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GLOBAL REGISTRY

Created on 18 November 2004, pursuant to Article 6 of the
AGREEMENT CONCERNING THE ESTABLISHING OF GLOBAL TECHNICAL REGULATIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES
(ECE/TRANS/132 and Corr.1)
Done at Geneva on 25 June 1998

Addendum

Global technical regulation No. 1

DOOR LOCKS AND DOOR RETENTION COMPONENTS

(Established in the Global Registry on 18 November 2004)

Appendix

Proposal and report pursuant to Article 6, paragraph 6.3.7. of the Agreement

- Proposal to develop a global technical regulation concerning door locks and door retention components (TRANS/WP.29/AC.3/5)
- Report on the development of a global technical regulation concerning door locks and door retention components (TRANS/WP.29/2004/70), adopted by AC.3 at its twelfth session (TRANS/WP.29/1037, para. 88)

UNITED NATIONS

PROPOSAL TO DEVELOP A GLOBAL TECHNICAL REGULATION
CONCERNING DOOR LOCKS AND DOOR RETENTION COMPONENTS

Objective of the proposal

In the United States of America (USA), between 1994 and 1999, complete and partial ejections resulted in approximately 9,864 fatalities and 9,767 serious injuries per year. Door ejections accounted for 1,668 of those fatalities (19 per cent) and 1,976 of the serious injuries (22 per cent). Hinged side door openings accounted for approximately 90 per cent of all door ejection fatalities and 93 per cent of all door ejection serious injuries. This situation is likely to be a problem elsewhere.

The objective of this proposal is to develop a global technical regulation regarding door locks and door retention components intended to reduce door latch system failures. In view of the 1998 Global Agreement, we now have an opportunity to develop an improved and harmonized door locks and door retention components regulation. Moreover, the work on the global regulation will provide an opportunity to consider in the new regulation most, if not all, international safety concerns as well as available technological developments.

The USA is currently looking into upgrading its door locks and door retention components regulation to provide more stringent requirements. The current regulation was designed to test for door openings in vehicles that were built in the 1960s. Changes in vehicle latch designs common in the 1960s and 1970s have rendered the existing regulations largely obsolete. Likewise, the ECE regulation is now over thirty years old. Neither regulation has been amended significantly since their original adoption. Accordingly, the existing regulations have become less effective and likely do not provide many safety benefits at this time.

In light of the USA regulatory upgrade effort, we believe that this would be an excellent opportunity for the international community to develop a global technical regulation (gtr) concurrently with the USA. Everyone could benefit from harmonization and new technology-based improvements of the door locks and door retention components regulation. The benefits to the Governments would be the improvement of the door locks and door retention components adoption of the best safety practices, the leveraging of resources, and the harmonization of requirements. Manufacturers would benefit from reduction of the cost of development, testing and fabrication process of new models. Finally the consumer would benefit by having a better choice of vehicles built to higher, globally recognized standards providing a better level of safety at a lower price.

Description of the proposed regulation

The current requirements only test individual latch components without regard to how those components interact with each other, with other portions of the door, or with the directions of force loading conditions occurring in real world crashes. Door openings are frequently caused by a combination of longitudinal and lateral forces during the crash, which can subject the latch system to compressive longitudinal and tensile lateral forces. These forces often result in structural failures of the latch system as well as other non-latch systems such as hinge strike supports, door frame and door sheet metal. Hence, it would be beneficial to consider developing

full system requirements. In addition, current requirements have no test procedure for evaluating the safety of sliding doors. Consideration of such requirements would be valuable.

The gtr will be applicable for passenger vehicles, multi-purpose vehicles as well as trucks. The performance and test requirements for the door latch, striker and hinges will be based on the stringency needed to attain reasonable safety benefits in a cost effective manner. The gtr will be developed based in part on existing national regulations, directives of Contracting Parties as well as the international standards and regulations listed below. The USA prepared a table to facilitate comparison of the present USA and ECE regulations, which are currently being widely used by many Contracting Parties. The table is annexed to this proposal.

The results of additional research and testing conducted by any Contracting Parties since the existing regulations were promulgated will also be factored into the requirements of the draft gtr and may result in the proposal of new requirements.

Elements of the gtr, which cannot be resolved by the Working Party will be identified and dealt with in accordance with the protocol established by AC.3 and WP.29. The proposed gtr will be drafted in the format adopted by WP.29 (TRANS/WP.29/882).

Existing regulations and directives

Though there are no regulations currently contained in the Compendium of Candidates, the following regulations and standards will be taken into account during development of the new global technical regulation regarding door locks and door retention components.

- UNECE Regulation 11 – Uniform provisions concerning the approval of vehicles with regard to door latches and door retention components.

- U.S. Code of Federal Regulations (CFR) Title 49: Transportation;
  Part 571.206: Door locks and door retention components.

- EU Directive 70/387/EEC, concerning the doors of motor vehicles and their trailers.

- Canada Motor Vehicle Safety Regulation No. 206 - Door locks and door retention components.

- Japan Safety Regulation for Road Vehicle Article 25 – Entrance

- Australian Design Rule 2/00 – Side Door Latches and Hinges.

International Voluntary Standards

- SAE J839, September 1998 - Passenger Car Side Door Latch Systems

- SAE J934, September 1998 - Vehicle Passenger Door Hinge Systems

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Annex

COMPARISON BETWEEN FMVSS No. 206 and ECE REGULATION No. 11

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
A. Application			
1. **Vehicles**			
a. Passenger Cars	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 passenger cars **(≤ 9 seats and < 3.5 tonnes (~7,000 lb))**	
	- Back doors, door locks, latches and hinges on passenger cars manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
b. MPVs	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 MPVs **(≤ 9 seats and < 3.5 tonnes (~7,000 lb))**	
	Back doors, door locks, latches and hinges on MPVs manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
c. Trucks	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 Trucks **(≤ 9 seats and < 3.5 tonnes (~7,000 lb))**	
	Back doors, door locks, latches and hinges on trucks manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
2. Exemptions	Folding, roll-up and detachable doors and door components on doors modified for use with a wheelchair lift system	See above	
B. Requirements			
1. **Hinged Side Doors, (Except Cargo)**			
a. Door System	Not specified	Not specified	Research shows that door components affect one another during a crash causing doors to open. Therefore, a full door system test may capture these failures.

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
b. Latching System (latch and striker)	Requires that hinged side door latches must have a fully latched position; and a secondary/ intermediate latching position.	Same	
	Requires that hinged side door latches must withstand a longitudinal load of 11,000 N in the fully latched position and 4,450 N in the secondary latched position	Requires that hinged side door latches must withstand a longitudinal load of **11,110 N** in the fully latched position and **4,440 N** in the secondary latched position.	The variation in loads are minor and they result from different methods of converting FMVSS 206's original English units to metric
	Requires that hinged side door latches must withstand a transverse load of 8,900 N in the fully latched position and 4,450 N in the secondary latched position	Requires that hinged side door latches must withstand a transverse load of **8,890 N** in the fully latched position and **4,440 N** in the secondary latched position	
	Requires that the door latch assembly shall not disengage from the fully latched position when a longitudinal or transverse load of 30 g is applied to the door latch system (including the latch and its actuating mechanism with the locking mechanism disengaged). Verified by calculation (SAE J839) or by an agency approved test procedure.	Requires that the door latch shall not move from the fully latched position when an acceleration of 30 g is applied in both directions longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged. Verified by calculation (SAE J839) or by **dynamic inertial testing**	**Only, ECE R11 has provisions for an inertial dynamic testing procedure. However, it is unknown whether European manufacturers and testing facilities have ever conducted testing using this procedure.**
c. Hinges	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,000 N and a transverse load of 8,900 N applied separately.	Requires that each side door hinge system must support the door and withstand a longitudinal load of **11,110 N** and a transverse load of **8,890 N** applied separately.	Minor differences in test loads resulting from conversion.
	Not specified	Requires that the retention components of hinged mounted side doors, other than folding doors, shall be mounted at the forward edge in the direction of travel.	ECE R11 requires that hinged side doors, except cargo doors, have hinges located on the front of the door.
Door Locks	Requires that each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle.	Not specified	
	Requires that side front door locks, when engaged, disable the outside door handle or other outside latch release control shall be inoperative	Not specified	
	Requires that side rear door locks, when engaged, disable both the outside and inside handles or other latch release controls shall be inoperative	Not specified	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
2. **Hinged Side Doors, Cargo Type**			
a. Door System	Not specified	Not specified	A better test is needed to address the number and orientation of cargo door latches and better simulate actual loading conditions that cause openings.
b. Latching Systems (latch and striker)	Requires that each hinged side cargo door latch must only have a primary latching position	1. Requires that each hinged side cargo door latch must only have a primary latching position **and a secondary/intermediate latching position.**	FMVSS 206 does not have a requirement and strength provisions for the intermediate latching position.
	Requires that hinged side door latches must withstand a longitudinal load of 11,000 N in the fully latched position	Requires that hinged side door latches must withstanding a longitudinal load of **11,110 N** in the fully latched position and **4,440 N** in the secondary latched position.	Conversions differences in test loads and ECE R11 has strength provisions for the intermediate latching position
	Requires that hinged side door latches must withstand a transverse load of 8,900 N in the fully latched position	Requires that hinged side door latches must withstand a transverse load of **8,890 N** in the fully latched position and **4,440 N** in the secondary latched position	
	Not specified	Requires that the door latch shall not move from the fully latched position when an acceleration of 30 g is applied in both directions longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged. Verified by calculation (SAE J839) or by **dynamic inertial testing**	ECE R11 requires inertial resistance for sliding door latches, whereas FMVSS 206 does not.
Hinges	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,000 N and a transverse load of 8,900 N applied separately.	Requires that each side door hinge system must support the door and withstand a longitudinal load of **11,110 N** and a transverse load of **8,890N** applied separately	Conversions differences in test loads
	Not specified	Requires that the retention components of hinged mounted side doors, other than folding doors, shall be mounted at the forward edge in the direction of travel. In the case of double doors, this requirement shall apply to the door wing, which opens first; the other wing shall be capable of being bolted.	ECE R11 restricts the location of hinges

