

15 January 2014

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 14: Global technical regulation No. 14

Global technical regulation on pole side impact

Established in the Global Registry on 13 November 2013

Proposal and report pursuant to Article 6, paragraph 6.2.7. of the Agreement

- Authorization to develop global technical regulation No. 14 on pole side impact (ECE/TRANS/WP.29/AC.3/28)
- Report on the development of global technical regulation No. 14 on pole side impact (ECE/TRANS/WP.29/2013/121, adopted by AC.3 at its thirty-ninth session (ECE/TRANS/WP.29/1106, para. 86)



UNITED NATIONS

Authorization to develop global technical regulation No. 14 (Pole side impact)

I. Key points and proposal

1. Data from Australian States suggests that fatalities from side impacts account for 20 to 25 per cent of the Australian road toll:
 - (a) There are indications that nearly half of these fatalities result from impacts with narrow objects, principally poles and trees.
 - (b) Over the last 10 years, single vehicle fatality rates have decreased at a much lower rate than road fatalities.
2. The experience of other countries coincides with that of Australia, indicating that pole side impacts and side impacts require extensive and collective international action.
3. This need is underlined by the fact that there is wide variation internationally between current side and pole side crash tests used both in regulation and new car assessment programs.
4. Similarly a number of different crash dummies are being used in side impact tests, with concerns over their biofidelity and measurement of injury criteria.
5. This means not only a lack of consistency for motorists and industry but raises concerns about the effectiveness of crash tests in predicting real world injury outcomes.
6. Progress in development of the WorldSID provides a unique opportunity to improve the international crash test regime for side impacts, improving the safety of motorists and minimising costs to consumers and industry.
7. Australia proposes the development of a global technical regulation (gtr) to provide an international pole side impact standard. The development process should include consideration of existing pole side impact test protocols in United States of America Federal Motor Vehicle Safety Standard (FMVSS) No. 214, the perpendicular pole test used by several new car assessment programs and an offset perpendicular pole test, as canvassed by the Advance Protection Systems (APROSYS) project.
 - (a) A pole side impact standard is likely to produce benefits for side impacts generally by driving improvements in head protection.
8. This work could be conducted under the auspices of the Working Party on Passive Safety (GRSP) and proceed in close conjunction with the proposed further work on WorldSID dummy (see Informal Document No. WP.29-150-04/Rev.1).
9. An option to enable early progress and adoption of the gtr would be to focus the standard on the WorldSID 50th Male dummy, while the WorldSID 5th Female dummy remains under development.

II. Background

10. Between 1999 and 2008 road fatalities in Australia decreased from 9.3 to 6.9 per 100,000 people. In the same period there was a much smaller decrease in single vehicle crash fatalities from 3.4 to 3.3 per 100,000 people, meaning that single vehicle crash

fatalities increased as a proportion of road fatalities from 37 to 47 per cent, signalling the need for increased action on single vehicle crashes.

11. In Australia, poles and trees are the most commonly hit objects in fatal single vehicle crashes. In New South Wales (Australia's most populous state), a pole or tree was the first object hit in 24 per cent of fatal road crashes in 2008. In Western Australia, collisions with poles and trees were the primary cause of 21 per cent of fatal crashes and over 11 per cent of serious injury crashes in the ten year period between 1995 and 2004.

12. Side impacts accounted for approximately 24 per cent of the road toll of the Australian state of Victoria between 2000 and 2007. Data from Western Australia suggests a similar figure.

13. The experience of a number of other countries with regard to side impact and narrow object impact fatalities appears similar to that of Australia. For example, 25 per cent of road fatalities in the United Kingdom in 2008 were from side impacts, and over 10 per cent were from impacts with narrow objects. In New Zealand 24 per cent of fatalities in light four wheel vehicles in 2008 involved crashes where the vehicle struck a pole, post or tree. In the United States, nearly 20 per cent of fatal road crashes in 2008 involved side impacts and about 10 per cent involved impact with narrow objects. APROSYS cites 14 per cent of road fatalities in France in 2004 as occurring in vehicle impacts with narrow objects.

