicle surfaces not involving the bumper system, as well as damage resistant criteria not to be exceeded by the bumper itself.

These additional requirements were in effect for 1980 to 1982 models and required barrier and pendulum impact test speeds identical to the Canadian bumper standard. On May 14, 1982, the United States reduced the test impact speeds from 8 km/h to 4 km/h for longitudinal impacts and from 4.8 km/h to 2.4 km/h for corner pendulum impacts. The damage resistance criteria were also dropped from the U.S. regulation. Conversely, the no damage requirement to safety-related parts and to all exterior vehicle surfaces not involving the bumper system remained in effect.

During the same period in Europe, a bumper standard specified by the UNECE was developed (hereinafter referred to as ECE Regulation No. 42). The standard, created in 1980, does not include a barrier impact test but comprises pendulum impact tests using speeds similar to those of the United States. In this test, a profiled pendulum strikes the vehicle with a speed of 4 km/h on the front and rear bumpers and at 2.5 km/h at the bumper corners. Similar to the Canadian bumper standard, ECE Regulation No. 42 ensures the integrity of various safety systems.

The U.S. bumper standard, on the other hand, is not intended to improve the integrity of safety systems but to reduce the costs associated with damage to bumpers involved in low-speed collisions. The reason for this difference is that through the *Motor Vehicle Information and Cost Savings Act*, the U.S. government is empowered to regulate the design of automobiles solely for the purpose of savings in cost to the public at large, whereas Canadian legislation constrains regulations to improvements in safety. In other words, Transport Canada does not have the authority to regulate requirements that would not offer a safety benefit. This is why the requirements of the Canadian bumper standard cannot be fully aligned with those of the United States on the basis employed by U.S. lawmakers.

On May 14, 1983, Transport Canada published in Part I of the *Canada Gazette* a proposal to partially harmonize its bumper requirements with those of the United States by lowering the velocities of the barrier and pendulum bumper impact tests to the same values as those of the United States. This would have also brought the Canadian speeds for the pendulum tests closer to those of ECE Regulation No. 42. However, the Department received significant opposition from the provinces and territories, the public, the media and the insurance industry with respect to the proposed lowering of bumper impact velocities. This opposition resulted in the Department withdrawing its proposal on August 3, 1985, and the Department not harmonizing its bumper standard impact test speeds with those of the United States and the UNECE. This divergence still exists today.

In the decades that followed, one issue that the Department put effort into addressing was collision compatibility between passenger cars and larger and heavier vehicles. On September 23, 2004, Transport Canada introduced a new regulation aimed at reducing the risk of injury in collisions between passenger cars and large commercial vehicles. This regulation mandated the installation of low mounted rear underride guards on large commercial trailers to reduce the likelihood of passenger vehicles from traveling underneath the rear of the trailer in the event of a collision.

Moreover, Transport Canada signed a Memorandum of Understanding (MOU) in 2006 with the automotive industry aimed at improving compatibility between new passenger cars and light duty trucks in front-to-front and front-to-side vehicle collisions by the effective date of September 2009. In this MOU, vehicle manufacturers have agreed to redesign the bumper energy absorbing structure of larger vehicles to better protect occupants of smaller vehicles in the event of a collision.

Development of a global technical regulation on pedestrian safety

Since September 4, 2002, the Department has been participating in the development of a gtr on pedestrian safety at the UNECE. The intent of the gtr is to establish countermeasures that will

help reduce injuries and fatalities sustained by pedestrians when they are struck by automobiles. Once approved, the gtr will comprise a series of tests to replicate collisions involving child and adult pedestrians where impacts occur at 40 km/h. It is expected that these tests will help reduce injuries to the lower legs of pedestrians against front bumpers, and upper legs and heads against hoods. Finalization of this gtr is expected in the near future. It is expected that when and if this gtr is adopted, manufacturers will be facing new challenges to design and manufacture more pedestrian-friendly bumpers, while still being required to meet the existing bumper standards of several jurisdictions. This will be further complicated by the need to maintain or improve fuel economy performance in relation to fuel efficiency regulations and incentive programs.

Ratings from insurance groups

There are several insurance groups worldwide that rate bumper performance during low-severity collisions based on the cost of repairing vehicle damage. These consumer metric tests influence bumper system design with the intent of minimizing vehicle damage. The largest groups are the Insurance Institute for Highway Safety (IIHS) in the United States, and the Research Council for Automobile Repairs (RCAR) with members in Europe, Asia and America.

