

**MINUTES OF THE THIRD MEETING OF
THE GRSP INFORMAL GROUP ON A POLE SIDE IMPACT GTR**

Held at the US Department of Transportation Offices
1200 New Jersey Avenue, SE Washington DC, USA
9 June 2011

Attendees

Name	Organization
Robert Hogan (Chair)	Department of Infrastructure and Transport (Australia)
Thomas Belcher (Secretary)	Department of Infrastructure and Transport (Australia)
Mark Terrell	Department of Infrastructure and Transport (Australia)
Suzanne Tylko	Transport Canada
Anthony Jaz	Transport Canada
Jean-Philippe LePretre	UTAC France
Richard Damm	German Federal Ministry of Transport
Bernd Lorenz	BASt
Dr Sascha Pfeifer	German Association of Automotive Industry (VDA)
Dr. Jae-Wan Lee	Korea Automobile Testing & Research Institute
Hans Ammerlaan	RDW Netherlands
Bernie Frost	UK Department for Transport
David Hynd	TRL, UK
Craig Newland	Australian Automobile Association
Susan Meyerson	NHTSA, US Department of Transportation
Bruce Donnelly	NHTSA, US Department of Transportation
Christopher Wiacek	NHTSA, US Department of Transportation
Peter Broertjes	European Commission
Katsutoshi Ishida	JASIC
Takehisa Yamakawa	JAMA
Akihiko Akiyama	Honda
Koshiro Ono	JARI
Thomas Loew	Audi
Philipp Wernicke	BMW Group
Thomas Slaba	BMW Group
Agnes Kim	Ford Motor Company
Jack Jensen	General Motors
Ansgar Pott	Hyundai Motor Europe Technical Center
Myriam Constant	PSA Peugeot Citroen
Irina Dausse	Renault
Martin Delin	Volvo Cars
Dr Michael Fitzharris	Monash University Accident Research Centre (MUARC)

By phone

Karsten Hallbauer

TAKATA-Petri AG

1. Welcome and Introductions

(Attendees as noted above)

Mr Hogan opened the meeting by noting the passing of Mr Hideki Yonezawa who had participated in the first meeting of the Pole Side Impact Group. Mr Hogan paid tribute to Mr Yonezawa's contribution over many years to vehicle safety research and the work of GRSP.

2. Adoption of the Agenda

The agenda (PSI-03-01) circulated by the chairman immediately prior to the meeting was adopted with some minor changes to the running order.

3. Minutes of the Second Meeting and Progress Report to WP29

The minutes (PSI-03-02) from the second meeting held in Brussels, Belgium and circulated by the chairman prior to the meeting were agreed.

It was agreed that Australia would prepare and submit a progress report for the informal group on a pole side impact GTR to the next meeting of GRSP (December 2011).

It was noted that the Actions from the second meeting had either been completed or were being addressed later in the agenda, with two exceptions.

- *NHTSA to consider whether any of the benefit data for FMVSS 226 might have relevance to a Pole Side Impact GTR and whether this could be extracted – Ms Meyerson indicated that there was insufficient data to calculate benefits for a pole side impact standard.*
- *NHTSA to investigate with UMTRI the possibility of separating pole side impacts from other side impacts in the UMTRI investigation of the effects of occupant age on AIS 3+ injury outcomes (for possible use Australian study proposal) – It was noted that MUARC, who were undertaking research for the Australian Government, would explore this issue further.*

4. Interim Reports

4.1 Joint Australian/Canadian crash test program

Mr Belcher presented a summary of the joint vehicle-to-pole side impact research being undertaken by Australia and Canada (PSI-03-03). Among other matters, he noted that there had been significant forward movement of the ribs in several of the perpendicular angle tests.

Mr Hogan noted that the test program had only recently commenced and that more detailed analysis would be provided for the next meeting.

4.2 Australian Research Project

Dr Fitzharris presented a summary of preliminary findings from analysis of Transport Accident Commission of Victoria and Australian National Crash In-depth Study (ANCIS) serious side impact crash data being undertaken by the Monash University Accident Research Centre (PSI-03-07). The presentation focused on data analysis to investigate the injury profile of near-side, side impact crashes and a comparison of injury risk between pole and vehicle-vehicle impact. Among the findings it was noted that pole side impact crashes were much more likely to lead to injury than vehicle to vehicle crashes.