14. Impacts with narrow objects such as poles and trees are particularly likely to cause serious head injuries when the impact is from the side and closely aligned with a vehicle occupant. The risk of head injury can be reduced by ensuring that effective energy absorption (i.e., a curtain airbag) prevents hard contact between an occupant's head and any intruding narrow object. From experience, Regulation No. 95 does not generally require any countermeasure for head protection. A well-developed pole side impact regulation / test method would promote improved head protection. This could also improve side impact compatibility, particularly for multiple vehicle side impacts between high-fronted vehicles, such as SUVs, and smaller passenger vehicles.

15. Currently EuroSID 2 (ES-2) is used in pole side impact testing by both the Euro and Australian new car assessment programs. ES-2re is specified for use in the FMVSS No. 214 pole test. However, both the WorldSID taskforce and NHTSA have conducted research that has shown the WorldSID 50th Male dummy to be considerably more biofidelic than both ES-2 and ES-2re. On the 10 point ISO TR9790 biofidelity rating scale, the WorldSID taskforce found the WorldSID 50th Male dummy to have a rating of 7.6, ES-2 a rating of 4.7, and ES-2re a rating of 4.2.

16. Pole side impact research in Australia has shown that the injury risk predicted by the WorldSID 50th Male and ES-2 in full-scale vehicle crash tests can be dramatically different. Most notably, for one vehicle model, the WorldSID 50th Male was observed to bottom out the head curtain airbag, making hard contact with the pole. In contrast, the ES-2 head avoided hard contact with the pole. For the same vehicle and impact conditions, the WorldSID 50th Male recorded a HIC36 of 2942 while ES-2 recorded a HIC36 of 809. The difference in the head response of the two dummies is believed to be largely due to differences in shoulder design. Given that the WorldSID has been demonstrated to be the most biofidelic side impact dummy, it is probable that some vehicles predicted to perform adequately in crash tests conducted with ES-2, may not offer the same level of protection to actual vehicle occupants involved in pole/tree side impact crashes. A technical paper including this Australian Government research was presented at the 2007 Enhanced Safety of Vehicles Conference (07-0255).

17. The ES-2 was originally developed for mobile deformable barrier (MDB) to vehicle side impact conditions, and pole side impact conditions are somewhat different. In order to achieve maximum benefit from any pole side impact evaluation, the most biofidelic dummy

should be used to ensure the level of protection offered to vehicle occupants is as close as possible to that predicted under full-scale pole side impact conditions. For this reason WorldSID is likely to be the most technically suited dummy for a pole side impact global technical regulation.

18. Australia fully supports the proposal from the United States of America, as detailed in informal document No. WP.29-150-04-Rev.1 and distributed for consideration as ECE/TRANS/WP.29/2010/82, to establish an informal group to develop the WorldSID 50th Male and 5th Female dummies.

Report on the development of global technical regulation No. 14 on pole side impact

A. Introduction

1. The intention of this report is to supplement procedural information on the development of the gtr included in the Part I (Statement of technical rationale and justification) of the gtr and to provide further details on the informal working group.
2. For information on the technical rationale and justification of the gtr, readers are referred to Part I the gtr.

