ESV 2007 GOVERNMENT OF CANADA STATUS REPORT

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Canada

ABSTRACT

This report presents the Canadian road safety situation, describes the programs, research and regulatory activities of Transport Canada since the previous report presented at ESV in 2005. Canada continues to actively pursue policy initiatives to improve the safety of Canadians and to actively participate in numerous international research and regulatory working groups to advance motor vehicle safety and road safety. Transport Canada is pleased to have contributed to the knowledge base, both nationally and internationally. The department 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 licensing and registration of drivers and motor vehicles, the enforcement of their respective traffic laws, 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 more than 50%, while its population not only grew by approximately 35% but also became more mobile, as the number of licensed drivers grew by approximately 50%.

Canada's Road Safety Vision 2010

Canada's road safety advocates' vision is to have the safest roads in the world. For more than a decade, this vision has been supported by a national road safety plan. First introduced in 1996 as Road Safety Vision 2001, the successor plan, called Road Safety Vision 2010, was introduced in 2002. All levels of government, as well as national public and private sector stakeholders with a strong interest in road safety endorsed this nine-year initiative. The Vision contains four strategic objectives: to raise awareness of road safety issues among the general public; to improve communication, cooperation and collaboration among road safety agencies; to enhance enforcement initiatives; and to improve national data quality and collection practices.

Road Safety Vision 2010 also contains an overall quantitative national target (a 30% decrease in fatalities as well as serious injuries by 2010) as well as numerous quantitative sub-targets whose reductions range from 20% to 40%, that focus on Canada's major road safety problems (e.g. non-use of seat belts, drunk-driving, speeding, intersections, commercial vehicles, rural roads, vulnerable road users and high-risk drivers). The principal idea behind the introduction of a national road safety plan in Canada emanated from the view that the use of a more focused approach to the development and implementation of safety initiatives would likely lead to more successful strategies and ultimately safer road travel.

A number of task forces, comprised of representatives from various levels of government as well as key public and private sector organizations, have assumed ownership of the various targets as well as for developing and implementing strategies to meet the target objectives. These task forces operate under the auspices of the Canadian Council of Motor Transport Administrators, a body that coordinates federal, provincial and territorial efforts to improve the road transportation system in Canada.

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

- Conducting national seat belt use surveys to identify and target specific problem areas and groups (e.g. young drivers, rural roads); introducing a pilot project aimed at increasing proper use of child seats for young children; removing exemptions and increasing fines and demerit points for non-users of seat belts.
- 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.

- 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; and the installation of transverse rumble strips at high-risk intersections and on road edges.
- Introducing a strengthened hours of service regulation to provide commercial vehicle drivers with greater opportunities to obtain additional rest; carrying out focused commercial vehicle enforcement campaigns that targeted seat belt usage, mechanical inspections and hours of service; combining a carrier's on-road compliance record for convictions, inspections and collision history into a single number safety rating that represents a carrier's risk.
- 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.
- Transport Canada is: developing enhanced frontal-impact occupant protection and side-impact protection regulations, both of which will benefit a large number of vehicle occupants involved in serious crashes; conducting research on driver distraction, speed management, gearshift, seatbelt interlocks, and Electronic Stability Control systems. These are described in more detail in other sections below.

Notwithstanding the collective efforts undertaken by all stakeholders to date, limited progress has occurred towards the achievement of the Road Safety Vision 2010 national target. During 2005, the most recent year for which data are available, overall road user fatalities decreased by 1.4% and serious injuries by 5.5% over the average number of fatalities and serious injuries that occurred during the timeframe of the inaugural national road safety plan (1996-2001), which is the period against which progress among the targets is being measured. A mid-term review of Road Safety Vision 2010 is currently being conducted to assess progress to date and to identify areas where greater effort is required in order to increase the likelihood of achieving the quantitative targets of Canada's national road safety plan.

Canada currently ranks 11th among Organisation for Economic Cooperation and Development member countries when comparisons are made on a deaths per billion vehicle kilometres traveled basis (2005 figures).

COLLISION DATA

Collision investigations

A program of in-depth collision investigations is carried out by seven 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 (FMVSS) 208 - Occupant Crash Protection, moderately severe vehicle to vehicle side impacts, vehicle to pole side impacts, side air bag and side curtain deployment crashes, and frontal collisions involving fully restrained rear seat occupants. Special collision investigation topics include school bus and motor coach crashes, air bag or seat belt induced fatal and serious injuries, collisions involving event data recorders, collisions between pedestrians and heavy freight vehicles, the performance of child restraints in crashes and collision testing the crashworthiness of micro cars.

Transport Canada and one of the research teams are each undertaking the second phase of a pilot study investigating the causes of fatal motor vehicle collisions. This study involves compilation of data on human, vehicle and environmental factors

involved in collisions and use a multi-disciplinary approach to assess the principal causal factors. Both retrospective data collection and on-scene, in-depth, collision investigation techniques are being used to compare the effectiveness of the two approaches.