5. Safety Need

5.1 Presentation of consolidated data

Mr Hogan presented a consolidated summary of the crash data provided to Australia by the various contracting parties (PSI-03-04). In particular, Mr Hogan noted that German and French data had been provided since the last meeting.

The German data had revealed that around 10% of the German road toll was from pole side impact, with all side impacts (including pole and other side impacts) accounting for around 50% of vehicle occupant fatalities in Germany.

Mr Pott questioned why the data in Germany was so different compared to France and the UK, and suggested that these differences should be explored further.

Mr Damm stated that pole side impacts in Germany were a very significant problem that needed to be dealt with. The data provided by Germany was national data and was consistent year-to-year. Typically around 30% of M1 vehicle occupant fatalities involved a collision with a tree. Of these around 50% were side impacts. While numbers had decreased, in 2009 there were 430 pole side impact fatalities. Mr Damm stated that differences in German and French data had been observed in the past, and although the vehicles may be similar in Germany and France, roads and other factors may not. Nearly all of the pole/tree side impacts in Germany were occurring outside of urban areas.

Mr Hogan noted that there were similarities between the Australian and German pole side impact data. He said that while further analysis was required, most high level data had been collected and that the group was approaching diminishing returns with regard to further collection of safety need data. Side impacts were a significant proportion of the road safety problem in most, if not all countries, which had provided data.

5.2 Detailed Australian Data

Mr Belcher presented a summary (PSI-03-05) of data collected on side impact fatalities and serious injuries by impact type, occupant age and year of vehicle manufacture in Victoria, Australia. Detailed analysis of all side impacts by side impact type, suggested

that a pole side impact GTR would require head protection countermeasures which were likely to be beneficial in more than just pole side impacts.

5.2A NHTSA Presentation on Incremental Benefits of an Oblique Pole Test

Ms Meyerson provided a summary (PSI-03-06) of the incremental benefits estimated for an oblique pole test relative to a perpendicular pole test in the FMVSS 214 regulatory impact analysis. There were significant benefits both with respect to fatalities and AIS 3-5 injuries across the various countermeasures envisaged.

5.3 Category 2 Vehicles

NHTSA agreed to provide a justification for including Category 2 vehicles in the scope of a pole side impact GTR for the next meeting.

Mr Hogan noted that Australia had provided safety need data for Category 2 vehicles at the first meeting.

5.4 Proposed scope / application of GTR

Mr Belcher presented a comparison (PSI-03-08) of the scope wording proposed for a pole side impact GTR at the Brussels meeting, the current GTR 7 scope and the applicability of FMVSS 214.

Mr Pott stated that it was too early to consider extending scope to Category 2 vehicles as crash data had not been provided and raised a concern regarding some of the delivery vans in Europe and small trucks in Japan that would be captured by the scope wording presented.

Ms Meyerson supported extending the scope to the greatest extent possible. This would allow contracting parties to set the scope appropriate to their own circumstances. There was precedent for this in other GTRs and it had worked well in the past. She reiterated that NHTSA would look at the justification and benefits of including Category 2 vehicles and present an analysis to the group at the next PSI meeting.

Mr Terrell suggested that the scope should include all vehicles for which the test was feasible, and that it would then be up to contracting parties to determine benefits for vehicle categories when examining application of the GTR.

Mr Frost suggested that the reference to Special Resolution 1 in the wording proposed at the Brussels meeting was superfluous and could be removed. Mr Frost suggested that the concept of a footnote, similar to the one drafted, was good, but that this should be placed in square brackets at this stage, for revision as appropriate towards the end of the GTR development process.

Ms Tylko supported the inclusion of vehicles for which testing was technically feasible in the scope. The case for applying the GTR to specific vehicle types captured by the GTR scope should then be determined as appropriate by each contracting party.

Mr Damm stated that the scope wording drafted was commonly used wording for GTRs and noted that the scope does not enter into force until applied by a contracting party. In addition, some Category 2 vehicles had similar design features to passenger vehicles and national police reported data did not always reliably differentiate passenger vehicles from passenger vehicle derived commercial vehicles.