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
Door Locks	Requires that each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle.	Not specified	ECE R11 has no lock requirements
	Requires that side front door locks, when engaged, disable the outside door handle or other outside latch release control shall be inoperative	Not specified	
	Requires that side rear door locks, when engaged, disable both the outside and inside handles or other latch release controls shall be inoperative	Not specified	
3. **Hinged Back Doors**			
a. Door System	Not specified	Not specified	Because of number and orientation of back door latches, a door system test would better simulate actual loading conditions that cause doors to open.
b. Latching Systems (latch and striker)	Each back door must have at least <u>one primary latch and striker assembly</u> with a fully latched position and a secondary latched position	Not specified	ECE R11 has no requirements for back doors, locks, latches or hinges.
	Requires that primary back door latches must comply with load tests one, two and three as well as to inertial resistance requirements	Not specified	
	Requires that auxiliary back door latches, if present, must comply with load tests one and two and inertial resistance requirements	Not specified	
	<u>Load test one:</u> Fully latched: 11,000 N secondary latch: 4,450 N *Application of load*: perpendicular to the face of the latch (corresponding to the longitudinal load test for side doors)	Not specified	
	<u>Load test two:</u> Fully latched: 8,900 N secondary latch: 4,450 N *Application of load*: in the direction of the fork-bolt opening and parallel to the face of the latch	Not specified	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
b. Latching Systems (latch and striker) (cont'd)	Load test three: Back doors, opening upwards: Fully latched position shall not disengage under load of 8,900 N *Application of load:* orthogonal to directions of load tests one and two	Not specified	
	Inertial Resistance Requirements Requires that the fully latched position shall not disengage under inertia load of 30 g. *Application of the inertia load*: in the directions of load tests one, two and three.	Not specified	
c. Hinges	Load test one: Each back door hinge system shall support the door shall not separate under load of 11,000 N *Application of load*: perpendicular to the hinge face plate such that the hinge plates are not compressed against each other.	Not specified	
	Load test two: Each back door hinge system shall support the door shall not separate under load of 8,900 N *Application of load*: perpendicular to the axis of the hinge pin and parallel to the hinge face plate such that the hinge plates are not compressed against each other.	Not specified	
	Load test three: Back doors opening upward: no separation under load of 8,900 N *Application of load*: in the direction of the axis of the hinge pin	Not specified	
d. Door Locks	Requires that each back door system equipped with interior door handles or that leads directly into a compartment that contains one or more seating accommodations shall be equipped with a locking mechanism with operating means in both the interior and exterior of the vehicle. When the locking mechanism is engaged, both inside and outside door handles or other latch release controls shall be inoperative	Not specified	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
4. **Sliding Doors**			
a. Door System	Side Sliding Doors Requires the track and slide combination or other supporting means of side sliding doors shall not separate under outward transverse load of 17,800 N (8,890 N to each load bearing member at opposite edges of door).	Same	
	Back Sliding Doors Requires the track and slide combination or other supporting means of side sliding doors shall not separate under outward transverse load of 17,800 N (8,890 N to each load bearing member at opposite edges of door).	Not specified	Only FMVSS 206 requires sliding back doors to have performance requirements.
b. Latching Systems (latch and striker)	Not specified	Requires that the sliding door latch/striker assembly must withstand a longitudinal load of 4,440 N in intermediate latched position 11,110 N in fully latched position.	Only ECE R11 requires sliding door latch requirements and a requirement to ensure door closure
	Not specified	Requires that the sliding door latch/striker assembly must withstand a transversal load of 4,440 N in intermediate latched position 8,890 N in fully latched position.	
	Not specified	Requires that the sliding door latch shall not move from fully latched position when acceleration of 30 g is applied longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged.	
	Not specified	Requires that sliding doors without an intermediate latched position: if the door is not fully latched, must automatically move away to a partially open position; readily apparent to the vehicle occupants	
c. Hinges	NA	NA	
d. Door Locks	No requirements	No requirements	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
C. Test Procedures			
1. **Hinged Side Doors (including cargo)**			
a. Door System	Not specified	Not specified	
b. Latching Systems (latch and striker)	The test procedure specifies (defined in SAE J839): 1. For the longitudinal load attach the latch and striker to test fixture. Locate weights to apply 890 N tending to separate latch and striker in direction of door opening. Apply test load perpendicular to latch face at a rate $\leq$ 5 mm/min 2. For the transverse load attach latch and striker to test fixture Apply load in line with the contacting surfaces of latch and striker, in door opening direction at a rate $\leq$ 5 mm/min.	Same	
	The test procedure specifies (defined in SAE J839): For the (S5.1.1.2) Inertia load, calculation of complete door latch system (i.e. door latch, striker, outside and inside handle, key cylinder and any connecting mechanisms) in the fully latched position, showing that the system will remain in the fully latched position when subjected to an inertia load of 30 g in any direction	Same as FMVSS 206 but provides the additional option to conducted dynamic inertial testing. *The dynamic test is as follows:* -vehicle itself or simulated structure secured to a chassis with door lock system fully latched -acceleration of 30 to 36 g applied to the chassis for at least 30 msec in forward direction parallel to vehicle longitudinal axis as well as in direction of the door opening, perpendicular to above described first direction - when equipped with lock device ensure that it does not come into action during the tests.	Only, ECE R11 has provisions for an inertial dynamic testing procedure. However, it is unknown whether European manufacturers and testing facilities have ever conducted testing using this procedure.

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
c. Hinges	Conventional Hinges The test procedure specifies (defined in SAE J934): Attach a test fixture to the mounting provision of the hinge system, simulating vehicle position (door fully closed) relative to the hinge centerline. Distance between the extreme end of one hinge in the system to the extreme end of another hinge in the system: 16.00 in (406.4 mm). Apply load equidistant between the linear center of the engaged portion and of the hinged pins and through the centerline of the hinge pin in the longitudinal vehicle direction (for longitudinal strength) and in the transverse vehicle direction (for transversal strength). Apply test load at a rate S 0.2 in (5 mm) per minute until failure. Record maximum load	Same	
	Piano Hinges The test procedure specifies (defined in SAE J934): For piano type hinges, the hinge spacing requirements of SAE J934 shall not be applicable and arrangement of the test fixture shall be altered as required so that the test load will be applied to the complete hinge	Same	
d. Door Locks	Not specified	Not specified	
2. **Back Doors**			
a. Door System	Not specified	Not specified	Because of number and orientation of back door latches, a door system test would better simulate actual loading conditions that cause doors to open.
b. Latching Systems (latch and striker)	The test procedure specifies: Load test one, two and three are same as for side door latches, longitudinal load, except that the test load must be applied in the directions specified in load tests one, two and three Inertia loads: same as for side door latches	Not specified	FMVSS 206 has a procedure for testing back door latches.
c. Hinges	The test procedure specifies: Same as for side hinged doors except that the loads shall be in the direction specified in test load one, two and three described above. The same test device may be used for load tests two and three.	Not specified	FMVSS 206 has a procedure for testing back door hinges.

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
d. Door Locks	Not specified	Not specified	
3. **Sliding Doors**			
a. Door System	Side Sliding Doors The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 N (2,000 lb) to the load-bearing members at the opposite edges of the door (17,800 N (4,000 lb) total). The demonstration may be performed wither in the vehicle or with the door retention components in a bench test fixture	Same	
	Back Doors The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 N (2,000 lb) to the load-bearing members at the opposite edges of the door (17,000 N (4,000 lb) total). The demonstration may be performed wither in the vehicle or with the door retention components in a bench test fixture	Not specified	FMVSS 206 has a procedure for testing sliding back doors.
b. Latching Systems (latch and striker)	Not specified	Same as for side hinged doors	FMVSS 206 does not test sliding door latches
c. Hinges	NA	NA	
d. Door Locks	Not specified	Not specified	

REPORT ON THE DEVELOPMENT OF A GLOBAL TECHNICAL REGULATION CONCERNING DOOR LOCKS AND DOOR RETENTION COMPONENTS

PRELIMINARY REPORT

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1. INTRODUCTION

During the one-hundred-and-twenty-sixth session of WP.29 of March 2002, the Executive Committee of the 1998 Global Agreement (1998 Agreement) adopted a Programme of Work, which includes the development of a global technical regulation (gtr) to address inadvertent door opening in crashes. The Executive Committee also charged the Working Party on Passive Safety (GRSP) to form an informal working group (working group) to discuss and evaluate relevant issues concerning requirements for door locks and door retention components to make recommendations regarding a potential gtr.

The United States of America volunteered to lead the group's efforts and develop a document detailing the recommended requirements for the gtr. The United States of America presented informal document No. 6 in March 2003, formally proposing the work and highlighting the relevant issues to be addressed in the gtr.

Under the guidelines governing the development of a gtr, the working group is to first evaluate the merits of the proposal. This evaluation should include:

- An examination of the merits of the proposal in detail, outlining the pros and cons of the proposal;
- Consideration of other regulations on the same subject, which are listed in the compendium;
- A determination that the proposal addresses a problem of sufficient magnitude to warrant the development of a regulation;
- An examination of whether the nature, extent and cause of the problem addressed by the proposal are correctly characterized;
- An examination of whether the proposal provides a sufficiently effective, performance oriented approach to address the problem;
- A determination that the approach identified in the proposal is appropriate to address the problem; and
- A description of needed additional information.

The working group met to generally evaluate the likelihood of developing a door retention gtr on 2 and 3 September and on 9 December, in Paris, France and Geneva, Switzerland, respectively. A more thorough evaluation of the United States of America proposal was conducted on 3 and 4 April in London, England. A fourth meeting is scheduled for late July/early August this year.

The Contracting Parties represented in the working group are the Netherlands, France, Canada, Japan, United States of America, and the European Union. Representatives from the European Association of Automotive Suppliers (CLEPA) and the International Organization of Motor Vehicle Manufacturers (OICA) are also participants.

This report summarizes the main issues discussed by the Working Party in evaluating the proposal to develop a draft global regulation on door lock and door retention components.

2. REQUEST TO PROCEED WITH THE DRAFTING OF A GTR

Current regulations were designed to test for door openings in vehicles that were built in the 1960s. Aside from changes made to United States of America and Canadian requirements in the early to mid-1990s to address rear door openings, no significant changes have been made to any of the current regulations, notwithstanding changes in vehicle latch designs from those that were common in the 1960s and 1970s. Accordingly, the existing Regulations have become less effective and probably do not provide many safety benefits. Additionally, existing door retention regulations are comparable in terms of content, indicating that harmonization in the area is possible.

Given the similarity of existing standards, the causes of door openings should be amenable to a global solution. This is because there is little variability in door retention designs among those jurisdictions that currently regulate door design. It is the belief of the working group that everyone could benefit from harmonization in this area, particularly since no existing regulations address new technology-based improvements of the door locks and door retention components. Governments would benefit from the adoption of best practices, leveraging of resources, and the harmonization of requirements. Manufacturers would benefit from the reduction of the cost of development, testing, and production process of new models. The consumer would benefit by having a better choice of vehicles built to higher, globally recognized standards providing a better level of safety at a lower price.