Data Dictionary

Recently, a new collision data dictionary has been adopted by the CCMTA. This new data dictionary has been developed by consensus among the jurisdictions and will allow for uniformity of the basis for collision data amongst the jurisdictions. Such equivalency will permit fairer comparison as well as compilation, once implemented.

Electronic Traffic Related Data Collection

In partnership with selected provincial governments and police agencies, Transport Canada is conducting a demonstration project of a computer and communications-based system called the Traffic and Criminal Software System (TRaCs). This software is designed for multi-jurisdictional use and was built in modules allowing for great flexibility. It has many potential uses including the electronic on-site collection of traffic collision data, enforcement and ticketing and commercial vehicle inspection. The demonstration is designed to verify the flexibility of the software and its application within several police operated record management systems and computer assisted dispatch systems.

Participating police agencies and commercial vehicle inspectors in Alberta have pilot tested the data collection software and forms for crashes, citations and commercial vehicle inspection. Integration with motor vehicle registration databases allowed for the automatic population of data elements to be achieved. This demonstration project is intended to provide a national focus for the development of uniform electronic data collection performance standards leading to improved efficiencies, quality and timeliness of traffic collision data.

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, side impact protection and towards the advancement of anthropometric test devices (ATDs) used in the evaluation of occupant protection.

Frontal Crash Protection

Front Seat Occupants For the past several years the department has been developing a proposal to update the existing CMVSS 208 and address the safety needs of Canadian belted occupants. The frontal crash test program has therefore, focused on examining the effect of test speed and injury criteria on restraint optimization for belted vehicle occupants whose injury tolerance is less than that of the healthy average sized male.

Triplicate sets of identical vehicle models were tested at 40, 48 and 56 km/h in full frontal rigid barrier (FFRB) tests to investigate occupant restraint system characteristics, characterize chest response and define occupant kinematics at incremental test speeds. Preliminary findings suggested a non-linear relationship between test speed and chest deflection. In fact, several vehicle models were observed to produce lower chest deflections at 56 km/h than at 40 km/h. Some vehicle models may be designed to perform in this manner, however, an analysis of dummy kinematics indicated that reduced chest deflections may be due to dummy anomalies. Preliminary results are presented in these proceedings. The study has identified key parameters that must be considered when developing and defining regulations intended to optimize restraint systems.

New Technologies For the first time, advanced instrumentation developed for Transport Canada by Denton ATD and Boxboro Systems has made it possible to measure chest deflection at each rib. Previously, measurements were obtained from four InfraRed – Telescoping Rod for Assessment of Chest Compression (IR-TRACCs) located on either side of the sternum. While more predictive than the single point measurement, the IR-TRACCs were not sensitive enough to quantify belt location with respect to the centrally mounted potentiometer. The twelve optical sensors located on either side of the sternum define the chest deflection profile in the fore-aft and lateral directions as a function of time.

Since the locations of the sensors can be moved along the ribs, subsequent studies will focus on defining which locations best quantify load paths applied to the chest. This technology is very promising for frontal crash protection research and may also be the long sought solution for multi-point sensing in side impact test dummies, like the WorldSID family.

Rear Seat Occupants Governments and public safety advocacy groups have publicized the "rear seat is best for children" message for many years now. However, where as stringent regulations and extensive design innovations have been introduced to protect front seat occupants there are still no dynamic requirements for occupants seated in the rear. New sub-compact vehicles are generating much higher occupant accelerations and thus pose a significant challenge to rear seat occupant protection. Options such as frontal airbags and load limiters, which effectively protect front seat occupants, are not available in the rear seat.

Transport Canada is continuing the rear seat occupant protection study initiated in 2002 to define appropriate dummy measurement criteria that will assist in the identification of 'good' vs. 'poor' restraint systems. The study relies on comparisons to front seat passenger responses to investigate the influence of belt geometry and seat cushion characteristics. Since the reliability of seatbelt use data for rear seats contained in national accident databases has traditionally been poor, Transport Canada relies on data obtained from the special collision investigation studies to validate and complement crash test data. Trends from the field are slowly beginning to emerge and are helping define crash characteristics and injury mechanisms associated with rear seat injuries.

Partnerships with vehicle manufacturers who have introduced advanced restraint technologies in the rear seats of their vehicles have also helped advance Transport Canada's understanding of rear seat restraint systems and dummy kinematics.

Child Protection Child dummies representing a 12-month-old infant, and 3-year-old, 6-year-old and 10-year-old children are being tested in the frontal protection program. The child dummies are restrained in age appropriate child restraints and booster seats to investigate the performance of the restraints in severe crash test conditions.

Because the crash tests are severe, and the true biofidelity of child dummies has yet to be determined, field data is essential to validate or, at the very least, gauge the study results. To this end, a partnership has been established with a large paediatric trauma center. Dedicated and passionate in the prevention of child trauma, the emergency staff has agreed to notify the crash investigation team of any frontal collision resulting in the admission of a child who was restrained in the rear seat and using the vehicle seatbelt.