Until very recently, IIHS used four impact tests to rate bumper performance. The four configurations were two full-width front and rear impacts into a flat barrier, a front impact into an angled barrier, and a rear impact into a centered pole. The first two configurations were patterned after the U.S. federal full-width impacts but used the Canadian 8 km/h impact speed rather than the U.S. 4 km/h. The two latter impact tests were also conducted at 8 km/h and represented additional crash configurations that may be encountered in the real world.

In 2007, IIHS released a new bumper test protocol to better mimic the design of a car bumper and assess underride and override during vehicle-to-vehicle low speed crashes. The impact speed of the front and rear full-width impacts was changed from 8 km/h to 9.6 km/h and the flat barrier was substituted with a steel barrier developed with RCAR comprising a plastic absorber and flexible cover simulating typical energy absorbers and plastic bumper covers from passenger cars. The third and fourth tests comprise front and rear corner impacts at 4.8 km/h against the same barrier with a 15% bumper overlap.

The RCAR test program, which has existed since 1999, uses a different test procedure for evaluating bumper performance. The tests are a 40% overlap front impact into a flat rigid barrier (known as the Danner test in Germany and the Thatcham test in the United Kingdom) and a 40% overlap rear impact by a 1 000 kg mobile barrier. The tests are completed at a speed of 15 km/h. In 2006, the tests were modified and the vehicle now strikes the barriers with an angle of 10°. In addition, the mass of the mobile barrier has been increased to 1 400 kg. In 2009, RCAR is expected to add the same front and rear full-width bumper impact tests into a steel barrier that were recently adopted by IIHS.

While IIHS widely publicizes its results, some members of RCAR use results of their tests to rate vehicles for insurance pricing purposes. According to RCAR, many manufacturers have also incorporated the insurance test into the development program for new models. The test serves to forewarn of any difficulties or problems that may arise with a production standard vehicle, and thus provides the opportunity to eliminate such difficulties at an early stage.

Protection of the occupants in high-speed frontal collisions

Car bumpers do not typically play a major role in vehicle crashworthiness or occupant protection during front or rear collisions. According to American Iron and Steel Institute (AISI), new technologies permit the bumper design to absorb about 15% of the energy under high-speed impact. Nonetheless, there is a direct interaction between the bumper and the chassis rails. The

bumper is also a common structural component in both low- and high-speed crash tests, and has an influence on the level of vehicle stability in a crash and the deployment synchronicity of the air bag system. Diverging bumper standard requirements between jurisdictions increase the complexity for manufacturers of complying with high-speed crash test requirements. A harmonized world bumper standard would reduce the burden on industry by allowing manufacturers to design, test and produce products to one set of standards.

Review of alternatives

Manufacturers of vehicles are increasingly challenged to comply with all applicable bumper standards; receive high performance, low cost ratings from insurance groups; protect occupants in high-speed frontal collisions; enhance pedestrian safety requirements; provide visually appealing designs to their customers; and maintain aerodynamic characteristics which promote fuel efficiency. If manufacturers need to design several vehicle front and rear ends to accommodate different safety standards from various jurisdictions, this could increase costs to the consumers or decrease the number of vehicle models offered in a given jurisdiction. Thus, the Department believes that it is time to revisit the Canadian bumper standard and determine whether it is justified to maintain or amend the standard.

The Department is considering the following options and is interested in gathering comments:

1. Maintain status quo;
2. Maintain status quo but allow alternative compliance with the lower leg requirements of the gtr on pedestrian safety (since this portion of the gtr is the most advanced);
3. Rescind the Canadian bumper standard;
4. Rescind the Canadian bumper standard but regulate the lower leg requirements of the gtr on pedestrian safety as either mandatory or optional;
5. Amend the Canadian bumper standard to align the bumper impact test speeds with those of the United States; and
6. Amend the Canadian bumper standard to align the bumper impact test speeds with those of the United States and allow optional (or potentially require) compliance with the lower leg requirements of the gtr on pedestrian safety.

As a normal practice, the Department seeks to harmonize its regulatory requirements with those of other countries wherever possible to facilitate trade and minimize the economic burden of compliance on the automotive industry, as well as the costs that the industry subsequently passes on to its customers. The first option to maintain status quo by keeping the Canadian bumper standard unchanged implies that the standard would remain in disharmony with the U.S. and UNECE standards. The Canadian bumper impact tests are double the speed of any other country's bumper regulations. This higher impact speed may require a stiffer bumper system. This may represent an impediment to free trade if unique model variants are designed for the Canadian marketplace, with a potential loss of vehicle sales for some manufacturers, as well as the inability for the general public to import certain models of vehicles sold in the United States. In addition, some manufacturers have found it necessary to commit additional testing and engineering resources and, in some cases, have experienced longer lead times and/or the unavailability of certain models for the Canadian market due to the existing disharmony. The end result for consumers is a potentially smaller consumer choice and an increase in car purchase prices. An analysis, prepared by the National Highway Traffic Safety Administration (NHTSA), which supported that the U.S. bumper standard impact test speeds be reduced by half in 1982,