Accordingly, the working group requests that a draft gtr be prepared based on its evaluation of the United States of America proposal and the safety problems associated with door openings in general. While not all issues that would be addressed by a gtr have been resolved, no issues are sufficiently problematic to prevent the development of a draft regulation. It is proposed that a draft proposal could be prepared for discussion at the next GRSP meeting pursuant to the following schedule:

Tasks	Dates
1st Progress Report to GRSP	June 2003
1st Progress Report to AC.3	June 2003
Preparation of 1st Draft GTR	July 2003
4th Informal group Meeting	July/August 2003
2nd Draft GTR	September 2003
5th Informal group Meeting	October 2003
2nd Progress Report/Draft GTR to GRSP	December 2003
6th Informal Group Meeting	February 2004
2nd Progress Report to AC.3	March 2004
3rd Progress Report/Adoption of Final Draft GTR by GRSP	May 2004
3rd Progress Report to AC.3	June 2004
Submittal of Final Draft GTR to AC.3	November 2004

3. EVALUATION OF THE SAFETY PROBLEM

At the request of the working group, the United States of America provided data on the magnitude of the door ejections and door openings based on 1994-99 National Automotive Sampling System (NASS) and Fatal Analysis Reporting System (FARS) annual estimates. No data from other jurisdictions was presented. The United States of America data shows that:

- There are approximately 42,000 door openings, or failures in the United States per year;
- Complete and partial ejections cause 9,864 fatalities & 9,767 serious injuries in the United States of America each year;
- Door ejections constitute 19 per cent (1,668) of ejection fatalities and 22 per cent (1,976) of ejection serious injuries;
- 94 per cent of serious injuries and fatalities attributable to ejections through doors involve unbelted occupants; and
- Hinged side door openings account for 90 per cent of door ejection fatalities and 93 per cent of ejection serious injuries.

According to the United States of America statistics, less than one per cent of occupants who sustain serious and fatal injuries in tow-away crashes are ejected through doors. However, the risk of a door failure is relatively high. Additionally, despite the relatively rare occurrence of door ejections in crashes, the risk of serious or fatal injury is high when ejection occurs. Door ejections are the second leading source of ejections in all crashes in the United States of America. They are particularly likely in rollover crashes.

Door openings are frequently caused by a combination of forces occurring during a crash, which simultaneously subject door retention components to either compressive/tensile lateral and longitudinal forces. These forces often result in structural failures of the latch system and hinges. Structural failure of the latch and striker are the leading cause of door openings. The United States of America data indicate that about one half of door openings are associated with damage to the latch or striker alone, and about two-thirds involve damage to the latch or striker, either alone, or in combination with damage to one or more of the hinges. Failures involving the door supports and the doorframe occur far less frequently. Side door openings constitute approximately 90 per cent of all door ejection fatalities and 93 per cent of the serious injuries.

The rate of ejections through doors is heavily dependent on belt use. Accordingly, the risk of ejection will probably vary from jurisdiction to jurisdiction, based on differing rates of belt use. Nevertheless, the incidence of door openings should be relatively constant given the similarity in door designs and the lack of occupant behaviour patterns as a factor in door failures.

4. REVIEW OF EXISTING INTERNATIONAL REGULATIONS

The following existing regulations, directives, and standards pertain to door locks and door retention components:

Existing Regulations and Directives

- UNECE Regulation No. 11 – Uniform provisions concerning the approval of vehicles with regard to door latches and door retention components.
- The United States of America Federal Motor Vehicle Safety Standard No. 206, Door locks and door retention components. (FMVSS No. 206)
- European Union Directive 70/387/EEC, concerning the doors of motor vehicles and their trailers.
- Canada Motor Vehicle Safety Regulation No. 206 – Door locks and door retention components. (CMVSS No. 206). [Note: The North American Regulations FMVSS and CMVSS No. 206 are substantially similar].
- Japan Safety Regulation for Road Vehicle Article 25 –
- Australian Design Rule 2/00 – Side Door Latches and Hinges
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International Voluntary Standards

- SAE J839, September 1998 – Passenger Car Side Door Latch Systems
- SAE J934, September 1998 – Vehicle Passenger Door hinge Systems
- ISO – No standards found

These and other available standards on the subject continue to be examined by the working group. A preliminary analysis has been made to identify the differences in the application, requirements, and test procedures of the North America and UNECE Regulation No. 11 regulations, as appended to this report (informal document No. 15 of the thirty-first GRSP session). There are no apparent conflicts between the gtr proposal and other existing international standards.

5. DISCUSSION OF ISSUES TO BE ADDRESSED BY A GTR

The following discussions reflect the working groups' identification of specific issues, as well as the group's evaluation of those issues.

A. Applicability

The application of a door retention component gtr will, to the extent possible, use the revised vehicle classification and definitions that the Working Party on General Safety (GRSG) Common Task Group has prepared.

However, questions remain as to what vehicles from these categories will be covered under the gtr. Some members of the group urge that the gtr should initially only apply to M1 (< 9 seats), and N1 (<3.5 tonnes) vehicles, while others have stressed the inclusion of all vehicles other than M2s, M3s, and N3s, for at least some portions of the gtr. Among those desiring a gtr more limited in scope, it was proposed that N2 vehicles could be

added in the future after evaluating various door designs for these vehicles. Some of those arguing in favour of a more inclusive gtr noted that current United States of America, Canadian, and Australian requirements already apply to all vehicles other than buses (M2 and M3 vehicles) and that the applicability of existing requirements to commercial trucks has not proven problematic for vehicle manufacturers. Accordingly, a question remains as to whether to specifically include N2s and N3s in the gtr, with the potential to exclude certain N2 and N3 vehicles from some or all of the requirements.

The working group will continue to discuss the application issue and will examine the revision to the vehicle classification by GRSG and any effects it would have on the definitions of vehicles applicability of this gtr in order to reach a final recommendation.

B. General Requirements

The working group agreed to recommend that the gtr should specify requirements for side and back doors, door retention components and door locks and to consider all available research and testing done by various jurisdictions. The groups agreed to recommend that force levels identified in the current component static tests for latches and hinges be harmonized to eliminate variations due to rounding of unit conversions. New requirements and test procedures for hinged side and sliding doors proposed by North America for inclusion are being evaluated for consideration. Other requirements being evaluated include provisions to ensure doors remain closed and operational following dynamic crash testing, as well as an inertial load dynamic test and limitations on circumstances under which rearward mounted door hinges would be allowed on hinged side doors.

1. Hinged Side Doors Issues

Currently, UNECE Regulation No. 11 has similar requirements to FMVSS No. 206, although UNECE does not distinguish between cargo and non-cargo door latches. The group agreed to recommend that side cargo doors (i.e., double doors) meet the same requirements as side hinged doors. The United States of America and Canada have developed a series of new test procedures designed to better simulate real world door opening in crashes.

1.1. New hinged full door test requirements

These tests consist of lateral and longitudinal door-in-frame quasi-static (full door) tests in both longitudinal and lateral directions, independently from the door system. These procedures are designed to simulate various failures during crashes:

- The lateral full door test is designed to simulate latch failures in crashes that produce outwards forces on the door (i.e., through occupant loading or inertial loading) such as side crashes that result in vehicle spin and rollover. This procedure is intended to replace the current lateral tensile bench test.
- The longitudinal full door test is designed to simulate a collision in which the side of the vehicle is stretched, leading to the possibility that the striker could be torn from its mated latch (i.e., far side door in side impacts, and front and rear

offset crashes on the opposite side door). This procedure is intended to replace the current longitudinal tensile bench test.

At present, most members do not support the adoption of full door tests into the gtr. Because of the current European Union requirement for both the component tests and a door closure requirement in dynamic tests, there is some question among the members as to whether a full door test provides any additional value. One member has requested an analysis of how the full door test will improve safety (or the reduction in door openings) as compared to existing requirements. The United States of America will provide this analysis.

Other members of the working group have been unable to evaluate the contemplated test procedures because they did not have a sufficiently precise test procedure (e.g., size of loading plates, point of application against the door, whether and how screws attach the loading plate to the door, how screws attach the loading plate to the test frame.) However, they expressed several concerns that the new procedure will end up being unduly design restrictive, given the limitations of the test frame. For example, it may be that multiple test frames would be required to ensure an appropriate "fit" between the door and the test frame. This is because placement of the test load relative to the latch mechanism may be sufficiently different to produce significantly different results, and because door specific holes must be drilled into the test frame. Additionally, the test frame may not adequately address new latch designs that may be mounted in non-traditional locations. Likewise, the procedure does not allow manufacturers the benefit of non-latch attachments that are primarily used for side impact purposes but also may have a positive effect on door closure.

Those members voicing concerns over the new procedures have argued that conducting the proposed tests on a full vehicle rather than a test frame is impractical because not all loads can be applied to a closed door. However, it may be possible to cut the door frame and attach it to the test frame, although such an approach may not fully replicate the actual door-in-frame as installed in the vehicle since cutting the door frame may change its characteristics. Such an approach may address the fit between the latch and striker, as well as the physical characteristics of the door and the doorframe.

The primary concern with the proposed tests is whether they adequately address the instances of door failures in the real world or whether a dynamic or quasi-dynamic test (e.g., dynamic loading against the door interior) would be preferable. One member noted that he/she was concerned that a static test inadequately tests door systems for real world conditions. He/she stated that a dynamic requirement, where a dummy or other test form was propelled into the door, would be preferable to the static application of a load against the door, even if the statically-applied load were higher than the dynamically-applied load.

Because of the more encompassing concerns related to the full-door tests, there was little discussion over whether the trim should be removed or what would constitute "trim" if it were removed. A question was raised as to what exactly would be the point of the tests since the load direction would change with the application of force. It is unclear to what extent the removal of trim would limit the change in load direction.

While not rejecting the full door tests completely, the members noted that a more thorough evaluation, based on a more fully-articulated test procedure, was needed and generally expressed serious concerns over these forms of tests being included into a gtr. Committee members were provided with a more detailed test procedure for analysis. Several members have agreed to evaluate the procedure and communicate any questions over test methodology.

1.2. New Combination Component Test

The combination latch/striker component bench test is designed primarily to simulate the force conditions causing near side door openings in side impacts (longitudinal and lateral force loading).

The group discussed this combination test and has agreed to further evaluate the procedure.

1.3. Rear mounted hinges

UNECE Regulation No. 11 requires, with a limited exception, that hinges be located at the forward edge of hinged side doors, because of the difficulty in closing a rear hinge door that is inadvertently opened while the vehicle is in motion. Some members of the group believe that this requirement is too design restrictive. The group members agreed to develop and consider a proposal for requirements and procedure for testing reverse mounted side hinged doors to prevent such openings. A proposal was submitted that would require that all hinges be located on the forward edge of doors or otherwise, would be required to: (1) limit vehicle speed to $\leq$ [25 km/h], if door is open; (2) make the interior door handles be inoperable, if vehicle speed is > [4 km/h], and; (3) require that a vehicle be equipped with a door telltale indicator. While the proposal has not been fully evaluated, it appears to merit further consideration. Accordingly, the working group has agreed to further consider the proposal.