Transport Canada has completed a study investigating child seat attachment methods for children weighing more than 48 lbs and for infant carriers. Preliminary findings indicate that the lower anchorage belt or LATCH, when used in combination with the top tether, provides good retention of the child seat. Use of both the LATCH and the seatbelt when used in combination with the top tether did not degrade retention over either method alone. In some vehicles, the use of both methods was found to limit excursion. The much shorter length of LATCH webbing relative to that of the seatbelt more effectively limited the forward displacement of the child seat in 48 km/h rigid barrier tests. Similar results were observed for rear-facing infant seats. The complete findings of the study will be submitted for publication in 2007.

Side Impact Crash Protection

The Traffic Accident Information Database (TRAID) administered by Transport Canada, reports that approximately 950 passenger vehicle occupants are fatally injured in side-related crashes each year in Canada. Approximately 10% of the occupants are killed in single narrow object collisions, and 55% are killed in vehicle-to-vehicle crashes. Like many jurisdictions around the world, women tend to be overrepresented in car-to-car crashes while men tend to be overrepresented in narrow object collisions.

The International Harmonized Research Activities (IHRA) Side Impact Working Group had, prior to its demise, proposed two test configurations, one car-to-pole and one barrier-to-car test (ESV 2005). Transport Canada remains strongly committed to regulatory harmonization and has therefore, continued to take into consideration the findings of the working group in the design of its research programs.

A study comparing the capabilities of ES-2re and WorldSID in oblique pole test conditions was completed and published in 2006. Transport Canada has accepted the lead in the preparation of the ISO SC22/WG1 pole test procedure.

Side impact tests are being conducted to compare the intrusion profiles of vehicle-to-vehicle crashes to the intrusion profiles resulting from IIHS barrier-to-car impacts. The WorldSID 50^{th} and 5^{th} percentile test dummies are being used extensively in both near side

and far side impacts to better understand the influence of barrier design and to evaluate side impact occupant protection.

A study comparing lower anchorage and seatbelt restrained child and infant seats in SUV-to-car side impact crash tests is under way. Child protection is being evaluated in both near side and far side impacts. Results of this study will be published in the next year.

A subcommittee, led by Transport Canada was established in 2005 to develop a new seating procedure for WorldSID. The procedure, which is currently in draft form, is being developed in collaboration with Asia-Pacific, Europe and the U.S. and is the first seating procedure to be based on the world vehicle fleet.

Dummy Development

A study comparing the FTSS and Denton 5th female Hybrid III chest jackets was published in 2006. An SAE working group is now working towards developing a new harmonized 5th female moulded jacket.

The biofidelity of the WorldSID 50th male and 5th female dummies continues to be evaluated as iterations of design modification and/ or improvements to durability are introduced. Transport Canada is collaborating with the dummy manufacturers by providing in-vehicle dummy response data to enhance the capabilities of the WorldSID 5th female.

Significant progress has been made in the advancement of the only 3-year-old side impact dummy, the Q3s. A full-scale accident reconstruction, based on a crash that was investigated by the Transport Canada accident investigation teams, was carried out to evaluate this newly modified test dummy. The results indicate that the head, neck and pelvis of the revised Q3s accurately predicted the injuries that were incurred by the child in the collision. Further work is required to improve the response of the shoulder and chest.

Improvements in Test Capabilities

Transport Canada now has a fully enclosed crash test facility making it possible to conduct tests in a temperature-controlled environment year round. A pneumatic Hyge sled was installed in 2006. The sled has a 2MN capacity and offers negative G capability. This acquisition will serve as an excellent complement to in-vehicle crash testing by providing dummy evaluation opportunities as well as assisting in rear seat restraint and child protection studies.

CRASH AVOIDANCE RESEARCH

Evaluation of Electronic Stability Control (ESC) on Motor Vehicles

As of February 2007, ten vehicles had been tested to evaluate the performance of their ESC systems; these included 4 automobiles, 3 SUVs, 2 pickup trucks and one minivan. Testing included manoeuvres such as the Sine with Dwell, the Closing Radius Turn and the J-Turn. A programmable steering controller was used for all manoeuvres. Testing was performed mostly on dry asphalt, and supplementary tests were performed on wet pavement under raining conditions and on packed snow in the winter. Testing on packed snow was performed with both winter and 4-season tires. Preliminary analyses of the data show that the performance of ESC systems far exceeds that called for in the US NHTSA Notice of Proposed Rulemaking for FMVSS 126. Technical evaluation of ESC systems will continue as new ESC-equipped vehicle models become available in Canada.

Transport Canada conducted a survey in February 2006 to determine the level of awareness and understanding of ESC in Canada. Awareness of ESC was low. Sixty percent of the people surveyed had not heard of ESC before, and less than 5% had vehicles with ESC. Some people even believed that their vehicle was fitted with ESC, when it was not.