B. Procedural Background

3. At the 150th session of the World Forum for Harmonization of Vehicle Regulations (WP.29) in March 2010, the representative from Australia introduced an informal document (WP.29-150-11), proposing the development of a global technical regulation (gtr) on pole side impact (PSI). There were five key elements to this proposal, namely that:
 - (a) A high number of fatalities occurred in pole side impacts (that is, impacts with narrow objects such as telegraph poles, signposts and trees) and other side impacts in Australia and other countries;
 - (b) There was wide variation between side and pole side crash tests both in regulations and voluntary standards;
 - (c) There was wide variation between the crash dummies being used in the crash tests and concerns over their biofidelity, raising concerns about their effectiveness in predicting real world injury outcomes;
 - (d) The development of the WorldSID 50th percentile adult male dummy, with its superior biofidelity, provided a unique opportunity to improve the international crash test regime for side impacts through development of a gtr on pole side impact, thereby improving the safety of vehicle users and minimising costs to consumers and industry; and
 - (e) A pole side impact standard was likely to produce benefits for side impacts generally by driving improvements in head protection.
4. The Executive Committee of the 1998 Agreement (AC.3) requested the secretariat of WP.29 to distribute WP.29-150-11 with an official symbol for consideration and vote at its June 2010 session. It was agreed to transmit WP.29-150-11 to the Working Party on Passive Safety (GRSP) to consider at its May 2010 session and to assess the need for establishing an informal working group.
5. At its forty-seventh session in May 2010, GRSP considered an official proposal made by the expert from Australia (ECE/TRANS/WP.29/2010/81) together with a further Informal document (GRSP-47-28), which included a proposed task list (subsequently developed into terms of reference), and endorsed the establishment of an informal working group under the chairmanship of Australia, subject to the consent of AC.3.

6. At the 151st session of WP.29 in June 2010, AC.3 considered an official proposal tabled by the representative from Australia and agreed to develop the gtr and to establish the informal working group. AC.3 also agreed that the initial tasks of the informal working group should be to:

- (a) Confirm the safety need for a gtr in light of the increasing prevalence of electronic stability control in the vehicle fleet; and
- (b) Simultaneously assess potential candidate crash test standards to be addressed by the proposed gtr. The proposal was included in the list of proposals for developing gtrs, adopted by AC.3 (ECE/TRANS/WP29/AC.3/28).

7. At the 154th session of WP.29 in June 2011, AC.3 adopted the terms of reference of the informal working group and its first progress report (ECE/TRANS/WP.29/2011/87).

8. At the 157th session of WP.29 in June 2012, AC.3 adopted the second progress report of the informal working group, together with a change to the terms of reference of the informal working group to clearly provide for a second phase of the development of the gtr to incorporate the WorldSID 5th percentile adult female (ECE/TRANS/WP.29/2012/59). The amended terms of reference are provided at Annex 1.

9. At the fifty-first session of GRSP in May 2012, the informal working group submitted an initial draft of part II of the gtr (GRSP-51-16).

10. At the 158th session of WP.29 in November 2012, AC.3 agreed to fix the mandate for the first phase of the informal working group until March 2014, on the basis that an official draft of the gtr would be considered by AC.3 in November 2012, but that delays were possible. It was also noted that as the timetable to validate the WorldSID 5th percentile adult female was unclear, a proposal for the deadline of the second phase would be brought forward separately.

11. At the fifty-second session of GRSP in December 2012, the informal working group submitted an initial draft of Part I and a further developed draft of Part II of the gtr (GRSP-52-07).

12. At the fifty-third session of GRSP in May 2013, the informal working group submitted the Proposal for a global technical regulation on Pole Side Impact (ECE/TRANS/WP.29/GRSP/2013/7) and the Proposal for amendments to ECE/TRANS/WP.29/GRSP/2013/7 (GRSP-53-05).

13. GRSP substantially agreed the proposed amendments to ECE/TRANS/WP.29/GRSP/2013/7 contained in GRSP-53-05 and made a number of other amendments to the text. These changes are shown in revision marking mode in GRSP-53-23. GRSP adopted ECE/TRANS/WP.29/GRSP/2013/7 as amended by GRSP-52-23, so it could be provided as a working document for consideration by AC.3 in November 2013.

14. Details of the Informal Working Group:

The informal working group conducted the following meetings:

- (a) 1st meeting, Bonn, 16-18 November 2010
- (b) 2nd meeting, Brussels, 3-4 March 2011
- (c) 3rd meeting, Washington, 9 June 2011
- (d) 4th meeting, Seoul, 27-28 October 2011
- (e) 5th meeting, London, 22-23 March 2012
- (f) 6th meeting, Munich, 20-21 June 2012

(g) 7th meeting, Washington, 20-21 September 2012

(h) 8th meeting, Paris, 20-21 November 2012

15. The informal working group also held a drafting session by webex on 7 February 2013.

16. Meetings were attended by representatives of: Australia, Canada, China, the European Commission, France, Germany, Japan, the Netherlands, the Republic of Korea, the United Kingdom, the United States of America, and the International Organisation of Motor Vehicle Manufacturers (OICA).

