ESV 2011 GOVERNMENT OF CANADA STATUS REPORT

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ABSTRACT

This report presents the Canadian road safety situation and describes the programs, research and regulatory activities of Transport Canada since the previous report presented at ESV in 2007. Canada has actively pursued policy initiatives to improve the safety of Canadians and has participated in numerous international research and regulatory working groups to advance motor vehicle safety and road safety.

Transport Canada is committed to on-going collaboration with industry, foreign governments, provincial and territorial governments and stakeholders.

CANADIAN ROAD SAFETY SITUATION

In Canada, road safety is a responsibility that is shared among the federal and provincial/territorial governments. The federal government is primarily responsible for the safety of new vehicles and inter-provincial commercial carriers, while the provincial/territorial governments have jurisdiction over the operation and maintenance of motor vehicles, road infrastructure and the development and implementation of road safety programs.

Like many other developed countries, Canada's road safety record improved greatly during the past quarter century. During this period, fatalities resulting from motor vehicle traffic collisions decreased by approximately 50%, while Canada's population not only grew by approximately 30% but also became more mobile, as the number of licensed drivers grew by approximately 50%. The population of Canada was estimated as approximately 34 million in 2010. Road fatalities in 2009 were approximately 2,200 and statistics for 2010 will be available in the near future. Detailed statistics for 2008 are reported at: http://www.tc.gc.ca/eng/roadsafety/tp-tp3322-2008-1144.htm

Canada's Road Safety Strategy 2015

Canada's new road safety initiative, called Road Safety Strategy 2015, intends to build on the success of the two previous national road safety plans.. The new strategy, which became effective in January 2011, retained a number of the key attributes of its predecessors, including the long term vision of having the safest roads in the world. In addition, the core strategic objectives of the previous road safety plans - raising public awareness and commitment to road safety, improving communication, collaboration and cooperation among all stakeholders, enhancing enforcement and improving road safety information in support of research and evaluation – were also retained.

Characteristics of Road Safety Strategy 2015 that set it apart from Canada's previous national road safety plans include:

- The flexibility afforded jurisdictional (provincial and territorial) partners to develop their own unique road safety plans
- The holistic nature of the current strategy that emphasizes the benefits of adopting coordinated strategies that make roads, vehicles and road users safer and aims to move the current strategy more towards a safer systems type of framework
- The absence of hard quantitative targets at the national level, thereby enabling jurisdictions to determine their desired level of road safety effort. However, progress will still be measured at the national level using rate-bases indices. In addition, jurisdictions can still adopt hard targets should they wish to do so
- A framework of proven effective best practices that jurisdictions can adopt to address key target groups and contributing factors that are frequently cited among fatally or seriously injured crash victims.
- A fluid framework that is regularly updated with new best practice strategies throughout its five-year duration

Some of the key initiatives that have been carried out recently in selected Canadian jurisdictions to make road travel safer included:

- Conducting national seat belt use surveys to identify and target specific problem areas and groups (e.g. young male drivers, pickup trucks, rural roads); national surveys on proper use of child seats for young children; removing exemptions and increasing fines and demerit points for non-users of seat belts.
- Conducting drug and alcohol use surveys among night-time drivers; drinking-driving campaigns targeting youth or young males that raise the awareness of the consequences of drinking and driving and; mandatory assessment/rehabilitation and alcohol ignition interlock programs; the introduction of tougher sanctions for first-time offenders; and research into the use of designated drivers in rural areas.
- Conducting a pilot study that used positive reinforcement to decrease the incidence of aggressive driving and speeding; apilot study on the use of fixed speed cameras; introduced legislation aimed at reducing speeds in construction zones or when passing emergency vehicles or tow trucks; tougher sanctions (fines, demerit point and license suspensions) for speeding violations; expanded red-light camera programs to enhance intersection safety; educating the general public about proper road use practices at roundabouts and the installation of transverse rumble strips at high-risk intersections and on road edges..
- Introducing speed governors on heavy goods vehicles that limit vehicle speeds to 105 km/h.
- Introducing graduated licensing programs covering more than 95% of novice drivers in Canada that require novice drivers to adhere to a number of restrictions before they receive full driving privileges; developing public awareness campaigns targeting youth that focused on the dangers to young drivers and others of driving at unsafe speeds, drinking and driving and non-use of seat belts.
- Pedestrian and driver awareness campaigns reminding each road user of their respective responsibilities; tougher licensing requirements for operators of motor scooters and motor-assisted bicycles; and audits at city intersections to identify existing and potential safety issues, particularly with regard to pedestrians and cyclists.