Transport Canada has initiated statistical studies to quantify the effectiveness of ESC in Canada. This work is on going and we hope to complete the analyses by the end of 2007; the results of these analyses and the technical evaluation of ESC will then be used to determine the cost-benefit of ESC for Canadians. If these studies show that ESC would have a significant benefit for Canadians, Transport Canada will consider mandating these systems in Canada.

A web page with consumer-oriented information on ESC has been created and is available at

http://www.tc.gc.ca/roadsafety/tp/tp14651/vs200701/menu.htm.

Speed Management

Transport Canada is currently conducting a research programme on speed management to investigate technologies that influence vehicle speeds and their potential impact on road safety and greenhouse gas emissions (GHG).

Work is being undertaken in four main areas: Intelligent Speed Adaptation (ISA); fuel consumption/cost displays; modelling; and attitudes and driver behaviour.

A 20-vehicle pilot field trial was undertaken in Ottawa to evaluate two types of Intelligent Speed Adaptation systems: a haptic feedback system in which pedal pressure increases when the speed limit is exceeded, and an audio/visual system mounted on the dash that provides a voice alert when the speed limit is exceeded. The objectives of this trial were to develop a better understanding of the implementation issues and to collect preliminary data to measure the impact of ISA on speed and fuel consumption. Questionnaires were also administered to measure attitudes, experiences, and acceptance.

A field trial is also being planned to evaluate the Belonitor system that was developed and tested in the Netherlands. This system provides drivers with continuous in-vehicle feedback on vehicle speed and following distance; drivers are rewarded points for good driving behaviour.

We have found that drivers are largely unaware of the cost of speeding; we therefore plan to develop an on-board real-time fuel cost/consumption information display. A field trial with this display will determine its effect on speed choice and driver behaviour.

Using the data collected in the field trials and supplemented by laboratory testing, models are being developed to better understand the impact of speed controls on safety and GHG emissions.

Finally, a survey was conducted to examine drivers' behaviours and attitudes about speeding. The purpose was to identify and measure factors that influence speed choice in a representative sample of Canadian drivers; we also wanted to assess their need for information as well as determine how we could influence the public to view speeding as both a safety and environmental issue. A national telephone survey, with 10 subsequent focus groups in 5 cities across Canada were undertaken to assess what drivers know, think and feel about speeding and how this impacts their behaviour.

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 speed, young drivers, and achieving ambitious road safety targets.

Reports from two of the working groups were published in October 2006: "Speed Management" and "The Young Driver: The Road to Safety". Some of the key findings of the Speed Management report are as follows: speeds need to be reduced quickly if national fatality reduction targets, set in many OECD/ECMT countries, are to be met; speed management should be a central element of any road safety strategy and can help achieve appropriate speeds; new technologies, including ISA, can bring significant improvement, and progressive implementation is encouraged. The JTRC working group recommended that each country support that all new cars be equipped with voluntary manual speed limiters as a first step, followed by informative ISA. In addition, research on emerging technologies, such as cooperative vehicle-road speed management systems should also be facilitated. The report can be obtained at the following address: **http://www.cemt.org/JTRC/WorkingGroups/SpeedManagement/index.htm**.

Some of the key findings of the Young Driver report are as follows: road crashes are the single largest killer of 15-24 year olds in industrialized countries. This entails a significant economic and human cost given the years of productive life lost due to the doubling of the crash death rate in this age group. The report examines ways to reduce the death toll in this age group, which includes training related to self-assessment and the ability to identify risk, the licensing process and meaningful enforcement. Information on the report can be found at **http://titania.sourceoecd.org/vl=1576213/cl=14/nw=1/rpsv/~6687/v2006n14/s1/p1l**

TELEMATICS AND ERGONOMICS

Methods to Assess Safety Implications of In-Vehicle Technologies

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. Transport Canada has a multipart research program to assess the safety implications of new in-vehicle technologies (telematics) on driver behaviour. Driver distraction is a leading concern. A variety of projects have been undertaken. We are also participating in a number of working groups and committees to address these problems.

Basic Research

This work investigates the problems facing drivers in terms of driver perception required level of concentration; hence distraction and performance when they use these new technologies (emailing PDAS, navigation systems, different forms of interfaces, etc.) while driving.

Evaluation of Industry Safety Principles for In-vehicle Information and Communication Systems

This project evaluates compliance and usability of advanced in-vehicle information and communication systems with respect to the Alliance of Automobile Manufacturers' (AAM) safety principles. In-vehicle information and communication systems (telematics systems) from four leading manufacturers were evaluated according to the most recent guidelines from the AAM document "Statement of Principles, Criteria and Verification Procedures for Driver Interactions with Advanced In-Vehicle Information and Communication Systems". Results provided insights into how the current automotive industry standard for telematics systems rate versus new criteria. The project also provided an independent assessment of the value of these industry guidelines and these results provide benchmark data on which to assess the safety developments of future telematics systems.