17. A number of other organisations, particularly research bodies, attended various meetings and documents were circulated to an extensive mailing list.

18. The meetings were chaired by Mr Robert Hogan and the Secretariat and technical support was provided by Mr Thomas Belcher and Mr Mark Terrell, from the Australian Department of Infrastructure and Transport.

19. The gtr informal working group has worked in close conjunction with the informal working group on harmonization of side impact dummies (WorldSID group) and generally meetings of the WorldSID group have been held immediately before meetings of the gtr group, enabling participants to attend both meetings.

20. A large number of documents have been referred to or developed by the informal working group, including minutes and presentations, which - taken together with the documents submitted to GRSP - provide a chronology of development of the gtr. These documents are listed in Annex 2 and are available on the UNECE website at: <https://www2.unece.org/wiki/pages/viewpage.action?pageId=3178630>

Annex 1

Revised Terms of Reference

The major tasks that will be performed by an Informal Working Group include:

- (a) Review of existing research, including crash tests, and literature;
- (b) Liaison with, and consideration of the results of, the GRSP WorldSID Informal Working Group;
- (c) Assessment of safety need, including analysis of current fatalities and injuries from pole side impact, other side impacts and rollovers, taking account of positive safety developments already occurring or likely such as ESC; and target vehicle categories to be taken into consideration;
- (d) Examination of possible test procedures;
- (e) Consideration of variations to candidate test procedures;
- (f) Establishment of likely countermeasures driven by shortlisted test procedures;
- (g) Calculation of likely injury mitigation coverage of the crash and injury population from these countermeasures;
- (h) Assessment of benefits and costs for shortlisted test procedures (including data from a significant range of countries, as there may be wide variations in benefits);
- (i) Assessment of likely incremental benefits and costs from, e.g., testing for smaller (5th percentile female) and non-struck side and rear seat occupants;
- (j) Selection of a preferred test procedure; and
- (k) Production of a draft global technical regulation phase 1 (WorldSID 50th percentile male) for consideration by GRSP and subsequently WP.29.; and
- (l) Production of a draft global technical regulation phase 2 (WorldSID 5th percentile female) for consideration by GRSP and subsequently WP.29.

Annex 2

Papers from Meetings of the Informal Working Group

- RD-01 National Highway Traffic Safety Administration (NHTSA): 49 CFR Parts 571 and 585 Federal Motor Vehicle Safety Standards; Occupant Protection in Interior Impact; Side Impact Protection; Fuel System Integrity; Electric-Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection; Side Impact Phase-In Reporting Requirements; Final Rule (2007)
- RD-02 NHTSA (Office of Regulatory Analysis and Evaluation, National Centre for Statistics and Analysis): FMVSS No. 214 Amending Side Impact Dynamic Test: Adding Oblique Pole Test (2007)
- RD-03 NHTSA & Abacus Technology Corporation: NHTSA Side Impact Research: Motivation for Upgraded Test Procedures
- RD-04 NHTSA: 49 CFR Parts 571 and 598 Federal Motor Vehicle Safety Standards; Side Impact Protection; Side Impact Phase-In Reporting Requirements; Proposed Rule (2004)
- RD-05 NHTSA: 49 CFR Parts 571 and 585 Docket No. NHTSA–2008–0104 RIN 2127–AK27 Federal Motor Vehicle Safety Standards; Occupant Protection in Interior Impact; Side Impact Protection; Side Impact Phase-In Reporting Requirements (2008)
- PSI-01-01 Draft Agenda for the First Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-01-02 Request for Country Data
- PSI-01-03 Pole Definition
- PSI-01-04 Summary of Existing Crash Test and Simulation Data
- PSI-01-05 GRSP Informal Group on a Pole Side Impact GTR (WP.29 and GRSP Decisions, Draft Procedures and Terms of Reference)
- PSI-01-06 Agenda for the first meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-01-07 Australian Department of Infrastructure and Transport: Pole Side Impact gtr: Assessment of Safety Need: Initial Data Collection
- PSI-01-08 German Federal Highway Research Institute (BASt): Influence of Vehicle Stability Control on Accidents on Rural Roads – GRSP Informal Group on a Pole Side Impact GTR
- PSI-01-09 Australian Department of Infrastructure and Transport & Monash University Accident Research Centre (MUARC): Evaluating Vehicle Technologies – Electronic Stability Control Using Australian Used Car Safety Ratings Data
- PSI-01-10 NHTSA: US Side Impact Pole Test – Federal Motor Vehicle Safety Standard No. 214
- PSI-01-11 European Enhanced Vehicle-safety Committee (EEVC) Working Group 13 & Working Group 21: Accident Data: Side Impacts with Poles
- PSI-01-12 Australian Department of Infrastructure and Transport: Summary of available test data