The findings of the 2007 mid-term review of Canada's previous national road safety plan led jurisdictional road safety partners to carry out focused strategies and interventions that were supported by heightened police enforcement campaigns targeting non-use of seat belts, drinking and driving and speeding/aggressive driving. These focused efforts combined with the downturn in economic conditions contributed to substantial decreases in fatalities and serious injuries during 2008 and 2009, in particular. 2010 casualty results are not yet available. The numbers of road users killed and seriously injured in crashes during 2007-2009 period were 16.5% and 19.8% lower, respectively, than comparable figures during the 1996-2001 comparison periods.

Canada currently ranks 10th among Organisation for Economic Cooperation and Development member countries when comparisons are made on a deaths per billion vehicle kilometres traveled basis (2009 figures).

COLLISION DATA

Collision investigations

A program of in-depth collision investigations is carried out by six contracted research teams across Canada, and by Transport Canada staff located in the National Capital Region. The work supports the Directorate's research and regulatory development programs, actively monitors high-profile traffic safety incidents across Canada, and provides a mechanism for rapid response to such incidents.

Current activities include directed studies focused on several safety issues, and a program of special collision investigations which captures incidents of interest that fall outside of the criteria for particular directed studies. On-going directed studies are investigations of frontal air bag deployments involving vehicles built to comply with the provisions of the current Federal Motor Vehicle Safety Standard (CMVSS) 208 - Occupant Crash Protection, moderately severe vehicle to vehicle side impacts, vehicle to pole side impacts, vehicle rollover collisions with side air bag and/or side curtain deployment, and frontal collisions involving fully restrained rear seat occupants. Special collision investigation topics include school bus and motor coach and 15 passenger van crashes, air bag or seat belt induced fatal and serious injuries, collisions involving event data recorders, collisions between pedestrians and heavy freight vehicles, and the performance of child restraints.

Transport Canada completed the final phase of a pilot study investigating the causes of fatal motor vehicle

collisions. A total of 378 fatal collisions were documented in the study database. This study involves compilation of data on human, vehicle and environmental factors. Work is currently underway to establish an overview of the major causal factors. The results will provide the Department with unique insight into fatal collisions and evaluate the potential of a variety of countermeasures.

INTERNATIONAL ROAD RESEARCH

Transport Canada has participated for many years in the OECD Road Transport Research Program now known as the Joint OECD/ECMT Transport Research Centre. Recent research initiatives by the JTRC include Drugs and Driving: Detection and Deterrence and an upcoming report on Pedestrian Safety and Urban Space and Health.

The Drugs and Driving report indicates that while drug impaired driving shares some commonalities with alcohol impaired driving, there are also substantive differences to the extent that a separate stream of research, policy development and enforcement should be pursued specific to the issue. The report stresses that drugs and driving is a complex issue that requires more research into the impacts of specific drugs, testing protocols and technologies and harmonization of testing procedures and an accepted list of drugs of interest are required. Additional support will be required for enforcement personnel to specifically address the drugs and driving challenge. This challenge includes more than illicit or controlled substances and should include all drugs that impair a driver's ability to safely operate a motor vehicle.