Research in Support of ISO Standards Development

Transport Canada continues to conduct research in support of telematics testing procedures being developed by the ISO. The focus has been on the Lane Change Test and Occlusion methodologies. A variety of current navigation systems have been tested, comparisons made with measures from other research projects (e.g., HASTE) and refinements of metrics examined. The Driver Metrics Workshop (sponsored by the Alliance of Automobile Manufacturers and Transport Canada) was held in Ottawa in October 2006. The workshop offered a forum for researchers from around the world to present data and discuss the issues associated with these testing methods. The presentations from the workshop are available at
http://ppc.uiowa.edu/drivermetricsworkshop/

Memorandum of Understanding Concerning In-vehicle Telematics

Transport Canada is in the process of negotiating a memorandum of understanding (MOU) with automotive manufacturers dealing with the safety of in-vehicle telematics devices. The MOU will address safety concerns, be adaptive to continued technological advancement, and not unnecessarily burden the industry.

Human Factors Issues for In-Vehicle Warnings

This Transport Canada project is investigating and developing methods to assess the performance of safety critical in-vehicle warnings. Advanced Vehicle Safety technologies can assist drivers in avoiding crashes and minimizing harm. To be effective, however, the warnings need to lead the driver to timely and appropriate responses. This work investigates and assimilates the research on measuring the performance of warnings. Although the main focus will be automotive warnings, this project will also provide a survey of what can be learned from other applications (e.g. aircraft) and applied to the automotive realm. Criteria such as conspicuity, perception and reaction time, response type, appropriateness of response, signal detection (false alarms, hits, misses, rejections) and annoyance levels will be considered. Based on a review of the literature, a set of selected performance measures will be applied to a variety of automotive warning systems. The ultimate goal is to have a toolbox of performance measures (and criteria) that can be applied to automotive warning systems to evaluate their effectiveness. The development of Warning Guidelines is a current work item for the IHRA-ITS Informal Group WP 29 that is led by Dr. Peter Burns. Transport Canada also made a presentation addressing warning assessment requirements and testing methods at the recent NHTSA Human Factors Forum on Advanced Vehicle Safety Technologies held in January 2007.

Usability work on the Universal Anchorage System for Child Restraints

Since September 2002, all new Canadian vehicles and child restraint systems (CRS) have been required to come equipped with the Universal Anchorage System (UAS), which includes lower anchorage, and top tether, attachments. As of April 2007, the installation of UAS anchorages will also be required in a proportion of seats on all new school buses. Despite being designed to make CRS installation in vehicles easier and with fewer opportunities for misuse, there have been reports that the UAS is not as easy to use, or as effective, as hoped. A usability study was conducted wherein participants installed child restraints using different styles of UAS attachments in both a passenger vehicle and a school bus. Results revealed that people are generally unaware of the UAS, and have difficulty locating UAS anchors in both types of vehicles. Design improvements for child restraints and vehicles were identified. Implementation of the study's recommendations will improve the overall usability of the UAS, and will form the basis for a public education campaign on this, still new, attachment system for child restraints.

REGULATORY INITIATIVES

Trailer Rear Under-ride Protection

At the last ESV Transport Canada reported that a regulatory initiative requiring trailers to be equipped with rear under-ride protection was being mandated. When this initiative was incorporated, manufacturers were provided two years to become compliant. During this interim two year period manufacturers have been allowed to follow either the existing requirements in place in the United States, under Federal Motor Vehicle Safety Standards (FMVSS) 223 and 224, or they have had the alternative of installing rear underride protection devices meeting the strict Canadian requirements. The option of meeting the requirements of the United States will be eliminated on September 1, 2007. After that date all rear underride protection devices installed on trailers sold in Canada will need to be constructed to the stringent Canadian requirements.

While the dimensional requirements of the Canadian regulations remain consistent with the existing United States regulations, the strength and energy absorption requirements for the guard are significantly higher. The stronger Canadian guard design is needed to protect smaller vehicles with lower front hood lines.

Universal Anchorage Systems on School buses

Studies in the United States and Canada continue to conclude that school bus travel is the safest form of transportation for school children. School buses in Canada are specifically designed yellow buses equipped with numerous safety devices to protect children both inside and around the exterior of the bus. Some of the features that make school buses safe are energy-absorbing seats that provide passive protection and structural integrity features that increase safety in the rare event of a collision. While school buses have traditionally been used to transport school-aged children to and from school and other activities, there has been an increase in the use of school buses to transport preschool-aged children (under approximately 4½ years old).

In an effort to evaluate the safety implications for preschool-aged children travelling in school buses, Transport Canada conducted a research program, which revealed that appropriately installed infant or child restraints could enhance occupant protection for small children in the event of a collision. Transport Canada subsequently amended its regulations in order to require Universal Anchorage Systems on bus seats for newly built buses to improve infant and child safety and to simplify the process by which caregivers can restrain infants and children in buses.