Mr Broertjes suggested that a broad scope may have the benefit (for manufacturers) of preventing individual contracting parties from contradicting the GTR in national legislation. Cost-benefit analysis comes in transposition to national law. Mr Broertjes also suggested that the group should carefully consider the feasibility of including convertible vehicles in the scope of a GTR on pole side impact.

Ms Meyerson advised that convertibles were not excluded from the FMVSS 214 pole test as combination side airbags can be used in these vehicles to meet the requirements.

It was agreed that NHTSA and the Department of Infrastructure and Transport would review current exemptions from the FMVSS 214 pole test as a starting point for the PSI GTR scope.

Mr Pott undertook on behalf of OICA to prepare a presentation for the next meeting on vehicles included in the current scope that should be excluded/exempted from a PSI GTR, including pictures of these vehicles and a justification for exemption.

6. Examination of Possible Test Procedures

6.1 WorldSID Update

Ms Meyerson provided an update on the progress of the work of the WorldSID group.

NHTSA was working on defining the allowable space in the dummy for housing of the data acquisition system.

Planned testing with the WorldSID 5th percentile adult female had been pushed back due to delays in obtaining parts. As much testing as possible was required with the 5th female.

Testing with 1D-IRTRACC, 2D-IRTRACC and RibEye was required to understand what rib measurement capabilities are necessary for regulation.

The WorldSID 50th percentile adult male specifications were on track to be finalised and agreed by early 2012. If there was a need to use 2D-IRTRACC or RibEye instead of 1D-IRTRACC this would extend the timeline a little.

Mr Frost raised a concern about the WorldSID 50th percentile male shoulder design and the possibility that high shoulder loads may offload the thorax. Mr Frost noted that the WorldSID 50th and 5th dummies have different shoulder designs and that the UK would like to understand the implications of and reasons for this.

Mr Wernicke stated that PMHS biofidelity testing had shown that the WorldSID shoulder was actually softer than a typical PMHS. The WorldSID 50th shoulder design was much

more biofidelic than ES-2 and the shoulder was a load path that could take considerable load without risk of severe injury.

Mr Hogan stated that the issue of shoulder load was for the WorldSID group to consider but that the PSI group would not go forward with a regulation until it was satisfied of the suitability of WorldSID.

6.2 Inclusion of 5th Percentile Female in the GTR

Mr Hogan requested suggestions regarding the possibility that a pole side impact GTR might be drafted with 50th percentile adult male requirements included and a placeholder for 5th percentile adult female requirements to be agreed and implemented when the WorldSID 5th percentile female was ready. This would allow contracting parties to obtain benefits of the 50th percentile adult male without having to wait for the 5th percentile adult female to be finalised.

Ms Meyerson stated that NHTSA would be open to consider agreeing a GTR which included requirements for a WorldSID 50th percentile adult and a SID-IIs, with a placeholder for a WorldSID 5th percentile adult female. This could allow countries that do not currently have a pole side impact regulation, to implement one in the shortest possible time. NHTSA would need to have further internal policy discussions regarding how this issue may best be handled. Ms Meyerson noted that the 5th female test was not just used to drive benefits for small females, but also to ensure airbags and sensors were designed to work for pole impacts occurring across the full door.

Mr Slaba suggested a two-phased approach with the initial drafting of requirements for a WorldSID 50th percentile adult male with WorldSID 5th percentile adult female requirements to follow at a later date may be the most sensible approach given the 5th female specifications and requirements will take some time to finalise.

Mr Broertjes also suggested that a two phase approach may be the most suitable. Some contracting parties may elect not to apply 5th percentile adult female requirements, however a 5th percentile female should be considered for inclusion in the GTR when ready so as not to limit benefits of technology to 50th percentile adult males.

Mr Frost suggested a two phased approach could be sensible given the timeline for the 5th percentile adult female dummy may prove difficult. However, a GTR should include a 5th female and if this meant including the current regulated dummy (SID-IIs) then a clear statement should be included in part A that a WorldSID 5th percentile adult female was to be substituted when ready.

Ms Tylko stated a preference for the first phase of the GTR to focus on the WorldSID 50th male. Pinning the success of WorldSID 50th to the WorldSID 5th could create unnecessary risk that development of the entire GTR would fail or drag on for many years. There were currently a limited number of WorldSID 50th males in the world. There were even fewer WorldSID 5th females. This meant some parties had no experience with the 50th let alone the 5th. Ms Tylko continued that it was not just a matter of simply substituting a WorldSID 5th for a SID-IIs. This would mean differences in seating procedure which would result in differences in impact alignment. None of these

issues meant a WorldSID 5th should not and could not be considered for implementation when ready. The two dummies should be considered separately.