1.4. Rear side door locks

Unlike the door lock and door retention component requirements in North America, UNECE Regulation No. 11 does not have provisions for rear side door locks. Some of the working group members expressed concerns over including such requirements in the gtr, while others insisted that such requirements are necessary for the protection of children in the rear seat. In discussing this issue, several recommendations were made for inclusion in the gtr: (i) a door that can be opened with a single movement of the door handle when the door is in a locked position must be fitted with a child safety lock, (ii) automatic door locks that allow the driver to engage or disengage the child safety locks from the front seat would be acceptable, (iii) doors that require some action other than the release of the door with a single movement of the door handle when the door is in a locked position may have child locks, but would not be required to have such locks; these doors could be required to have a manual door-lock release that would allow rear-seat passengers to open the door in the event of a crash. It was suggested that door lock requirements should be consistent with the UNECE Regulations Nos. 94 and 95. The United States of America indicated that child locks are not regulated in the current North

American standards, and that in any final recommendation, it is important that doors not be allowed to be opened from the interior with a single movement of the door handle when the door is locked.

The informal group will continue to discuss this item in order to reach a final resolution.

2. Issues Unique to Side Sliding Doors

The requirements and test procedures in both UNECE Regulation No. 11 and the North American standards were discussed and the working group agreed to recommend the inclusion of the current requirements for the track and slide combinations of side sliding doors. Further, the group agreed to recommend adding the latch/striker system requirements of UNECE Regulation No. 11. However, neither Regulation had a detailed full vehicle sliding door test procedure that better simulates real world door openings in crashes.

2.1. Full vehicle test

The United States of America and Canada have jointly developed a new full vehicle sliding door test procedure to replace the existing door-in-frame test in the North American standards. The procedure specifies that the track and slide combination or other supporting means for each sliding door, while in the closed position, cannot separate from the door frame when lateral forces of 18 kN are applied. The total displacement of each of the loading devices is to be limited to 460 mm.

Everybody in the working group reacted favourably to the proposals and agreed to consider them in the gtr. It was suggested that the requirements for the new sliding door test parallel those currently in UNECE Regulation No. 11, paragraph 5.4., which requires that the track, sliding combination or other supports do not separate under specified force loads. Also, it was recommended to consider a proposal to require that these doors do not separate from the doorframe more that 100 mm along any point along the perimeter.

2.2. Requirement for a telltale or audible alert

The working group members agreed to require either a secondary latch or some type of indicator signalling when a sliding door was not fully closed. Among the possible approaches are a visual or audible alert that informs the driver that the door is not completely closed. As noted above, it may be desirable to require a telltale or other alert whenever any door is incompletely closed.

3. Issues Unique to Back Doors

The group agreed to recommend that the requirements for cargo and back doors should be similar to those for hinged side doors; although some members argued that data on the risk of ejection through these doors must justify such a requirement. FMVSS/CMVSS No. 206 currently impose the same requirements on back doors as are applicable to side hinged doors. With the exception of the two areas discussed immediately below, the working group has agreed that these requirements would be appropriate for the gtr.

3.1. Back sliding door requirement

The group recommends not including requirements for these doors in the gtr, because these doors do not currently exist and could cause unforeseen risk to vehicle occupants or bystanders.

3.2. Rear glass tailgates

Some members commented that the North American standards restriction on latches or hinges attached to glazing is too restrictive, and that a less restrictive requirement, in terms of how much of the applicable door consists of glazing, seems appropriate. The United States of America noted that the point of the requirement was not to encourage "all glazing" doors, but rather an acknowledgement that these doors could not meet the strength requirements of FMVSS No. 206 and were exempted for practical reasons. The group requested, and OICA agreed, to develop various design parameters that would reduce the likelihood that ejections from these doors would not be the result of a retention component failure. The United States of America has agreed to review its requirement and better clarify what constitutes a door and what constitutes a window (i.e., hinges attached to a window fully incorporated into a latched tailgate).

The informal group will continue to discuss this item in order to reach a final recommendation.

4. Dynamic Requirements Issues

4.1. Dynamic inertial test procedure (optional to calculation)

The working group has agreed to recommend adopting the UNECE Regulation No. 11 dynamic inertial test requirements to the gtr, as an option to the inertial calculation. France provided a sled pulse currently used in UNECE type-approval testing. The deceleration pulse for the test ranged from 30g to 36g for a duration of at least 30 ms.

Questions were raised regarding the corridor for the sled test pulse as well as an objective and repeatable test procedure to enforce the requirement. OICA, working with France, provided a draft general test procedure and a wide range for the forces for an enforceable pull test on the latch [100N—500 N]. Some members argued against this and the group agreed to narrowing the force range provided to a value of [250N ± Tolerance]. Additionally, some members argued for appropriate measures to detect whether the door flips open and closes again during the inertia testing (e.g. use of adhesive tape or thread, or a spring to apply a force to a striker during the inertia testing). OICA agreed to further work on the detailed procedure to address this issue. The United States of America and Canada have agreed to define a sled test pulse corridor and evaluate the procedure as an option to the calculation.

4.2. Door closure and door operability requirements following dynamic crash testing

Some members would like to consider adopting a requirement in the gtr that side doors remain shut during vehicle dynamic crash tests. Existing UNECE standards with dynamic crash test components already require that the door stay closed during the test. It is believed that it is unnecessary to repeat this requirement in the gtr; it would suffice to reference the requirements of the other UNECE Regulations or of the FMVSS/CMVSS in the gtr.

The group likewise considered whether the gtr should require that at least one door per row be operable following crash testing (possibly to exclude rear doors in rear impacts and side struck doors in side impact testing). Existing UNECE standards with dynamic crash test components already have such a requirement. A test procedure needs to be developed. Some members believe that it is unnecessary to repeat this requirement in the gtr; it would suffice to reference the requirements of the other UNECE Regulations or of the FMVSS/CMVSS in the gtr.

C. Other concerns

Questions were raised during group discussions as to whether to include in the gtr at this time other requirements, such as vehicle entrapment involving electric door, remote keyless entry systems, power assisted side and sliding door closure, and whether to include a "telltale indicator" for all doors. It was recommended that a door telltale indicator be required for each vehicle door to be activated when doors are partially or completely open. The group will continue to discuss these issues and whether to include them in the gtr at this stage.

6. COST EFFECTIVENESS ASSOCIATED WITH A GTR

The estimated cost of the new requirements, if adopted, would probably be minor. However, a full evaluation of the costs effectiveness associated with a gtr, will be provided once the working group completes its evaluation of the proposed test procedures.

7. REFERENCE DOCUMENTS USED BY THE WORKING GROUP

A list of informal documents used by this Informal group is listed and available on the UNECE WP.29 website (http://www.unece.org/trans/main/welcwp29.htm). In addition, test reports and other pertinent documents detailing the United States of America and Canada proposed test procedures are accessible from the **United States of America Department of Transportation Docket Management System (Docket No. NHTSA-1996-3705) Web access at http://dms.dot.gov/**

Number of Informal Document*/	Title of Informal Document
TRANS/WP.29/GRSP/2001/1	Proposal for Draft Candidate GTR on Door Latches and Door Retention Components (OICA)
Informal document No. 15 of the thirty-first GRSP session	Comparison Between FMVSS No. 206 and UNECE R11 (U.S.)
INF GR/DL/1/1	Agenda September 2002 Meeting
INF GR/DL/1/2	Summary of Lateral Full Door Test (U.S.)
INF GR/DL/1/3	Summary of Longitudinal Full Door Test (U.S.)
INF GR/DL/1/4	Summary of Combination Test (U.S.)
INF GR/DL/1/5	Summary of Transport Canada Sliding Door Test (Canada)
INF GR/DL/1/6	Transport Canada Test Reports (Canada)
INF GR/DL/2/1	Agenda December 2002 Meeting
INF GR/DL/2/2	Proposal for a Test Procedure Concerning the Resistance against Inertial Loads of Side Door Locks on Motor Vehicles (OICA)
INF GR/DL/2/3	Comparison of Locking Requirements in FMVSS 206 with UNECE R11 (OICA)
INF GR/DL/3/1	Agenda April 2003 Meeting
INF GR/DL/3/2	Crash Data on US Door Ejection/Openings (U.S.)
INF GR/DL/3/3	Full Door and Combination Detailed Test Procedures (U.S.)
INF GR/DL/3/4	Dynamic Inertial Sled Test Pulse (France UTAC)

*/ Informal Report (INF), GRSP Informal group (GR), Door Locks and Door Retention Components (DL), Meeting No., and Report Number

APPENDIX

COMPARISON

BETWEEN

FMVSS NO. 206 AND UNECE REGULATION No. 11

COMPARISON BETWEEN FMVSS No. 206 and UNECE REGULATION 11

DOOR COMPONENT	U.S. - FMVSS 206 (Shaded area reflects where FMVSS 206 lacks requirement equivalent to UNECE)	DIFFERENCES IN UNECE R11.02 (Shaded area reflects requirements different from FMVSS 206)	COMMENTS
A. Application			
1. Vehicles			
a. Passenger Cars	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 passenger cars **(≤ 9 seats and < 3.5 tonnes (~7,000 lb))**	
	- Back doors, door locks, latches and hinges on passenger cars manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
b. MPVs	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 MPVs **(≤ 9 seats and < 3.5 tonnes (~7,000 lb))**	
	Back doors, door locks, latches and hinges on MPVs manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
c. Trucks	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 Trucks **(≤ 9 seats and < 3.5 tonnes (~7,000 lb))**	
	Back doors, door locks, latches and hinges on trucks manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
2. Exemptions	Folding, roll-up and detachable doors and door components on doors modified for use with a wheelchair lift system	See above	

B. Requirements			
1. Hinged Side Doors, (Except Cargo)			
a. Door System	Not specified	Not specified	Research shows that door components affect one another during a crash causing doors to open. Therefore, a full door system test may capture these failures.
b. Latching System (latch and striker)	Requires that hinged side door latches must have a fully latched position; and a secondary/ intermediate latching position.	Same	
	Requires that hinged side door latches must withstanding a longitudinal load of 11,000 N in the fully latched position and 4,450 N in the secondary latched position	Requires that hinged side door latches must withstand a longitudinal load of **11,110 N** in the fully latched position and **4,440 N** in the secondary latched position.	The variation in loads are minor and they result from different methods of converting FMVSS 206's original English units to metric
	Requires that hinged side door latches must withstand a transverse load of 8,900 N in the fully latched position and 4,450 N in the secondary latched position	Requires that hinged side door latches must withstand a transverse load of **8,890 N** in the fully latched position and **4,440 N** in the secondary latched position	
	Requires that the door latch assembly shall not disengage from the fully latched position when a longitudinal or transverse load of 30g is applied to the door latch system (including the latch and its actuating mechanism with the locking mechanism disengaged). Verified by calculation (SAE J839) or by an agency approved test procedure.	Requires that the door latch shall not move from the fully latched position when an acceleration of 30g is applied in both directions longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged. Verified by calculation (SAE J839) or by **dynamic inertial testing**	**Only, UNECE 11 has provisions for an inertial dynamic testing procedure. However, it is unknown whether European manufacturers and testing facilities have ever conducted testing using this procedure.**
c. Hinges	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,000 N and a transverse load of 8,900N applied separately.	Requires that each side door hinge system must support the door and withstand a longitudinal load of **11, 110 N** and a transverse load of **8,890 N** applied separately.	Minor differences in test loads resulting from conversion.
	Not specified	Requires that the retention components of hinged mounted side doors, other than folding doors, shall be mounted at the forward edge in the direction of travel.	UNECE 11 requires that hinged side doors, except cargo doors, have hinges located on the front of the door.
Door Locks	Requires that each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle.	Not specified	
	Requires that side front door locks, when engaged, disable the outside door handle or other outside latch release control shall be inoperative	Not specified	
	Requires that side rear door locks, when engaged, disable both the outside and inside handles or other latch release controls shall be inoperative	Not specified	