This amendment represents a proactive approach geared to prevent injuries and deaths among young children. Extending the application of the standards to school buses also clarified Transport Canada's position regarding the use of infant and child restraint systems and reinforced the importance of safely restraining children travelling in any vehicle. Parental and caregivers' concerns will be addressed, as improved protection will be made available when transporting young children on a bus.

The minimum number of seating positions with anchorages varies from two to eight per bus, depending on the seating capacity. Buses with rearward facing seats are exempt. Anchorage systems are not permitted in a seating position adjacent to an emergency exit. The user-ready tether anchorages may not be located on the bus floor.

Mandating authority over the use of child seats in school buses and the retrofitting of school buses fall under provincial/territorial jurisdiction. The new requirements became effective on April 1, 2007.

Review of 15-Year Import Exemption

Under the Motor Vehicle Safety Act (MVSA), all vehicles imported into Canada must comply with all applicable Canada Motor Vehicle Safety Standards (CMVSS), and the manufacturer must certify their compliance at the time of the main assembly. The MVSA is based on self-certification by the manufacturer and provides for audit and verification rights to the Minister.

The Motor Vehicle Safety Regulations (MVSR), allow vehicles, with the exception of buses, that were manufactured 15 years or more before the date of importation into Canada, to be exempted from the safety standards applicable to their particular class of vehicles. This allowance was intended mainly for limited use by hobbyists and collectors and posed minimal risk to road users, since these vehicles were by and large not employed for everyday use at the time this rule was established in 1986.

Since both Canada and the United States use manufacturer based self-certification systems, the MVSA allows the importation of vehicles less than 15 years old that are sold at the retail level in the United States market, provided the vehicles comply fully with all applicable United States federal laws, and with specific mandatory Canadian safety standards such as seat belt anchorages, applicable at the time of the vehicles' main assembly. These vehicles subsequently have to be modified to comply with additional Canadian requirements in areas such as daytime running lamps, bilingual labelling, etc., before being presented for licensing by a province or

territory. Importation of these vehicles is managed through the Registrar of Imported Vehicles (RIV) program and details may be found at **http://www.riv.ca.**

Vehicles less than 15 years old, which are not certified to Canada or United States safety standards, are currently not permitted into Canada. This is because differences in vehicle safety regulation regimes do not allow the determination of safety equivalency.

Transport Canada has been asked by the Canadian Council of Motor Transport Administrators, which represents provincial/territorial and federal governments, to amend the 15-year rule for vehicle imports and align it with the United States threshold of 25 years. Reasons for this request include the fact that most, if not all of these vehicles are not certified to the CMVSSs.

Concurrent to the Council's request, Transport Canada has noted a significant increase in recent years in the importation of 15-year old and older vehicles for everyday use. Therefore, the department is proposing to amend this threshold to 25 years in order to return the regulation to its original intent, i.e. to promote the safety of the traveling public. This amendment will also align the age threshold with the United States' 25-year rule for vehicle importation. Transport Canada is consulting with stakeholders and expects to publish details of the proposed amendment in the Canada Gazette, Part I, in the near future.

Low Speed Vehicles

The Government of Canada is proposing to amend the definition for the low-speed vehicle class and to introduce marking requirements to better identify vehicles of this class. Low-speed vehicles are small 4-wheeled electric vehicles that have a maximum speed of 40 km/h and are designed for use in controlled areas. The proposal will better define low-speed vehicles and will increase other road users' awareness of them should they be operated in regular traffic.

The amendment will propose to update the definition to clarify the original reason for establishing the low-speed vehicle class, which was to allow vehicles for short trips such as shopping, social and recreational purposes, in limited, planned and controlled environments. In addition to amending the definition to clarify the intent, the amendment will propose to add a requirement for a slow-moving vehicle emblem to be permanently installed on low-speed vehicles.

To harmonize the Canadian definition with recent changes made in the United States, new wording will be introduced that will, for the first time, allow small trucks to be classified as low-speed vehicles. To ensure that large trucks and passenger vehicles cannot be improperly classified as low-speed vehicles, the proposal will include a maximum limit for their mass. Also, to remain in harmony with the United States, the proposal will specify what kind of safety glazing is acceptable for a low speed vehicle windshield.

Finally, a minor revision will be proposed to the definition to clarify the current "no emission" requirement to state that a low-speed vehicle does not use fuel as an on-board source of energy. This is in keeping with the original intent that a low-speed vehicle be an environmentally friendly electric vehicle.

REGULATORY HARMONIZATION

Sharing an integrated vehicle market with the United States, Transport Canada has been working to harmonize Canadian vehicle safety regulations with those of the United States, to the extent feasible. In the long term, Transport Canada's goal is to harmonize with the United Nations' GTR requirements where possible.