CRASHWORTHINESS RESEARCH

The Crashworthiness Research Division of the Road Safety and Motor Vehicle Regulation Directorate is mandated to reduce the number of Canadians injured or killed in traffic-related crashes by providing the necessary scientific basis for the development of regulatory initiatives. The research programs are directed towards improving frontal impact protection and side impact protection for adult and child occupants and towards the advancement of anthropometric test devices (ATDs) used in the evaluation of occupant protection.

Frontal Crash Protection

The frontal crash test program continues to focus on examining dummy kinematic and thoracic responses as a function of ATD size, vehicle seat position, seat track location, and test speed.

A summary of the frontal protection study and the key findings are presented in "Kinematic and Thoracic Response of the 5TH Percentile HYBRID III" of the 2011 ESV proceedings.

Child protection in motor vehicles and school buses continues to be a high priority for Transport Canada. Child dummies representing 12-month-old, 3-year-old, 6-year-old and 10-year-old children are tested in the rear seats of vehicles undergoing frontal and side impact crash tests. The child dummies are restrained in age appropriate child restraints or booster seats to investigate the performance of the restraints in the vehicle environment. Results of the on-going studies are available on the Transport Canada website http://www.tc.gc.ca/eng/roadsafety/safedrivers-childsafety-programs-regulations-research-research-887.htm

Transport Canada has recently completed a study investigating the dynamic loads of lower and upper anchorages (LATCH) for child restraints with upper weight limits above 40lbs. The findings, which were presented at the Government Industry Meetings in January 2011, indicate that the top tether shares up to 37% of the total load. The maximum loads recorded at each of the lower anchors during full frontal rigid barrier crash tests were all below 8kN. The results of a study investigating infant seat interactions with the interiors of vehicles undergoing full frontal crash tests will be presented and published in the 2011 ESV Proceedings (Paper 11-0406).

A comprehensive study of school bus occupant protection was completed in May 2010. The study reviewed school bus accident investigations conducted between 1992 and 2010 and included crash and sled tests. Compartmentalization was found to be effective in protecting children in frontal impacts but was not effective in severe side impacts, rollovers or events where there was significant vertical lift of the occupant compartment.

Side Impact Crash Protection

The International Harmonized Research Activities (IHRA) Side Impact Working Group had, prior to its termination, proposed two test configurations, one car-to-pole and one barrier-to-car test (ESV 2005). Transport Canada continues to actively support regulatory harmonization through its research programs and international working group activities.

A study comparing the capabilities of ES-2re and WorldSID with and without multi-point sensing technology in oblique pole tests of matched vehicles is underway. The WorldSID male, WorldSID female world harmonized side impact dummies and the Q-series 3 and 6-year-old child dummies are being used extensively in both struck side and far side lateral impacts to better understand the effects that crash

configurations, occupant to occupant interactions and the presence of countermeasures, including child restraints may have on the protection of all occupants in a motor vehicle.

A subcommittee, led by Transport Canada was established in 2005 to develop a new seating procedure for WorldSID male. The procedure, which has now been finalized, was developed in collaboration with representatives from Asia-Pacific, Europe and the U.S. and is the first seating procedure to be based on the world vehicle fleet. Efforts will now be redirected to develop a complementary seating procedure for the WorldSID female.

Dummy Development

The RibEye multi-sensor technology, originally developed for Transport Canada by Denton ATD (now Humanetics) and Boxboro Systems for the Hybrid III 5th percentile dummy has since been successfully introduced into the WorldSID male dummy. The optical technology makes it possible to track the displacement of each WorldSID rib in each of the principal axes providing valuable insight into the kinematic response of the chest during a side impact crash.

Improvements in Test Capabilities

Transport Canada's 30 year old crash laboratory located at the Motor Vehicle Test Centre in Blainville, Quebec has just undergone a major modernization, funded through the Federal Economic Action Plan. The facility, designed to serve Canadians and the motor vehicle safety community for the next 30 years includes:

- A new enclosed 232m main track twinned with a 100m track to conduct moving car to moving car frontal crash tests;
- A new 100m perpendicular track together with an adjustable surface mounted oblique track to conduct moving car to moving car side impact crashes at a variety of angles;
- A new structure to enclose the side impact crash pad, equipped with a dedicated control station and lighting system; and
- A new building to house the future vulnerable road user laboratory.