indicated that while the faster Canadian impact test speeds reduce lifetime repair costs for cars, they increase car purchase prices and fuel consumption. In terms of safety, a second report prepared by NHTSA in 1987, indicated that the change in the bumper standard from 8 km/h to 4 km/h in 1982 had not affected the protection of the safety related parts. From a cost-benefit perspective, Transport Canada has been unable to justify why the Canadian bumper standard should continue to be more stringent than those of the United States or the UNECE. In the absence of evidence that the benefits of the Canadian bumper standard exceed the cost to society resulting from it, maintaining the standard unchanged would not appear to constitute an appropriate solution.

Option 2, that of maintaining status quo but allowing optional compliance with the lower leg requirements of the gtr on pedestrian safety, could facilitate trade and minimize the economic burden of compliance on the automotive industry by incorporating some of the future requirements of the gtr on pedestrian safety. This would allow optional compliance with global requirements, while also maintaining the current requirements, allowing vehicle manufacturers freedom of choice. This option is practical only if the gtr is adopted by the UNECE and if any U.S. regulatory amendment mirrors the gtr.

Since the benefits to safety provided by bumpers in low-speed collisions are difficult to assess and there may be a greater need to address vehicle repair costs or pedestrian safety, options 3 and 4 are to either rescind the Canadian bumper standard altogether or to rescind it and regulate instead the lower leg requirements of the gtr on pedestrian safety. It should be pointed out that several countries in the world, such as Austria, France, the United Kingdom, Switzerland, Japan, and Australia, have no safety standards regulating bumper impact tests. The United Kingdom for one has an organization called the Motor Insurance Repair Research Centre (Thatcham), which instead uses the RCAR test to rate the performance of bumpers for insurance pricing purposes. Other countries, such as Japan, are more concerned about injury to their pedestrians and therefore do not necessarily want car bumpers to be so rigid and unyielding that they could lead to a higher risk of injuries to pedestrians. The downside to options 3 and 4 is that Canadian consumers could lose with respect to both safety and reparability if some manufacturers (including perhaps emerging entities that do not currently market in Canada) choose to economize by selling cars in Canada that meet none of the other national standards for bumpers.

The proposed option 5 would be to amend the Canadian bumper standard to align the bumper impact test speeds with those of the United States. This would ensure free trade between Canada and the United States, and would also put the Canadian impact test speeds more in line with those of ECE Regulation No. 42. While introducing this option would increase the number of passenger car vehicle models available in Canada, the Department is not able to determine if there would be any negative effect on safety as the current passenger car fleet is capable of meeting the higher speed tests.

Option 6 would be to not only amend the Canadian bumper standard to align the bumper impact test speeds with those of the United States but also to allow compliance with the lower leg requirements of the gtr on pedestrian safety as an option or as a mandatory requirement. Discussions with the industry revealed that, while it is very challenging and costly to design to the Canadian bumper standard and the gtr on pedestrian safety, they are able to manufacture vehicles that would comply with both the U.S. bumper standard and the gtr. World studies all suggest that pedestrian head and leg injuries will be significantly reduced with the introduction of pedestrian safety requirements. The science on lower leg injury prevention is relatively more advanced at present.

Comments

Manufacturers, importers, public safety organizations, insurers, and other interested parties are requested to provide their comments on this proposal in writing, at the address provided below, before December 31, 2007. Comments should be supported by data wherever possible.

Comments should identify those parts of the representations that should not be disclosed pursuant to the *Access to Information Act* and, in particular, pursuant to sections 19 and 20 of the Act, the reason why those parts should not be disclosed and the period during which those parts should remain undisclosed.

Comments, questions, and requests for additional information regarding this notice may be directed to Matthew Coons, Senior Regulatory Development Engineer, Road Safety and Motor Vehicle Regulation Directorate, Transport Canada, 330 Sparks Street, 8th Floor, Ottawa, Ontario K1A 0N5, 613-998-1961 (telephone), 613-990-2913 (fax); and Standards and Regulations Division, Road Safety and Motor Vehicle Regulation Directorate, Transport Canada, 330 Sparks Street, 8th Floor, Ottawa, Ontario K1A 0N5, 613-998-2268 (telephone), 613-990-2913 (fax).

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