Currently, Transport Canada is working aggressively to fully harmonize an additional 26 of its regulations with the US where no specific Canadian safety issues can be found. These include safety regulations on items such as vehicle brakes, tires, rims, etc. However, for areas where desirable unique safety requirements have been identified, such as vehicle theft and daytime running lights, they will remain partly divergent.

Hydrogen storage on vehicles

Transport Canada is currently reviewing the need for Canadian federal regulations to assure the safe use of hydrogen-fuelled vehicles. Transport Canada fully supports the concept of developing a global technical regulation (GTR), under the 1998 Global Agreement of the United Nations Economic Commission for Europe (UNECE): work that is expected to be underway in the near future.

Transport Canada is currently completing studies regarding hydrogen safety. One study involves the review and evaluation of the necessary requirements for the installation of hydrogen fueling systems on-board vehicles. In another study, experience from past high-pressure cylinder failures is being compiled, which will assist in re-design efforts to prevent future occurrences. Planning for a future study regarding the safety of relief systems for

hydrogen storage pressure cylinders is also underway.

Conclusions drawn from these Canadian studies will help to support the development of the GTR and the ensuing Canadian federal safety regulations.

Occupant Restraint Systems in Frontal Impact – CMVSS 208

On May 12, 2000, the United States Department of Transportation published a final rule in the Federal Register (Volume 65, Number 93) that made fundamental changes to its occupant protection requirements. Eleven amendments have subsequently been issued in order to clarify and amend the initial provisions. The intent of the United States final rule is to improve the frontal impact protection of front occupants, as well as to reduce the risk of air bag-induced injury to small women, older occupants, children, and those who are out-of-position at the moment of deployment. The new requirements include the introduction of additional dynamic tests using small female anthropometric test devices (ATD), neck injury criteria, improved head protection, lower chest deflection limits, and a series of out-of-position static tests.

Transport Canada has been working on amending its equivalent CMVSS regulation to account for these changes since 2000. Although many aspects of FMVSS 208 will be harmonized, chest deflection in particular is one area in which Transport Canada does not wish to harmonize. Currently in CMVSS 208, the 50th male ATD chest deflection limit in the full frontal rigid barrier test is 50mm versus the 63 mm limit in FMVSS 208. Harmonization of the chest deflection criteria would only degrade the safety of our standard.

The United States final rule increased the test speed for the 50th percentile male ATD in the frontal rigid barrier test to 56 km/h from 48 km/h and the phase-in for this speed change begins September 1, 2007. The CMVSS 208 equivalent test is currently still at 48 km/h, however, in order to prevent disharmony in the test speed between Canada and the United States, Transport Canada is reviewing options that would allow CMVSS 208 to use the 56 km/h test speed. The target for amending the test speed in the regulation is 2007-2008.

The addition of the United States requirements using the 5th percentile female ATD have been put on hold recently due to the repeatability issues presented earlier in this paper. Transport Canada will pursue amending the regulation with the 5th percentile female ATD once these issues have been resolved.

The provisions governing the child out-of-position static tests in the passenger position, which are the same as those of the United States, may be specified in a Memorandum of Understanding (MOU). It is anticipated that these requirements will evolve, necessitating future amendments. A MOU would enable the Department to adopt new provisions governing the passenger position in a timely fashion, which would allow motor vehicle manufacturers to make the latest advances in occupant protection system technology available to the Canadian public more quickly. The target for issuing this MOU is 2007.

Child Seat Safety Initiatives

Transport Canada has been active in its efforts to improve the benefits offered by child restraint systems. In this effort, it will be proposing to harmonize with many of the United States requirements. In a first step, Transport Canada has prepared an Interim Order to allow the sale of child restraint systems that can accommodate children weighing up to 30 kg (65 pounds). In a second step, Transport Canada plans to propose regulatory amendments over the next year. This would include more items of harmonization with the United States, such as use of the same Standard Seat Assembly, the same dynamic test pulse corridor and the same Anthropomorphic Test Devices for child restraint testing.

It is expected that further work will be needed to evaluate the potential for an increase in the weight limits for child restraint systems. This same work would also investigate the effectiveness of harnesses in school bus applications. In addition, Transport Canada would further explore its interest in restraint systems for the disabled by evaluating practices from other countries. Transport Canada officials will continue to be active at an international level, by participating at the ISO Working Group on child restraint systems. Theses activities will involve monitoring the latest child restraint developments, which would include side impact simulations aimed at regulatory improvements.

Universal Anchorage Systems (UAS)

Transport Canada proposed to align many of its requirements for Universal Anchorage Systems (UAS) with those of the United States While the current requirements were developed closely with the United States, some differences still remain. In this endeavor, it was proposed that the number of User-Ready Tether Anchors in Multi-purpose Passenger Vehicles be aligned with the United States, and that Canada align its strength applications for the

Universal Lower Anchors in positions where no tether anchors existed.