The success of this project would not have been possible without the expertise and dedication of our operator of the Centre, PMG Technologies, Inc. and our international research partners who welcomed us into their crash labs and so patiently answered all our questions.

Future Work

A new study to investigate and visually describe the consequences of child restraint misuse is currently underway and will continue for the next three years.

An important co-operative program to be undertaken by Transport Canada and the Australian Department of Infrastructure and Transport has been initiated to provide technical support for the development of the new Global Technical Regulation for Pole Impacts. Testing will take place at Transport Canada's Motor Vehicle Test Center and will include motor vehicles from the world market.

HUMAN FACTORS AND CRASH AVOIDANCE RESEARCH

The Human Factors and Crash Avoidance Research Division of the Road Safety and Motor Vehicle Regulation Directorate is mandated to reduce the number of Canadians injured or killed in traffic-related crashes by providing the necessary scientific basis for the development of regulatory initiatives to prevent crashes.

Evaluation of Collision Mitigation Systems (CMS)

Since 2008, Transport Canada has been reviewing the potential benefit of CMS in Canada. In addition to analyzing national collision data to assess the number of crashes where CMS could have provided some benefit, a technical evaluation of collision mitigation systems available in passenger cars in Canada was undertaken. A balloon car and a mobile target were developed and used in the evaluation of the performance of the CMS on commercially available systems (see Figure 1).

Results of preliminary analyses are being shared with ISO TC 204 WG 14 to assist in the development of ISO 22839 (Forward Vehicle Collision Mitigation Systems). Most of the test procedures identified at this stage of the development have been used in full-size testing.

Figure 1. Mitigation braking test with mobile target

Speed Management

A four-month field operational trial was undertaken to investigate the impact of influencing driving speed choice and behaviour through a reward-based process rather than the usual enforcement/punishment-based practice. Drivers were rewarded for not exceeding the speed limit and maintaining an appropriate following distance to the vehicle in front. These two criteria were measured continuously through the use of a Global Positioning System/Geographic Information System (GPS/GIS), an on-board digital speed limit map, and forward-looking radar. Continuous feedback was provided to the driver by an in-vehicle display. Figure 2 illustrates the Safemiles device and display. The display in the figure indicates the driver is compliant with both the posted speed limit and time headway. Points were accrued when both criteria were met for a period of 15 seconds. The participant used the points accumulated to purchase rewards. Results indicate that rewards are effective in influencing driver speed choice, at least in the short term. Compliance rates for both speed and following distance increased from the baseline to the feedback and reward period but dropped off in the post-baseline period although not to the same level as the initial baseline. This is consistent with the results from a similar trial conducted in the Netherlands.

Driver's Field-of-View Study

Vehicle pillars can vary considerably by position, angle, and size. They can create blind spots to the extent of completely obscuring approaching vehicles and pedestrians on the road. Currently, there is insufficient data and understanding of the implications these factors have for visibility and crash avoidance. Transport Canada is conducting a study to evaluate the extent and impact of field-of-view obstruction from pillars in light duty vehicles. Measurements have indicated that there is significant variation in driver view obstructions present amongst different vehicle models and is worth investigating further. Data analysis is looking at the possible link between driver blind spots and collision risk. A variety of new vehicle models are currently being measured.

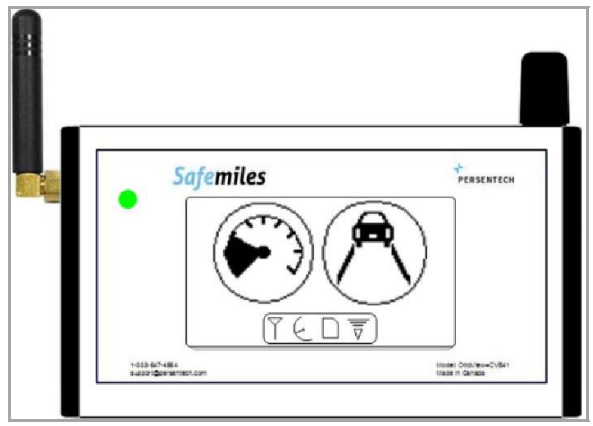

Figure 2. Illustration of Safemiles display.