2. Hinged Side Doors, Cargo Type			
a. Door System	Not specified	Not specified	A better test is needed to address the number and orientation of cargo door latches and better simulate actual loading conditions that cause openings.
b. Latching Systems (latch and striker)	Requires that each hinged side cargo door latches must only have a primary latching position	1. Requires that each hinged side cargo door latches must only have a primary latching position **and a secondary/intermediate latching position.**	FMVSS 206 does not have a requirement and strength provisions for the intermediate latching position.
	Requires that hinged side door latches must withstand a longitudinal load of 11,000 N in the fully latched position	Requires that hinged side door latches must withstanding a longitudinal load of **11,110 N** in the fully latched position and **4,440 N** in the secondary latched position.	Conversions differences in test loads and UNECE 11 has strength provisions for the intermediate latching position
	Requires that hinged side door latches must withstand a transverse load of 8,900 N in the fully latched position	Requires that hinged side door latches must withstand a transverse load of **8,890 N** in the fully latched position and **4,440 N** in the secondary latched position	
	Not specified	Requires that the door latch shall not move from the fully latched position when an acceleration of 30g is applied in both directions longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged. Verified by calculation (SAE J839) or by **dynamic inertial testing**	UNECE 11 requires inertial resistance for sliding door latches, whereas FMVSS 206 does not.
Hinges	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,000 N and a transverse load of 8,900N applied separately.	Requires that each side door hinge system must support the door and withstand a longitudinal load of **11,110 N** and a transverse load of **8,890N** applied separately	Conversions differences in test loads
	Not specified	Requires that the retention components of hinged mounted side doors, other than folding doors, shall be mounted at the forward edge in the direction of travel. In the case of double doors, this requirement shall apply to the door wing, which opens first; the other wing shall be capable of being bolted.	UNECE 11 restricts the location of hinges

Door Locks	Requires that each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle.	Not specified	UNECE 11 has no lock requirements
	Requires that side front door locks, when engaged, disable the outside door handle or other outside latch release control shall be inoperative	Not specified	
	Requires that side rear door locks, when engaged, disable both the outside and inside handles or other latch release controls shall be inoperative	Not specified	
3. Hinged Back Doors			
a. Door System	Not specified	Not specified	Because of number and orientation of back door latches, a door system test would better simulate actual loading conditions that cause doors to open.
b. Latching Systems (latch and striker)	Each back door must have at least <u>one primary latch and striker assembly</u> with a fully latched position and a secondary latched position	Not specified	UNECE 11 has no requirements for back doors, locks, latches or hinges.
	Requires that primary back door latches must comply with load tests one, two and three as well as to inertial resistance requirements	Not specified	
	Requires that auxiliary back door latches, if present, must comply with load tests one and two and inertial resistance requirements	Not specified	
	<u>Load test one:</u> Fully latched: 11,000 N secondary latch: 4,450 N *Application of load*: perpendicular to the face of the latch (corresponding to the longitudinal load test for side doors)	Not specified	
	<u>Load test two:</u> Fully latched: 8,900 N secondary latch: 4,450 N *Application of load*: in the direction of the fork-bolt opening and parallel to the face of the latch	Not specified	
	<u>Load test three:</u> Back doors, opening upwards: Fully latched position shall not disengage under load of 8900 N *Application of load:* orthogonal to directions of load tests one and two	Not specified	

	Inertial Resistance Requirements Requires that the fully latched position shall not disengage under inertia load of 30 g. *Application of the inertia load*: in the directions of load tests one, two and three.	Not specified	
c. Hinges	Load test one: Each back door hinge system shall support the door shall not separate under load of 11,000 N *Application of load*: perpendicular to the hinge face plate such that the hinge plates are not compressed against each other.	Not specified	
	Load test two: Each back door hinge system shall support the door shall not separate under load of 8,900 N *Application of load*: perpendicular to the axis of the hinge pin and parallel to the hinge face plate such that the hinge plates are not compressed against each other.	Not specified	
	Load test three: Back doors opening upward: no separation under load of 8,900 N *Application of load*: in the direction of the axis of the hinge pin	Not specified	
d. Door Locks	Requires that each back door system equipped with interior door handles or that leads directly into a compartment that contains one or more seating accommodations shall be equipped with a locking mechanism with operating means in both the interior and exterior of the vehicle. When the locking mechanism is engaged, both inside and outside door handles or other latch release controls shall be inoperative	Not specified	

4. Sliding Doors			
a. Door System	<u>Side Sliding Doors</u> Requires the track and slide combination or other supporting means of side sliding doors shall not separate under outward transverse load of 17,800 N (8,890 N to each load bearing member at opposite edges of door).	Same	
	<u>Back Sliding Doors</u> Requires the track and slide combination or other supporting means of side sliding doors shall not separate under outward transverse load of 17,800 N (8,890 N to each load bearing member at opposite edges of door).	Not specified	Only FMVSS 206 requires sliding back doors to have performance requirements.
b. Latching Systems (latch and striker)	Not specified	Requires that the sliding door latch/striker assembly must withstand a longitudinal load of 4,440 N in intermediate latched position 11,110 N in fully latched position.	Only UNECE 11 requires sliding door latch requirements and a requirement to ensure door closure
	Not specified	Requires that the sliding door latch/striker assembly must withstand a transversal load of 4440 N in intermediate latched position 8890 N in fully latched position.	
	Not specified	Requires that the sliding door latch shall not move from fully latched position when acceleration of 30g is applied longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged.	
	Not specified	Requires that sliding doors without an intermediate latched position: if the door is not fully latched, must automatically move away to a partially open position; readily apparent to the vehicle occupants	
c. Hinges	NA	NA	
d. Door Locks	No requirements	No requirements	

C. Test Procedures			
1. Hinged Side Doors (including cargo)			
a. Door System	Not specified	Not specified	
b. Latching Systems (latch and striker)	The test procedure specifies (defined in SAE J839): 1. For the longitudinal load attach the latch and striker to test fixture. Locate weights to apply 890 N tending to separate latch and striker in direction of door opening. Apply test load perpendicular to latch face at a rate $\leq$ 5 mm/min 2. For the transverse load attach latch and striker to test fixture Apply load in line with the contacting surfaces of latch and striker, in door opening direction at a rate$\leq$ 5 mm/min.	Same	
	The test procedure specifies (defined in SAE J839): For the (S5.1.1.2) Inertia load, calculation of complete door latch system (i.e. door latch, striker, outside and inside handle, key cylinder and any connecting mechanisms) in the fully latched position, showing that the system will remain in the fully latched position when subjected to an inertia load of 30g in any direction	Same as FMVSS 206 but provides the additional option to conducted dynamic inertial testing. *The dynamic test is as follows:* -vehicle itself or simulated structure secured to a chassis with door lock system fully latched -acceleration of 30 to 36 g applied to the chassis for at least 30 msec in forward direction parallel to vehicle longitudinal axis as well as in direction of the door opening, perpendicular to above described first direction - when equipped with lock device ensure that it does not come into action during the tests.	**Only, UNECE 11 has provisions for an inertial dynamic testing procedure. However, it is unknown whether European manufacturers and testing facilities have ever conducted testing using this procedure.**

c. Hinges	<u>Conventional Hinges</u> The test procedure specifies (defined in SAE J934): Attach a test fixture to the mounting provision of the hinge system, simulating vehicle position (door fully closed) relative to the hinge centerline. Distance between the extreme end of one hinge in the system to the extreme end of another hinge in the system: 16.00 in (406.4 mm). Apply load equidistant between the linear center of the engaged portion& of the hinged pins and through the centerline of the hinge pin in the longitudinal vehicle direction (for longitudinal strength) and in the transverse vehicle direction (for transversal strength). Apply test load at a rate S 0.2 in (5 mm) per minute until failure. Record maximum load	Same	
	<u>Piano Hinges</u> The test procedure specifies (defined in SAE J934): For piano type hinges, the hinge spacing requirements of SAE J934 shall not be applicable and arrangement of the test fixture shall be altered as required so that the test load will be applied to the complete hinge	Same	
d. Door Locks	Not specified	Not specified	
2. Back Doors			
a. Door System	Not specified	Not specified	Because of number and orientation of back door latches, a door system test would better simulate actual loading conditions that cause doors to open.
b. Latching Systems (latch and striker)	The test procedure specifies: Load test one, two and three are same as for side door latches, longitudinal load, except that the test load must be applied in the directions specified in load tests one, two and three Inertia loads: same as for side door latches	Not specified	FMVSS 206 has a procedure for testing back door latches.
c. Hinges	The test procedure specifies: Same as for side hinged doors except that the loads shall be in the direction specified in test load one, two and three described above. The same test device may be used for load tests two and three.	Not specified	FMVSS 206 has a procedure for testing back door hinges.
d. Door Locks	Not specified	Not specified	

3. Sliding Doors			
a. Door System	Side Sliding Doors The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 Newtons (2,000 pounds) to the load-bearing members at the opposite edges of the door (17,800 Newtons (4,000 pounds) total). The demonstration may be performanced wither in the vehicle or with the door retention components in a bench test fixture	Same	
	Back Doors The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 Newtons (2,000 pounds) to the load-bearing members at the opposite edges of the door (17,000 Newtons (4,000 pounds) total). The demonstration may be performanced wither in the vehicle or with the door retention components in a bench test fixture	Not specified	FMVSS 206 has a procedure for testing sliding back doors.
b. Latching Systems (latch and striker)	Not specified	Same as for side hinged doors	FMVSS 206 does not test sliding door latches
c. Hinges	NA	NA	
d. Door Locks	Not specified	Not specified	

SECOND REPORT

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1. INTRODUCTION

During the one-hundred-and-twenty-sixth session of WP.29 of March 2002, the Executive Committee of the 1998 Global Agreement (1998 Agreement) adopted a Programme of Work, which includes the development of a Global Technical Regulation (gtr) to address inadvertent door openings in crashes. The Executive Committee also charged the Working Party on Passive Safety (GRSP) to form an informal group (working group) to discuss and evaluate relevant issues concerning requirements for door locks and door retention components to make recommendations regarding a potential gtr.