- PSI-01-13 Australian Department of Infrastructure and Transport: Summary of current pole tests
- PSI-01-14 Transport Canada: Pole Test Comparison of the WorldSID IRTRACC, WorldSID Rib-Eye & ES-2re
- PSI-01-15 Australian Department of Infrastructure and Transport: Australian Pole Side Impact Research 2010 – A summary of recent oblique, perpendicular and offset perpendicular pole side impact research with WorldSID 50th
- PSI-01-16 NHTSA: Calculating Benefits for Oblique Pole Side Impact Rulemaking
- PSI-01-17 EEVC Working Group 13 & Working Group 21: Cost/Benefit of Side Impact Test Procedures
- PSI-01-18 Transport Canada: WorldSID Positioning – Sub-Committee Update
- PSI-02-01 Draft Agenda for the 2nd Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-02-02 First Progress Report of the Informal Group on a Pole Side Impact (PSI) GTR
- PSI-02-03 Minutes of the First Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-02-04 Agenda for the 2nd meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-02-05 NHTSA: FMVSS No. 226 – Ejection Mitigation Final Rule
- PSI-02-06 Australian Department of Infrastructure and Transport: Pole Side Impact GTR: Assessment of Safety Need: Updated Data Collection
- PSI-02-07 Renault & PSA Peugeot Citroen: Pole Side Impact Accident Data – France National & LAB Data
- PSI-02-08 Australian Department of Infrastructure and Transport: Application/Scope of PSI GTR (draft for discussion)
- PSI-02-09 APROSYS: Car to Pole Side Impact Activities
- PSI-02-10 NHTSA: WorldSID Crash Testing
- PSI-02-11 NHTSA: Discussion of Injuries in Pole Side Impact Crashes – NHTSA’s Motivation for Upgrading the Side Impact Test Procedures & Benefit Analysis
- PSI-02-12 BAST: Accident Data: Side Impacts with Poles – Informal Group on a Pole Side Impact GTR (PSI)
- PSI-02-13 Australian Department of Infrastructure and Transport: Analysis of Vehicle Structural Deformation in Oblique, Perpendicular, and Offset Perpendicular Pole Side Impact
- PSI-02-14 NHTSA: Real World Need for Oblique Test
- PSI-02-15 ISO/WG6 & ACEA-TFD: Update on the WorldSID Injury Risk Curves
- PSI-02-16 Australian Department of Infrastructure and Transport: Fatalities and Serious Injuries in Side Impact Crashes by Age – Victoria, Australia, 2000-2009