Methodologies for the Design & Evaluation of Driver-Vehicle Interfaces

The problem of driver distraction continues to be a major road safety concern. In April 2010, NHTSA launched its Driver Distraction Program in an effort to address the safety challenges presented by driver distraction. Transport Canada plans to continue collaborating with NHTSA and other stakeholders to develop distraction metrics and driver-vehicle interface guidelines.

Considerable research activity in both North America and Europe is currently focused on producing protocols for assessing the distraction potential of in-vehicle tasks and devices. Of particular interest are methodologies that are capable of assessing distraction arising from the use of speech-based technologies as much of the work to this point has been directed to visual-manual sources of distraction.

Transport Canada continues to work in this area building on previous efforts to assess the sensitivity, reliability and applicability of proposed testing methodologies. Working with international partners in North America and Europe, Transport Canada continues to conduct research in this area, much of it under the auspices of ISO TC22 SC13 WG8.

In previous projects, we have examined the Occlusion and Lane Change methods. In fall 2011, Transport Canada will contribute to a multi-site study examining the utility of the Detection-Response Task as a tool for the assessment of driver distraction. This

new work item for ISO is of particular interest as it shows promise for assessing distraction arising from both visual manual and speech-based interfaces.

Automated Control in Motor Vehicles

Advanced Driver Assistance Systems (ADAS) apply sophisticated in-vehicle sensor, information and communications technologies to support the driver. These innovative systems are taking over tasks that were traditionally performed by the driver. The automation of basic control functions (e.g., automatic transmission, anti-lock brakes and electronic stability control) has proven very effective, but the safety implications of more advanced systems in the field are uncertain (e.g., lane keeping assistance). This project is reviewing the legal liability considerations in Canada associated with automated control in passenger vehicles from the perspectives of the driver, manufacturer, insurer and regulator.

Although the International Harmonized Research Activities Steering Group was dissolved, the need for harmonized research on vehicle safety has increased. The last active working group (IHRA-ITS) is providing scientific support to the UNECE WP.29 ITS informal group to help develop a set of safety principles for automated control in vehicles. This IHRA-ITS group is supported by Canada, Germany, France, Japan, Sweden and the United Kingdom.

Automation can provide users with safe, comfortable, convenient and efficient mobility. However, drivers need to be aware of the road traffic situation around their vehicle at any given moment. They should also be able to anticipate relevant changes in the road traffic situation. The document produced by the IHRA-ITS working group describes some of the human factors issues associated with driving task automation. It sets out some basic principles that will help to optimize system performance and avoid drivers being out-of-the-loop and unprepared to manage safety-critical situations when they arise. In driving situations where the advanced driver assistance systems control or support elements of the driving task, drivers should be fully aware of the performance and limitations of those functions.

Human Factors Issues for In-Vehicle Warnings

Advanced crash warning technologies are being implemented in vehicles. These technologies are intended to warn drivers of the need for corrective action and have the potential to improve safety by preventing crashes or mitigating their impacts. To be effective, however, the warnings provided by these systems need to lead the driver to timely and appropriate responses.

Transport Canada is investigating and developing methods to assess the performance of safety critical in-vehicle warning signals. NHTSA, SAE and ISO TC22 SC13 WG are actively working in this area as well. A number of dimensions are important to consider when evaluating the warnings drivers receive. These include driver acceptance, perception, and interpretation of the alerts as well as driver performance in terms of reaction time, response type, and appropriateness of response. Recent work in our lab has indicated that drivers may not know the meaning of warnings they receive or the various symbols even after training. An additional concern is the lack of consistency for a given warning type particularly across makes of vehicles. There may be a need for standardization to reduce the confusion that may arise from this situation.