This proposal also included a unique Canadian provision to require that the rear seating positions of convertibles be equipped with a tether anchor. This direction supports Canada's strong safety message of using an appropriate child restraint system when traveling with a child in your vehicle. Transport Canada will continue to consult with its stakeholders and hopes to publish an amendment early next year.

Door Locks and Door Retention Components – CMVSS 206

Transport Canada has taken steps towards updating this regulation by proposing to align its requirements governing door latches, locks and hinges with those of the United States government and as an alternative, GTR No. 1, Door Locks and Door Retention Components. Manufacturers will be given the choice of following either the referenced United States government requirements or the requirements of GTR No.1.

This amendment will reduce the risk of a potential inadvertent door opening and subsequent occupant ejection by improving the requirements for sliding, cargo and rear-hinged side doors. In addition, the proposal will extend the application of this regulation to buses with a Gross Vehicle Weight Rating (GVWR) of 4,536 kg or less, including 12 and 15 passenger vans. Finally, the amendment will offer an alternative dynamic inertial test procedure to the current inertial calculation, which will be more representative of real-world conditions.

Roof Intrusion Protection – CMVSS 216

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 Standard (CMVSS) 216, "Roof Intrusion Protection". This safety standard was implemented in September 1973 and while it has been amended on several occasions in the intervening period, the performance criteria for roof design resistance above the front seats of motor vehicles has remained substantially the same.

The government of Canada is proposing to amend the Canadian safety standards relating to vehicle roof crush to improve the safety of vehicle occupants in the event of a vehicle rollover, while maintaining harmonization with safety standards recently proposed by the United States government.

Bumpers – CMVSS 215

Up until 1975, Canadian and the United States government bumper standards were harmonized. In 1975 the United States criteria changed, but the test speed was maintained at 8 km/h. In 1982 the United States test speed was reduced to 4 km/h. Transport Canada proposed an amendment in 1982 to harmonize CMVSS 215 with the modified requirements of the United States. This was rejected pursuant to stakeholder consultations, and Canada continues to be disharmonized in this regulation.

In 2007, Transport Canada will again consult stakeholders including the vehicle manufacturers, insurance companies and the general public, to determine if harmonization of CMVSS 215 with the United States requirements is feasible.

Global Technical Regulation (GTR) on motorcycle brake systems

Motorcycle brake system regulations have not kept pace with the advancement of modern technologies. With the improvement of disc brake systems and the recent introduction of new technologies such as anti-lock brake systems (ABS) and combined brake system (CBS), 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 (UNECE), held the week of November 14, 2006.

The GTR No.3 on motorcycle brake systems was subsequently registered in the United Nations Global Registry of Technical Regulations, obliging Contracting Parties to begin the process to adopt the gtr as part of their national requirements. This gtr provides manufacturers the option to test their products to just one series of harmonized requirements, in order to sell within the markets of all Contracting Parties to the 1998 Agreement.

The GTR No.3 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 GTR 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 national standard, the GTR includes a more appropriate 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. With the registration of GTR No.3, Transport Canada will be proposing to provide the GTR as an alternative to its existing national requirement, thus giving motorcycle manufacturers the choice of following either the Canadian requirements or those of the GTR.

Compatibility Memorandum of Understanding

The increase in popularity of MPV's and light trucks has raised concerns with vehicle-to-vehicle crash compatibility due to the different heights of bumpers on vehicles. On June 29, 2006 an MOU was signed with manufacturers stipulating that by September 1, 2009 vehicles sold in the Canadian market would be designed to meet the front-to-side and front-to-front performance requirements set out in the MOU.

In summary, in front-to-side crashes, the performance criteria is based on a HIC15 performance of 779 or less, with no direct head contact with the barrier, for a SID-IIs crash dummy located in the driver's seating position. The test is completed utilizing the Insurance Institute for Highway Safety's moving deformable barrier side impact crash test[1] protocol.

In front-to-front crashes, the manufacturers have two options available. Option 1 ensures that at least 50% of the light truck's frontal energy absorbing structure overlaps that of the passenger vehicle. Option 2 requires the addition of a secondary structure, designed to reduce structural over-ride onto a passenger car during a frontal crash.

Improving compatibility is an ongoing effort. As the research in vehicle-to-vehicle crash compatibility progresses, there may be a need to reassess or refine aspects of the performance criteria.

ELECTRONIC BELT FIT TEST DEVICE (EBTD) MEMORANDUM OF UNDERSTANDING

In 1982 the development of a physical belt fit Test Device began. The intent of the device was to verify the proper fit of seat belts on human bodies in the front seats of light duty vehicles. As technology progressed, it was decided that an electronic version of the belt test device (eBTD) would be more valuable in the development of vehicles.

A software programme was subsequently created, and on June 29, 2006, manufacturers signed a MOU expressing their intent to use the eBTD in the development of their vehicles. This MOU represents a Canadian milestone in which a design is verified to meet a standard by electronic means.

1 http://www.hwysafety.org/vehicle_ratings/test_protocol_side.pdf