The United States of America volunteered to lead the group's efforts and develop a document detailing the recommended requirements for the gtr. The United States of America presented informal document No. 6 in March 2003, formally proposing the work and highlighting the relevant issues to be addressed in the gtr.

The working group met to generally evaluate the likelihood of developing a door retention gtr on 2-3 September and on 9 December, in Paris, France and Geneva, Switzerland, respectively. A more thorough evaluation of the United States of America proposal was conducted on 3-4 April in London, England, on 23-24 July 2003 in Paris, France, and on 19-20 November in Paris, France. A sixth meeting is scheduled for February 2004.

A Preliminary Report was presented at the thirty-third GRSP meeting (Informal document No. 5). This report summarizes the main issues discussed by the Working Party in evaluating the proposal to develop a draft global regulation on door lock and door retention components during the first three meetings of the group. It also provides an evaluation of the safety problems associated with door openings and a review of the existing international regulations.

This Second Progress Report discusses the status of prior issues raised in the Preliminary Report, as well as new issues raised during the drafting of the gtr at the July and November 2003 working group meetings. Attached to this report is the most current draft of the door lock and door component gtr, including all associated appendices.

2. PROGRESS ON DRAFTING OF A GTR

At the July 2003 meeting of the working group, a draft gtr was presented for discussion. Using this as a template, revisions were made. A second draft was circulated among the members of the working group prior to the November 2003 meeting and was discussed at that meeting. While not all issues have been resolved, no issues are sufficiently problematic to prevent the agreement on a draft regulation. Accordingly, the working group is generally on track for meeting the schedule presented in the last progress report. That schedule has been modified as follows:

Tasks	Dates
1st Progress Report to GRSP	June 2003
1st Progress Report to AC.3	June 2003
Preparation of 1st Draft gtr	July 2003
4th Informal group Meeting	July 2003
2nd Draft gtr	November 2003
5th Informal group Meeting	November 2003
2nd Progress Report/Draft gtr to GRSP	December 2003
6th Informal Group Meeting	February 2004
2nd Progress Report to AC.3	March 2004
3rd Progress Report/Adoption of Final Draft gtr by GRSP	May 2004
3rd Progress Report to AC.3	June 2004
Submittal of Final Draft gtr to AC.3	November 2004

3. DISCUSSION OF ISSUES ADDRESSED IN THE DRAFT GTR

The following discussions reflect the working group's identification of specific issues, as well as the group's evaluation of those issues.

A. Applicability

The application of a door retention component gtr will, to the extent possible, use the revised vehicle classification and definitions that the Working Party on General Safety (GRSG) Common Task Group has prepared.

Due to concerns over conducting the hinged side door system test on some vehicle doors, questions still remain as to which vehicles from these categories will be covered under the gtr. Among those desiring a gtr more limited in scope, it was proposed that Category 1 and Category 2 vehicles greater than 3500 kg should be exempt from the gtr or could be added in the future after evaluating various door designs for these vehicles. Some of those arguing in favour of a more inclusive gtr noted that current United States of America, Canadian, and Australian requirements already apply to all vehicles other than buses (M2 and M3 vehicles) and that the applicability of existing requirements to commercial trucks has not proven problematic for vehicle manufacturers. It was noted that the United States of America requirements, while regulating all vehicles other than buses, do exempt certain door designs that cannot realistically be expected to meet the requirements of the standard. One suggestion was to use this same approach that has been used in North America for about 30 years.

The working group requests guidance from the GRSP regarding the applicability of a door latch gtr to vehicles heavier than 3.5 kg.

B. New Definitions in Standard

The working group has revised, developed, and agreed to new definitions to better reflect the language in the draft gtr. Further work still needs to be accomplished in defining folding doors.

C. General Requirements

The working group agreed to recommend that the gtr should specify requirements for side and back doors, door retention components and door locks and to consider all available research and testing done by various jurisdictions. New requirements and test procedures for hinged side and sliding doors proposed by North America for inclusion are being evaluated for consideration. Other requirements being evaluated include an inertial load dynamic test, load tests on latches in the direction orthogonal to the parallel and perpendicular to the latch face, and limitations on circumstances under which rearward mounted door hinges would be allowed on hinged side doors.

1. Hinged Doors Issues

The United States of America and Canada have developed a series of new test procedures designed to better simulate real world door opening in crashes.

1.1. New hinged full door test requirements

These tests consist of lateral and longitudinal door-in-frame quasi-static (full door) tests in both longitudinal and lateral directions, independently from the door system. These procedures are designed to simulate various failures during crashes:

- The lateral full door test is designed to simulate latch failures in crashes that produce outwards forces on the door (i.e., through occupant loading or inertial loading) such as side crashes that result in vehicle spin and rollover. This procedure is intended to replace the current lateral tensile bench test.

- The longitudinal full door test is designed to simulate a collision in which the side of the vehicle is stretched, leading to the possibility that the striker could be torn from its mated latch (i.e., far side door in side impacts, and front and rear offset crashes on the opposite side door). This procedure is intended to replace the current longitudinal tensile bench test.

At present, most members do not support the adoption of full door tests into the gtr. Because of the current European Union requirement for both the component tests and a door closure requirement in dynamic tests, there is some question among the members as to whether a full door test provides any additional value. One member has requested an analysis of how the full door test will improve safety (or the reduction in door openings) as compared to existing requirements.

The United States of America plans to provide this analysis at the next meeting of the working group.

Other members of the working group have evaluated the contemplated test procedures. They have expressed several concerns that the new procedure will end up being unduly design restrictive and non-repeatable, given the limitations of the test frame. For example, it may be that multiple test frames would be required to ensure an appropriate "fit" between the door and the test frame. This is because placement of the test load relative to the latch mechanism may be sufficiently different to produce significantly different results, and because door specific holes must be drilled into the test frame. Additionally, the test frame may not adequately address new latch designs that may be mounted in non-traditional locations. Likewise, the procedure does not allow manufacturers the benefit of non-latch attachments that are primarily used for side impact purposes but may also have a positive effect on door closure.

Those members voicing concerns over the new procedures have argued that conducting the proposed tests on a full vehicle rather than a test frame is impractical because not all loads can be applied to a closed door. However, it may be possible to cut the door frame and attach it to the test frame, although such an approach may not fully replicate the actual door-in-frame as installed in the vehicle since cutting the door frame may change its characteristics. Such an approach may address the fit between the latch and striker, as well as the physical characteristics of the door and the doorframe.

The primary concern with the proposed tests is whether they adequately address the instances of door failures in the real world or whether a dynamic or quasi-dynamic test (e.g., dynamic loading against the door interior) would be preferable. One member noted that he was concerned that a static test inadequately tests door systems for real world conditions. He stated that a dynamic requirement, where a dummy or other test form was propelled into the door, would be preferable to the static application of a load against the door, even if the statically-applied load were higher than the dynamically-applied load.

Because of the more encompassing concerns related to the full-door tests, there was little discussion over whether the trim should be removed or what would constitute "trim" if it were removed. A question was raised as to what exactly would be the point of the tests since the load direction would change with the application of force. It is unclear to what extent the removal of trim would limit the change in load direction.

While not rejecting the full door tests completely, the members have generally expressed serious concerns over these forms of tests being included into a gtr.

1.2. New Combination Component Test

The combination latch/striker component bench test is designed primarily to simulate the force conditions causing near side door openings in side impacts (longitudinal and lateral force loading).

The group discussed this combination test and one member has further evaluated the procedure. Some problems were noted in the test procedure that the group will attempt to resolve. There is also a request for justification of the recommended loads.

1.3. Rear mounted hinges

Regulation No. 11 requires, with a limited exception, that hinges be located at the forward edge of hinged side doors, because of the difficulty in closing a rear hinge door that is inadvertently opened while the vehicle is in motion. Some members of the group believe that this requirement is too design restrictive. The working group agreed to recommend that all hinges located on the forward edge of doors or otherwise, would be required to: make the interior door handles be inoperable, if the vehicle speed is > [4 km/h], and require that a vehicle be equipped with a door telltale indicator, as would be required for sliding doors without a primary door latch.

1.4. Rear side door locks

Unlike the door lock and door retention component requirements in North America, Regulation No. 11 does not have provisions for rear side door locks. Some of the working group members expressed concerns over including such requirements in the gtr, while others insisted that such requirements are necessary for the protection of children in the rear seat. In discussing this issue, several recommendations were made for inclusion in the gtr: (i) a door that can be opened with a single movement of the door handle when the door is in a locked position must be fitted with a child safety lock, (ii) automatic door locks that allow the driver to engage or disengage the child safety locks from the front seat would be acceptable, (iii) doors that require some action other than the release of the door with a single movement of the door handle when the door is in a locked position may have child locks, but would not be required to have such locks; these doors could be required to have a manual door-lock release that would allow rear-seat passengers to open the door in the event of a crash. It was suggested that door lock requirements should be consistent with Regulations Nos. 94 and 95. The United States of America and Canada indicated that child locks are not regulated in the current North American standards, and that in any final recommendation, it is important that doors not be allowed to be opened from the interior with a single movement of the door handle when the door is locked. Accordingly, language is being drafted that may accommodate both egress in a post-crash environment and child safety under normal operating conditions.

The informal group will continue to discuss this item in order to reach a final resolution.

1.5. Rear glass tailgates

Some members commented that the North American standards restriction on latches or hinges attached to glazing is too restrictive, and that a less restrictive requirement, in terms of how much of the applicable door consists of glazing, seems appropriate. The United States of America noted that the point of the requirement was not to encourage "all glazing" doors, but rather an acknowledgement that these doors could not meet the strength requirements of FMVSS No. 206 and were exempted for practical reasons. The United States of America has agreed to review its requirement and better clarify what constitutes a door and what constitutes a window (i.e., hinges attached to a window fully incorporated into a latched tailgate).

The informal group will continue to discuss this item in order to reach a final recommendation.

2. Issues Unique to Sliding Door

The requirements and test procedures in both Regulation No. 11 and the North American standards were discussed and the working group agreed to recommend the inclusion of the current requirements for the track and slide combinations of side sliding doors. Further, the group agreed to recommend adding the latch/striker system requirements of Regulation No. 11. However, neither regulation had a detailed full vehicle sliding door test procedure that better simulates real world door openings in crashes.

2.1. Full vehicle test

The United States of America and Canada have jointly developed a new full vehicle sliding door test procedure to replace the existing door-in-frame test in the North American standards. The procedure specifies that the track and slide combination or other supporting means for each sliding door, while in the closed position, cannot separate from the door frame when lateral forces of 18 kN are applied. The total displacement of each of the loading devices is to be limited to 460 mm.