- PSI-02-17 University of Michigan Transportation Research Institute: Effects of Occupant Age on AIS 3+ Injury Outcome Determined from Analyses of Fused NASS/CIREN Data
- PSI-02-18 BMW Group: Side Pole Impact Accidents and Vehicle Testing
- PSI-02-19 Australian Department of Infrastructure and Transport: Research Proposal – Quantitative analysis of Side Impact injuries, and effectiveness of existing countermeasures; Extension of existing work on side airbag effectiveness
- PSI-03-01 Agenda for the 3rd Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-03-02 Minutes of the Second Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-03-03 Australian Department of Infrastructure and Transport & Transport Canada: Joint Australian and Canadian Pole Side Impact Research
- PSI-03-04 Australian Department of Infrastructure and Transport: Pole Side Impact GTR: Assessment of Safety Need: Updated Data Collection
- PSI-03-05 Australian Department of Infrastructure and Transport: Fatalities and Serious Injuries in Side Impact Crashes by Impact Type, Occupant Age and Year of Vehicle Manufacture, Victoria, Australia, 1999-2010
- PSI-03-06 NHTSA: Incremental Benefits Perpendicular to Oblique Configuration
- PSI-03-07 MUARC: Data Analysis to Investigate the Injury Profile of Near-Side, Side Impact Crashes: a Comparison of Injury Risk between Pole and Vehicle-Vehicle Impacts
- PSI-03-08 Australian Department of Infrastructure and Transport: Scope of the GTR (draft for discussion)
- PSI-03-09 Australian Department of Infrastructure and Transport: Options for the 5th Female
- PSI-03-10 BASt: Accident Data: Side Impacts with Poles
- PSI-03-11 BMW Group: WorldSID 50M – Injury Criteria
- PSI-03-12 NHTSA: Repeatability of Oblique Test Configuration
- PSI-04-01 Agenda for the 4th Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-04-02 Minutes of the Third Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-04-03 Australian Department of Infrastructure and Transport: Joint Australian and Canadian Pole Side Impact Research
- PSI-04-04 French Technical Union for the Automobile, Motorcycle and Cycle Industries (UTAC): 4th Meeting of the GRSP Informal Group on Pole Side Impact GTR
- PSI-04-05 Australian Department of Infrastructure and Transport: Safety Need – High Level Figures
- PSI-04-06 Australian Department of Infrastructure and Transport: GTR Scope – N₁ Occupant Fatalities in Australia

- PSI-04-07 Australian Department of Infrastructure and Transport: Options for Addressing Gap in Readiness between WorldSID Male 50th and WorldSID Female 5th in Drafting the Pole Side Impact GTR
- PSI-04-08 Australian Department of Infrastructure and Transport: Analysis of Australian National Crash In-Depth Study (ANCIS) Pole Side Impact Cases by Angle of Impact
- PSI-04-09 NHTSA: Exclusions (in FMVSS 214)
- PSI-04-10 OICA: Scope of GTR – Pole Side Impact – Commercial Vehicle Use and Data
- PSI-04-11 JASIC/Japan: Japanese Proposal and Research Plan
- PSI-04-12 Australian Department of Infrastructure and Transport: Draft Outline of Preamble of the gtr
- PSI-04-13 Australian Department of Infrastructure and Transport: Draft Text of the Regulation of the gtr (NB a revised draft of this text was circulated to PSI Informal Group members on 4 November 2011 as a working document)
- PSI-05-01 Agenda for the 5th Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-05-02 Minutes of the Fourth Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-05-03 MUARC: Analysis of In-depth and Mass Crash Data to Inform the Development of the Pole Side Impact Global Technical Regulation
- PSI-05-04 BAST: Pole Side Impact Accidents in Germany
- PSI-05-05 Australian Department of Infrastructure and Transport & Transport Canada: Joint Australian and Canadian Pole Side Impact Research
- PSI-05-06 JASIC/Japan: Research TEST Result & Japanese Proposal
- PSI-05-07 OICA: Pole Side Impact Protection – Cost Data – Based on Studies from EEVC and NHTSA
- PSI-05-08 Australian Department of Infrastructure and Transport: Safety Need – High Level Figures
- PSI-05-09 OICA: Scope of GTR – Pole Side Impact – Exemption of Commercial Vehicles
- PSI-05-10 Australian Department of Infrastructure and Transport: The Importance of Pole Side Impact Alignment Accuracy
- PSI-06-01 Agenda for the 6th Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-06-02 Minutes of the Fifth Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-06-03 MUARC: Further Injury Risk Analysis and the Cost-effectiveness of Enhanced Side Impact Protection in the Form of a GTR for PSI Crashes
- PSI-06-04 Australian Department of Infrastructure and Transport & Transport Canada: Joint Australian and Canadian Pole Side Impact Research
- PSI-06-05 UTAC: Pole Side Impact Test on European Berline