Although in-vehicle warnings promise considerable benefit, drivers must understand them to respond appropriately. The goal of this work is to have a toolbox of performance measures (and criteria) that can be applied to automotive warning systems to evaluate their effectiveness. In addition, results of this work will provide input to human factors recommendations, guidelines and support for standards dealing with in-vehicle warnings.

Behavioral Adaptation to Backing aids

Increased interest in back-over crashes has prompted the evaluation of available technologies that might help to prevent these collisions. If the effects of these technologies on driver behaviour are not well understood, initiatives in the area may result in unanticipated changes.

A field study was conducted with 43 parent-aged participants driving their own vehicles for a period of two months. Their vehicles were equipped with one of three types of aftermarket reversing aid: two of the aids were video-based (one rear-view mirror display screen and one dash-mounted display screen) and the third aid was an auditory-based sonar system. Reversing performance was observed pre- and post-installation both with and without the use of the backing aid. Participants reported that the devices were useful at times, but also expressed dissatisfaction with all three aftermarket systems. There were a number of limitations with the three systems tested. They aftermarket video backing aids were often too slow to activate when the vehicle was put into reverse, the display screens were too small and hard to read because of poor image quality and glare under certain lighting conditions. The ultra sonic backing aid had too many annoying false alarms that caused drivers to mistrust the device.

At the conclusion of testing, an 'unexpected obstacle' was placed behind participants' vehicles without their knowledge and they were asked to reverse with the aid activated. Regardless of reversing aid type, the majority of drivers still collided with the unexpected obstacle. Although the systems investigated in this study may perform adequately enough to improve parking, they did not perform well enough to be considered a safety device. Future research is needed to evaluate the safety performance and used of original equipment backing aids.

Naturalistic Driving Studies: SHRP2 and the Canadian Naturalistic Driving Study

Naturalistic driving studies provide unique opportunities to obtain objective data for real-life crashes, near-crashes and normal driving. Previous experience in Europe, the US (100-car study) and Japan has shown that such large scale studies are an excellent way to collect otherwise unattainable data that can be used to enhance our understanding of drivers, their behavior and their use of new technologies in their vehicles.

There is a strong environment of cooperation between US and Canadian researchers as well as researchers from other parts of the world. Coordination in research activities and sharing of information and data are desirable outcomes of these projects.

Transport Canada personnel have been active participants in SHRP2 since the early days of the project and have been directly involved in the development of the RFPs and research planning and evaluation of this project. Transport Canada has membership on the SHRP2 Technical Coordinating Committee, a number of Expert Task Groups and chairs the SHRP2 Data Access Committee.

A Canadian Naturalistic Driving Study, modeled after SHRP2, will be conducted over the next few years. The results of this project will provide essential Canadian data to address road safety concerns.

REGULATORY INITIATIVES

Electronic Stability Control Systems

The Motor Vehicle Safety Regulations were amended on December 23, 2009 to introduce a new Canada Motor Vehicle Safety Standard (CMVSS) 126 Electronic Stability Control Systems, which requires that an electronic stability control system (ESC) be installed on all light-duty vehicles manufactured for Canada on or after September 1, 2011.

Light-duty vehicles include passenger cars, multi-purpose passenger vehicles, trucks and buses with a gross vehicle weight rating less than 4 536 kg. ESC technology assists the driver in maintaining control of a vehicle during emergency manoeuvres, such as swerving suddenly to avoid an obstacle or when cornering on slippery surfaces. Multiple international studies have shown that ESC has the potential of significantly reducing fatal crashes involving loss of control of light-duty vehicles. Analyses of Canadian crash data indicate that ESC could prevent approximately 29% of these types of crashes.