Everybody in the working group reacted favourably to the proposals and agreed to consider them in a gtr. It was suggested that the requirements for the new sliding door test parallel those currently in Regulation No. 11, Section 5.4, which requires that the track, sliding combination or other supports do not separate under specified force loads. Also, it was recommended to consider a proposal to require that these doors do not separate from the doorframe more than 100 mm along any point along the perimeter. Some concerns were voiced as to the level of potential risk involved in measuring such a displacement requirement. The working group agreed to consider modifying the contemplated requirement to retain the original intent behind the requirement, while addressing any potential risk of injury to the test technicians.

2.2. Requirement for a telltale

The working group members agreed to require either a secondary latch or some type of visual indicator signalling to the driver when a sliding door was not fully closed.

3. Addition of orthogonal force loading requirements for sliding and hinged doors

The working group has discussed the possibility of adding a force loading requirement in the direction orthogonal to the directions perpendicular and parallel to the latch face for hinged and sliding doors. All governing bodies expressing a view, support the inclusion of such a requirement, stating that the requirement is not burdensome and may prove beneficial in mitigating the risk of door failures in rollover crashes. Industry representatives in the working party are opposed to such a requirement because they believe it may be difficult and may not address a real world safety problem. The working group will continue to discuss this item in order to reach a final conclusion.

4. Dynamic Requirements Issues

4.1. Dynamic inertial test procedure (optional to calculation)

The working group has agreed to recommend adopting Regulation No. 11 dynamic inertial test requirements to the gtr, as an option to the inertial calculation. In addition to the longitudinal and lateral tests, tests in the vertical direction are also being considered. The UNECE test procedures were provided to the ad hoc committee and these are being validated by Canada. Testing is expected to be complete by the end of January 2004.

4.2. Door closure and door operability requirements following dynamic crash testing

Existing UNECE standards with dynamic crash test components already require that the door stay closed during dynamic crash tests. It is believed that it is unnecessary to repeat this requirement in the gtr. However, the working group believes that it is appropriate to discuss in the preamble to the gtr that jurisdictions not party to the 1958 Agreement would adopt a corollary requirement as part of their crash test requirements.

The group likewise considered whether the gtr should require that at least one door per row be operable following crash testing (possible to exclude rear doors in rear impacts and side struck doors in side impact testing). Existing UNECE standards with dynamic crash test components already have such a requirement. As with the requirement that doors stay closed during dynamic crash testing, the working group suggests discussing the adoption of such requirements by jurisdictions not party to the 1958 Agreement in the preamble to the gtr.

D. Other concerns

Questions were raised during group discussions as to whether to include in the gtr at this time other requirements, such as vehicle entrapment involving electric door, remote keyless entry systems, power assisted side and sliding door closure, and whether to include a "telltale indicator" for all doors. It was initially recommended that a door telltale indicator be required for each vehicle door to be activated when doors are partially or completely open. The group has tentatively concluded that such a requirement is only needed for doors without a secondary latch position (i.e., some sliding doors) and hinged side doors with rear mounted hinges that can operate independent of a mated hinged side door with front-mounted hinges.

4. COST EFFECTIVENESS ASSOCIATED WITH A GTR

The estimated cost of the new requirements, if adopted, would probably be minor. However, a full evaluation of the costs effectiveness associated with a gtr will be provided, once the working group completes its evaluation of the proposed test procedures.

5. REFERENCE DOCUMENTS USED BY THE WORKING GROUP

A list of informal documents used by this Informal group is listed and available on the UNECE website. In addition, test reports and other pertinent documents detailing the United States of America and Canada proposed test procedures are accessible from the **United States of America Department of Transportation Docket Management System (Docket No. NHTSA-1996-3705) Web access at http://dms.dot.gov/**

Number of Informal Document*/	Title of Informal Document
TRANS/WP.29/GRSP/2001/1	Proposal for Draft Candidate gtr on Door Latches and Door Retention Components (OICA)
Informal document No. 15 of the fifty-first GRSP session	Comparison Between FMVSS No. 206 and UNECE R11 (U.S.)
INF GR/DL/1/1	Agenda September 2002 Meeting
INF GR/DL/1/2	Summary of Lateral Full Door Test (U.S.)
INF GR/DL/1/3	Summary of Longitudinal Full Door Test (U.S.)
INF GR/DL/1/4	Summary of Combination Test (U.S.)
INF GR/DL/1/5	Summary of Transport Canada Sliding Door Test (Canada)
INF GR/DL/1/6	Transport Canada Test Reports (Canada)
INF GR/DL/2/1	Agenda December 2002 Meeting
INF GR/DL/2/2	Proposal for a Test Procedure Concerning the Resistance against Inertial Loads of Side Door Locks on Motor Vehicles (OICA)
INF GR/DL/2/3	Comparison of Locking Requirements in FMVSS 206 with UNECE R11 (OICA)
INF GR/DL/3/1	Agenda April 2003 Meeting
INF GR/DL/3/2	Crash Data on US Door Ejection/Openings (U.S.)
INF GR/DL/3/3	Full Door and Combination Detailed Test Procedures (U.S.)
INF GR/DL/3/4	Dynamic Inertial Sled Test Pulse (France UTAC)
INF GR/DL/4/1	Agenda July 2003 Meeting
INF GR/DL/5/1	Agenda November 2003 Meeting
INF GR/DL/5/2	BMW Presentation, “Proposed Door Test Procedures - Hinged Side Doors”
INF GR/DL/5/3	Photos and acceleration plots of inertial loading in z-direction

*/ Informal Report (INF), GRSP Informal group (GR), Door Locks and Door Retention Components (DL), Meeting No., and Report Number

THIRD REPORT

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1. INTRODUCTION

During the one-hundred-and-twenty-sixth session of WP.29 of March 2002, the Executive Committee of the 1998 Global Agreement (1998 Agreement) adopted a Programme of Work, which includes the development of a global technical regulation (gtr) to address inadvertent door openings in crashes. The Executive Committee also charged the Working Party on Passive Safety (GRSP) to form an informal group (working group) to discuss and evaluate relevant issues concerning requirements for door locks and door retention components to make recommendations regarding a potential gtr.

The United States of America volunteered to lead the group's efforts and develop a document detailing the recommended requirements for the gtr. The United States of America presented informal document No. 6 in March 2003, formally proposing the work and highlighting the relevant issues to be addressed in the gtr.

The working group met to generally evaluate the likelihood of developing a door retention gtr on 2-3 September and on 9 December 2002 in Paris, France and Geneva, Switzerland, respectively. A more thorough evaluation of the United States of America proposal was conducted on 3-4 April in London, England, on 23-24 July in Paris, France, and on 19-20 November 2003 in Paris, France. A draft version of the gtr was presented for discussion at the December 2003 GRSP meeting. A sixth meeting was held on 4–6 February 2004 in Paris, France.

A Preliminary Report was presented at the thirty-third GRSP meeting (Informal document No. 5). This report summarizes the main issues discussed by the working party in evaluating the proposal to develop a draft global regulation on door lock and door retention components during the first three meetings of the group. It also provides an evaluation of the safety problems associated with door openings and a review of the existing international regulations.

The Second Progress Report discussed the status of prior issues raised in the Preliminary Report, as well as new issues raised during the drafting of the gtr at the July and November 2003 working group meetings.

This Third Progress report discusses the outcome of discussions from the December 2003 GRSP meeting and the February 2004 informal group meeting, as well as the outcome of the discussions of the draft gtr of the May 2004 GRSP. A draft version of the gtr was submitted as a formal working document for the May 2004 GRSP meeting.

2. PROGRESS ON DRAFTING OF A GTR

At its December 2003 session, GRSP considered the draft gtr presented by the informal group. Several issues were discussed and concerns were raised in line with concerns raised by some representatives in the informal group. During the February 2004 meeting of the informal group several issues that were of concern to GRSP were resolved. The group agreed to recommend the deletion of the full door tests from the gtr. They also reached consensus on recommended language on rear door lock requirements. In addition, the United States of America provided justification for the combination tests and Canada provided a summary of their validation of the dynamic inertial tests. While not all issues have been resolved, no issues were sufficiently

problematic to prevent the development of a draft regulation. The following table lists the various milestones used in the development of this gtr.

Tasks	Dates
1st Progress Report to GRSP	June 2003
1st Progress Report to AC.3	June 2003
Preparation of 1st Draft gtr	July 2003
4th Informal group Meeting	July 2003
2nd Draft gtr	November 2003
5th Informal group Meeting	November 2003
2nd Progress Report/Draft gtr to GRSP	December 2003
6th Informal Group Meeting	February 2004
2nd Progress Report to AC.3	March 2004
3rd Progress Report/Adoption of Final Draft gtr by GRSP	May 2004
3rd Progress Report to AC.3	June 2004
Submittal of Final Draft gtr to AC.3	November 2004

3. DISCUSSION OF ISSUES ADDRESSED IN THE DRAFT GTR

The following discussions reflect the working group's identification of specific issues, as well as the group's evaluation of those issues.

A. Applicability

The proposed gtr provides that certain door retention components on any door leading directly into an occupant compartment, i.e., a compartment containing one or more seating accommodations, must comply with the requirements of the gtr. Tractor trailers are excluded because they do not meet this criterion. Likewise, doors leading into cargo compartments that are separated by a barrier would not be regulated since an individual could not access the occupant compartment through those doors. The gtr excludes folding doors, roll-up doors, detachable doors, and doors that provide emergency egress, as these types of doors would require entirely new test procedures and are not in such common use as to justify the development of new requirements and test procedures. Thus, for certain vehicle designs, some, but not all doors would be regulated by the gtr.

The application this gtr uses, to the extent possible, the revised vehicle classification and definitions that the Working Party on General Safety (GRSG) Common Task Group has prepared. Difficulties were encountered in determining which vehicles would be covered. Currently, UNECE Regulations only apply to M1 and N1 vehicles that have 9 seats or less and weigh 3,500 kg or less. Some members illustrated that it would be difficult to apply full door tests, such as the proposed inertial load, to large trucks and specialized vehicles. With the decision not to propose adoption of two full door tests, discussed in greater detail below, these concerns were largely resolved. Likewise, the retention of a calculation for meeting the inertial load requirements would allow a jurisdiction to avoid applying a full-door inertial load test for doors on heavier vehicles. The members concerned about the applicability of door retention requirements on heavier vehicles proposed that the gtr only apply to passenger cars, light

commercial vehicles, and vans and that other vehicles be excluded initially, then added in the future after further evaluation of various door designs. Some of those arguing in favour of a more inclusive gtr noted that current United States of America, Canadian, and Australian requirements already apply to all vehicles other than buses (M2 and M3 vehicles) and that the applicability of existing requirements to commercial trucks has not proven problematic for vehicle manufacturers. These members preferred the exclusion of specific door types rather than entire classes of vehicles. The longitudinal and transverse load requirements have been applicable to heavy trucks in the United States of America and Canada for over thirty years without imposing any hardship on vehicle manufacturers.