- PSI-06-06 Australian Department of Infrastructure and Transport: Safety Need – High Level Figures
- PSI-06-07 Australian Department of Infrastructure and Transport: Category 2 Vehicles: Australian Sales and Safety Need Data
- PSI-06-08 ISO WorldSID 50th Task Group: Update to GTR Pole Side Impact
- PSI-06-09 NHTSA: WorldSID 50th TEG: Status Report
- PSI-06-10 Medical College of Wisconsin: Preliminary Analysis of Shoulder Traumas from the CIREN Database
- PSI-06-11 Audi: Occupant Loading in Pole Side Impact
- PSI-06-12 NHTSA: Pole Side Impact Vehicle Tests: WorldSID Dummy Data
- PSI-06-13 Australian Department of Infrastructure and Transport & Transport Canada: Summary of Rib Deflection Responses
- PSI-07-01 Agenda for the 7th Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-07-02 Minutes of the Sixth Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-07-03 Australian Department of Infrastructure and Transport & Transport Canada: Joint Australian and Canadian Pole Side Impact Research
- PSI-07-04 Korea Automobile Testing & Research Institute: Evaluation of WS and ES2 Dummy in Pole Side Impact
- PSI-07-05 Medical College of Wisconsin: Deflection Responses from PMHS in Oblique Side Impact Sled Tests
- PSI-07-06 Medical College of Wisconsin & NHTSA Vehicle Research Test Centre: WorldSID Abdomen Tests
- PSI-07-07 OICA: Proposal for PSI GTR Scope
- PSI-07-08 OICA: Van and Passenger Car Dimensions
- PSI-07-09 OICA: Preamble Text for Pole Side Impact Global Technical Regulation
- PSI-07-10 Japanese Proposal for Narrow Vehicles (Kei Cars, Etc.) (Impact Velocity)
- PSI-07-11 Beyond Safe – Bringing Physics into Models: Effect of Seating Height in Side Impact
- PSI-07-12 RDW: Shoulder Loading of WorldSID 50th
- PSI-07-13 BMW Group: WorldSID 50% Shoulder Assessment – Industry Proposal
- PSI-08-01 Agenda for the 8th Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-08-02 Minutes of the Seventh Meeting of the GRSP Informal Group on a Pole Side Impact GTR
- PSI-08-03 GTR on Pole Side Impact: Timetable
- PSI-08-04 MUARC: Assessment of the Need for, and the Likely Benefits of, Enhanced Side Impact Protection in the Form of a Pole Side Impact Global Technical Regulation

- PSI-08-05 OICA: Preamble to GTR Pole Side Impact Scope Discussions
 - PSI-08-06 OICA: GIDAS Accident Analysis Pole Side Impact with CVs
 - PSI-08-07 OICA: Proposed Scope
 - PSI-08-08 WorldSID 50th Injury Risk Curves
 - PSI-08-09 Rationale Behind the Shoulder Assessment Criteria for WorldSID
 - PSI-08-10 LAB: Pole Side Impact Cost/Benefit Study, French Data
 - PSI-08-11 Draft Text of the PSI Regulation
 - PSI-08-12 Draft Preamble – Global Technical Regulation No. XX Pole Side Impact
 - PSI-08-13 Lenard, J., Frampton, R., Kirk, A., Morris, A., Newton, R., Thomas, P., Fay, P.: Accidents, Injuries and Safety Priorities for Light Goods Vehicles in Great Britain.
 - PSI-08-14 Minutes of the Eighth Meeting of the GRSP Informal Group on a Pole Side Impact GTR
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