CMVSS 126 harmonizes the Canadian requirements governing ESC with those of the United States. Canada has also participated in the development of a global technical regulation for ESC under the auspices of the United Nations World Forum for Harmonization of Vehicle Regulations, which was adopted in June 2008. This ensures the Canadian requirements for ESC will be globally aligned, further facilitating international trade.

Restraint Systems and Booster Seat Safety Regulations

Transport Canada continues to be active in its efforts to improve the benefits to young passengers offered by child restraint systems. On May 12, 2010, the Department published updated requirements for the *Motor Vehicle Restraint Systems and Booster Seat Safety Regulations*. In addition to introducing a new dynamic test performed with a lap/shoulder seat belt assembly, these regulations better align many of the testing requirements with those of the United States, while maintaining several testing requirements that were unique to Canada. These new regulations are expected to continue to improve on the excellent record of child protection offered by Canadian certified infant and child restraints and booster seats.

Transport Canada officials will continue to be active at an international level, by working closely with the National Highway Traffic Safety Administration on developing new seat requirements and by participating in the International Organization for Standardization Working Group on child restraint systems. These activities will involve monitoring the latest child restraint developments, which would include expected future requirements for side impact simulations aimed at continuing to improve the safety offered by restraint systems.

Occupant Restraint Systems in Frontal Impact

In order to improve occupant safety and maintain regulatory alignment with the United States, Transport Canada is preparing a proposal that would update Canada Motor Vehicle Safety Standard 208 *Occupant Restraint Systems in Frontal Impact* by making reference to portions of the respective United States safety standard. Consistent with the United States Federal Motor Vehicle Safety Standard 208, it is expected that the amendment will propose to adopt lap/shoulder seat belts at the rear inboard position of vehicles with a gross vehicle weight rating under 4 536 kg. Proposed changes will also include modification to the 50th percentile male rigid barrier crash test by increasing the test speed from 48 km/h to 56 km/h, adoption of the United States standard's neck injury criteria and elimination of the head acceleration requirement. Further, the proposed Canadian amendment would adopt the 5th percentile female rigid barrier and offset deformable barrier requirements and test procedures from the United States standard as well as the out-of-position driver and passenger requirements and test procedures.

While most of the anticipated changes to Canadian safety standard 208 would align with similar requirements in the United States regulation, areas where the modified standard will remain unique to Canada include no requirement for unbelted barrier crash testing, no chest acceleration requirement and unique barrier chest deflection limits for all vehicles with a gross vehicle weight rating up to 3 856 kg.

Designated Seating Position

The definition of a designated seating position is currently being updated by removing the exemptions for temporary, folding or other auxiliary seats. This change ensures that seat belts are installed in all seating locations. The method for determining the number of designated seating positions is also being updated to promote seat designs that provide improved visual cues of where an occupant should sit in a vehicle. This ensures that occupants sit only in locations where they receive the safety benefits that seat belts and other safety features provide.

Vehicle Identification Number

Every vehicle manufactured or imported for sale in Canada is identified with a unique alphanumeric 17-character vehicle identification number (VIN). The code configuration provides information regarding manufacturer, year of production, make and model, and several technical details. The VIN facilitates vehicle identification for safety research and vehicle recall campaigns. It is also used by provincial and territorial jurisdictions for registration purposes. Vehicle distributors, financial institutions, insurance companies and police departments use the VIN for warranty validation, insurance claim verification, recall campaigns and vehicle theft investigation.

The amended Canada Motor Vehicle Safety Standard 115 *Vehicle Identification Number* requires that the VIN of any two vehicles manufactured within a sixty-year period and having a model year of 1980 or later must not be identical. Moreover, this amendment, published on February 5, 2009, offers more flexibility to manufacturers to encode mandatory information, aligns the Canadian requirements regarding the VIN system with those in the United States and helps ensure the free movement of vehicles between Canada and the United States.