The GRSP agreed on the applicability of this gtr to all Category 1-1 vehicles, and category 2 vehicles.

B. New Definitions in Regulation

GRSP agreed on the new definitions that the working group has revised, and developed to better reflect the language in the draft gtr.

C. General Requirements

GRSP agreed on the recommendations of the working group specifying requirements for side and back doors, door retention components and door locks. The group considered all available research and testing done by various jurisdictions and recommended that force levels identified in the current component static tests for latches and hinges be harmonized to eliminate variations due to rounding of unit conversions. New requirements and test procedures for hinged side and sliding doors proposed by North America, as well as inertial load dynamic test and load tests on latches in the vertical direction for inclusion, were evaluated.

1. Hinged Doors Issues

1.1. New hinged full door test requirements

The United States of America and Canada developed a series of new test procedures designed to simulate real world door opening in crashes. These tests consist of door-in-frame quasi-static (full door) tests in both longitudinal and lateral directions, independent from the door system. These tests are discussed in more detail in the Preliminary and Second Progress Reports.

It was decided against recommending the inclusion of the full door tests into the gtr because the tests raised concerns about unduly restricting door designs, developing a repeatable and enforceable test procedure, and addressing door openings under real world conditions. Because of the current European Union requirement for both the component tests and a door closure requirement in dynamic tests, there is some question as to whether a full door test provides any additional value. In an analysis of the proposed tests using its FARS and NASS databases, the United States of America found only a marginal correlation between the proposed tests and door openings in the real world.

1.2. Combination Component Test

The GRSP discussed a new combination test procedure for hinged side doors that is representative of the combination of longitudinal compressive and lateral tensile forces that occur in real-world latch failures. Currently, no regulation, directive, or international voluntary standard has such a requirement. The proposed combination test procedure is a static bench test capable of evaluating the strength of the latching systems and designed to detect fork bolt detent bypass failures. No other test procedure within the gtr simulates these types of latch failure conditions. The United States of America made a presentation at the February 2004 informal group meeting, detailing justification and benefits for the tests. This information is presented below.

In the combination test, the latch is mounted on a flat steel plate that moves horizontally and the striker is mounted on a vertically moving ram device. During the test, the latch and striker, while in their primary coupled position, are simultaneously moved such that lateral tension (i.e., force applied perpendicularly to the coupled latch and striker) and longitudinal compressive forces (i.e., force applied against the latch toward the striker) are applied at their interface.

The required forces for the primary position of the hinged side door latching systems would be simultaneous forces of 16,000 N longitudinal compressive force and 6,650 N lateral tensile force. The longitudinal force application device is moved at a rate of one centimetre per minute until the longitudinal force is achieved.

In 1998 and 2001, the United States of America conducted two more series of tests. In both sets the latches were tested to failure in the longitudinal compressive direction. The average failure load in the 1998 tests was 16,186 N. The average failure load in the 2001 tests was 14,145 N. At present, it is unclear why there was an approximately 2,000 N reduction in the average load level required for latch failure. Whatever the reason, a load level of at least 16,000 N is required to regain the loss in load-bearing capability of latches seen in the 1998 tests. Evaluation of United States of America crash data in 2004 suggests that the minimum average failure load among doors subjected to combination tensile/compressive loading in the real world is approximately 17,000 N, with the maximum average failure load of 19,000 N. Thus, while a 16,000 N load has been proposed, it appears that a greater reduction in door openings would be possible if the longitudinal load were increased to the 17,000 N or 19,000 N level. No evaluation has been conducted as yet regarding the cost and design practicability associated with a longitudinal load greater than 16,000 N. Accordingly, the United States of America is not sufficiently confident that these higher load levels can be justified at this time.

It is anticipated that latch upgrades needed to meet the requirements of the combination tests would be no more than $0.21 (United States of America). If tested with a longitudinal compressive force of 15,000 N, it is anticipated that 39 per cent of the existing fleet would require some upgrade in order to pass the new test procedure. That failure rate increase to 43 per cent and 67 per cent when the longitudinal forces are increased to 17,00 N and 19,000 N, respectively. At the proposed 16,000 N load, the reduction in door openings is estimated to be between 8.9 per cent and 13.3 per cent. Based on the number of ejections through side hinged doors in the crash modes represented by the combination test, the new requirement would result in an annual reduction of 28 to 41 fatalities and 17 to 27 serious injuries in the United States of America alone.

There was support for this requirement in general, although the group continued to note technical difficulties in conducting the test. Accordingly, the GRSP has decided against supporting the adoption of the combination test into the gtr at this time. Instead, the GRSP delegates and representatives will work on the modification of the United States of America-based procedure, or the development of a new procedure, to capture the benefits associated with a test addressing door failures due to simultaneous compressive longitudinal and tensile lateral loading of latch systems in real world crashes.

1.3. Rear side door locks

Unlike the door lock and door retention component requirements in North America, UNECE Regulation No. 11 does not have provisions for rear side door locks. Some of the working group members expressed concerns over including such requirements in the gtr, while others insisted that such requirements are necessary for the protection of children in the rear seat.

The philosophical difference in opinion on how to best address the need for egress from a rear seat against the need to prevent children from opening a locked door precluded a single solution to rear door lock requirements. Instead, it was agreed to recommend that the interior door locking mechanism on a rear door, when engaged, must be releasable by an action other than the simple, single pull on the interior door handle. A jurisdiction may require that the separate action be directly available to either the driver of the vehicle or an occupant immediately adjacent to the locked door, or that the vehicle be equipped with either an automatic or manual child lock system. Currently UNECE and Japanese regulations have no requirements for door locks. However, based on comments from Working Party delegates and representatives, it appears that Japanese manufacturers could meet the first option while European manufacturers could meet the second option without any changes in vehicle design. Neither type of system would be prohibited as a supplemental safety device, and a jurisdiction could determine that either system was acceptable as the primary safety device.

GRSP agreed to the language recommended by the working group.

2. Issues Unique to Sliding Door

The requirements and test procedures in both UNECE Regulation No. 11 and the North American standards were discussed and the working group agreed to recommend the inclusion of the current requirements for the track and slide combinations of side sliding doors. Further, the group agreed to recommend adding the latch/striker system requirements of UNECE Regulation No. 11. However, neither regulation had a detailed full vehicle sliding door test procedure that better simulates real world door openings in crashes. GRSP discussed and agreed to the new full sliding door procedure developed by North America.

2.1. Full vehicle test

The United States of America and Canada have jointly developed a new full vehicle sliding door test procedure to replace the existing door-in-frame test in the North American standards. The procedure specifies that the track and slide combination or other supporting means for each sliding door, while in the closed position, cannot separate more than 100 mm from the door frame when lateral forces of 18 kN are applied.

GRSP agreed to the above and to a requirement that the total displacement of each of the loading devices to be limited to 300 mm.

Some concerns were voiced as to the level of potential safety risk involved in measuring the 100 mm displacement requirement. The working group agreed to consider modifying the contemplated requirement to retain the original intent behind the requirement, while addressing any potential risk of injury to the test technicians. The GRSP agreed that there are several new measurement technologies that would alleviate this potential risk and agreed to incorporate a statement in the annex of the test procedure to address this concern.

2.2. Requirement for a telltale

GRSP also agreed to the recommendation of the working group to require either a secondary latch or some type of visual indicator signalling the driver when a sliding door was not fully closed.

3. Addition of orthogonal force loading requirements for sliding and hinged doors

The working group has discussed the possibility of adding a force loading requirement in the direction orthogonal to the directions perpendicular and parallel to the latch face for hinged and sliding doors. These load tests, in the vertical direction, were evaluated and ultimately rejected except for back doors. Since a large number of door openings occur during vehicle rollovers, it was suggested that perhaps a load test in the vertical direction would help reduce these types of openings. However, it was ultimately determined that the addition of a load test conducted in a direction orthogonal to the existing tests could not be justified at the present time.

4. Dynamic Requirements Issues

4.1. Dynamic inertial test procedure (optional to calculation)

The GRSP agreed to the working group recommendation to adopt the UNECE Regulation No. 11 dynamic inertial test requirements to the gtr, as an option to the inertial calculation. In addition to the longitudinal and lateral tests, tests in the vertical direction were also considered. Canada validated these test procedures and presented the results at the February 2004 meeting. The informal group accepted the results, and Canada agreed to provide the clarified test procedure that was included in the draft gtr discussed at the May 2004 GRSP.

4. COST AND BENEFITS

The United States of America provided cost analyses for the combination and sliding door tests, as well as for the back door requirements, based on previous United States of America rulemaking.

5. REFERENCE DOCUMENTS USED BY THE WORKING GROUP

A list of informal documents used by this Informal group is listed and available on the UNECE website. In addition, test reports and other pertinent documents detailing the United States of America and Canada proposed test procedures are accessible from the **United States of America Department of Transportation Docket Management System (Docket No. NHTSA-1996-3705) Web access at http://dms.dot.gov/**

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Informal document No. 15 of the fifty-first GRSP session	Comparison Between FMVSS No. 206 and UNECE R11 (U.S.)
TRANS/WP29/GRSP/2004/9	Proposal for a Global Technical Regulation on Door Locks and Door Retention Components
INF GR/DL/1/1	Agenda September 2002 Meeting
INF GR/DL/1/2	Summary of Lateral Full Door Test (U.S.)
INF GR/DL/1/3	Summary of Longitudinal Full Door Test (U.S.)
INF GR/DL/1/4	Summary of Combination Test (U.S.)
INF GR/DL/1/5	Summary of Transport Canada Sliding Door Test (Canada)
INF GR/DL/1/6	Transport Canada Test Reports (Canada)
INF GR/DL/2/1	Agenda December 2002 Meeting
INF GR/DL/2/2	Proposal for a Test Procedure Concerning the Resistance against Inertial Loads of Side Door Locks on Motor Vehicles (OICA)
INF GR/DL/2/3	Comparison of Locking Requirements in FMVSS 206 with UNECE R11 (OICA)
INF GR/DL/3/1	Agenda April 2003 Meeting
INF GR/DL/3/2	Crash Data on US Door Ejection/Openings (U.S.)
INF GR/DL/3/3	Full Door and Combination Detailed Test Procedures (U.S.)
INF GR/DL/3/4	Dynamic Inertial Sled Test Pulse (France UTAC)
INF GR/DL/4/1	Agenda July 2003 Meeting
INF GR/DL/5/1	Agenda November 2003 Meeting
INF GR/DL/5/2	BMW Presentation, “Proposed Door Test Procedures - Hinged Side Doors”
INF GR/DL/5/3	Photos and acceleration plots of inertial loading in z-direction

*/ Informal Report (INF), GRSP Informal group (GR), Door Locks and Door Retention Components (DL), Meeting No., and Report Number