Low-Speed Vehicles

An amendment to Canada Motor Vehicle Safety Standard 500 *Low-speed Vehicles*, published on July 28, 2008, updates many of the requirements for that prescribed class. It clarifies the original reason for establishing the class - to allow the use of such vehicles for short trips such as shopping, social and recreational purposes, in limited, planned and controlled environments. In particular, the amendment expands the class to include small trucks, while limiting all vehicles to a maximum gross vehicle weight rating of 1361 kg.

Furthermore, a minor revision to the definition of low-speed vehicle was introduced in support of zero emission vehicles, specifying that low-speed vehicles do not use fuel as an on-board source of energy. This is in keeping with the original intent that low-speed vehicles are environmentally friendly electric vehicles.

Hydrogen Storage on Vehicles

Transport Canada fully supports the concept of developing global technical regulations, under the 1998 Global Agreement of the United Nations Economic Commission for Europe. The department is currently working to develop a global technical regulation for safe hydrogen storage on vehicles. Canada has fully supported this regulatory development and has worked with the United Nations group providing research into reasons for past cylinder failures. The Department has also supported research work involving efforts to prevent cylinders from failing during fires. This work is being used to develop the requirement for the bonfire tests of hydrogen cylinders.

Roof Intrusion Protection

To reduce the number of severe injuries and deaths caused by rollovers, Transport Canada regulates the strength of vehicle roofs by way of Canada Motor Vehicle Safety Standards 216 *Roof Intrusion Protection* and 220 *Rollover Protection*. Standard 216 was implemented in September 1973. While it has been amended on several occasions in the interim period, the performance criteria for roof resistance above the front seats of motor vehicles has remained substantially the same. Standard 220 was implemented in September 1979 and deals specifically with the rollover protection of school buses. The performance requirements therein have not changed since its original publication.

The government of Canada most recently amended the Canadian safety standards relating to vehicle roof crush (i.e. standards 216 and 220) on November 11, 2009, to improve the safety of vehicle occupants in the event of a vehicle rollover by increasing the force applied to the roof structure during testing and extending the application of standard 216 to larger passenger vehicles. These changes maintain harmonization with safety standards recently amended by the United States government.

Global Technical Regulation on Motorcycle Brake Systems

Motorcycle brake system regulations have not kept pace with the advancement of modern technologies. With improvements to disc brake systems and the recent introduction of new technologies such as anti-lock brake systems and combined brake systems, modern motorcycles can be equipped with very sophisticated and effective braking systems.

In an effort to improve and update existing national standards, Transport Canada agreed to sponsor the development of a global technical regulation on motorcycle brake systems. The final document was adopted at the World Forum for Harmonization of Vehicle Regulations (WP.29) of the United Nations Economic Commission for Europe, held the week of November 14, 2006.

The global technical regulation No.3 on motorcycle brake systems was subsequently registered in the United Nations Registry of Global Technical Regulations, obligating contracting parties to begin the process to adopt the regulation as part of their national requirements. This regulation provides manufacturers the option to test their products to just one series of harmonized requirements, in order to sell to all contracting parties to the 1998 Global Agreement.

The global technical regulation on motorcycle brake systems is based on best practices within existing contracting parties' national regulations, while taking into consideration modern brake system technologies that could improve rider safety. In an effort to include the most stringent performance requirements, the regulation draws mainly from three existing national motorcycle brake system regulations, including the UNECE Regulation No. 78, the United States FMVSS 122 and the Japanese Safety Standard JSS 12-61.

Compared to the existing Canadian safety standard on motorcycle brake systems, the global technical regulation includes a more realistic test for braking in wet weather conditions, slightly more stringent requirements when subject to repeated brake applications and when braking from high speeds, and new requirements for motorcycles equipped with anti-lock brake systems.

Currently, the motorcycle brake system requirements in Canada are harmonized with the United States. Transport Canada subsequently proposed to include the requirements of the global technical regulation on motorcycle brake systems as an alternative to the existing national requirement, which would provide motorcycle manufacturers the choice of two globally recognized compliance options within the Canadian safety standard.