Mr Slaba and Mr Wernicke expressed concern about the possibility of SID-IIIs being used in a pole side impact GTR until the WorldSID 5th female was ready.

Ms Kim suggested that a placeholder could create difficulties for manufacturers as time would be required to undertake test and development work with the options.

Mr Terrell circulated a list of options during the meeting (PSI-03-09) regarding the implementation of 5th female requirements in a pole side impact GTR. Members of the group were requested to provide written feedback/comments on these options within 1-2 months of the meeting.

6.3 Angle of Impact

Mr Lorenz presented an updated BAST analysis of the angle of side impacts with poles from GIDAS and German national accident data (PSI-03-10). This analysis was conducted by classifying impact angle data in 10 degree intervals (e.g. 90 ± 5 degrees, 80 ± 5 degrees etc) instead of 30 degree intervals (e.g. 90 ± 15 degrees, 60 ± 15 degrees etc) as used in previous analyses. From this refined and updated analysis it was concluded that oblique impact angles were the most common for severe and fatal pole side impact crashes in Germany.

Mr Frost asked whether any analysis had been done to investigate the influence of ESC on the angle of impact. Mr Lorenz advised that this had not been done in this analysis.

Mr Hogan noted that the analysis of GIDAS cases presented by Mr Slaba at the last meeting had suggested an increased tendency for oblique impacts where ESC was fitted.

6.4 Injury Criteria and Thresholds

Mr Wernicke presented a summary of the current status of development of agreed injury risk curves for the WorldSID 50th percentile adult male dummy. He noted that ISO Working Group 6 had chosen the survival method. There were a number of open questions and issues and these would be addressed during the course of the year.

Mr Ammerlaan expressed a view that injury criteria thresholds should not necessarily be set by default at the 50% AIS 3+ injury risk value. In the case of UNECE R95, EEVC had decided to use a 30% AIS 3+ injury risk value as the injury criterion threshold limit for EuroSID thorax rib deflection. Feasibility should also be considered, as the relative difficulty of meeting a 50% AIS 3+ injury criteria threshold value could be quite different for each body region.

6.5 Repeatability of Oblique Test Procedure

Ms Meyerson presented a summary of the repeatability of the oblique pole test impact alignment in NHTSA testing (PSI-03-12). Most test impact alignments were within ± 10 mm of the targeted impact alignment and results achieved using the floating floor test method had been more repeatable/accurate than tests conducted using skates.

Ms Tylko commented that a floating/flying floor (carrier sled) could be used to achieve very accurate impact alignments, but that it would be important to ensure the surface properties of the floor, including the use of Teflon pads, and the timing of the braking of the sled are tightly specified.

Mr Frost and Mr Belcher supported tightly specifying requirements for a floating/flying floor (carrier sled) in the GTR to provide clarity to test facilities and aid the reproducibility of test results obtained from different test facilities.

6.6 Test Speed

Mr Belcher sought the opinion of informal group members regarding the most appropriate way to specify test speed requirements in a pole side impact GTR, given that many contracting parties would need to implement the GTR in a type approval system and FMVSS 214 currently required manufacturers to ensure vehicles would meet the requirements of a pole test at any velocity between 26 km/h to 32 km/h inclusive.

Ms Meyerson stated that the 26 km/h to 32 km/h test speed in FMVSS 214 was used to ensure robustness of sensors and airbag deployment algorithms for varying impact speeds.

Mr Broertjes and Mr Frost suggested that specification of a range of test speeds would be possible in a type approval system if a worst case speed were identified for the type approval testing.

Ms Tylko suggested that there should be a justification for including a range of test speeds in a GTR and in terms of airbag sensors and impact detection, the impact alignment may well have more influence than varying the test speed by up to 6 km/h.

Mr Damm considered that any requirement (such as a test speed range) that may require several tests to be conducted to meet a pole side impact GTR could unnecessarily increase cost to manufacturers and consumers without much benefit. Mr Damm expressed a strong preference for a GTR that would allow one worst case “high” test speed to be specified in any subsequent UNECE regulation.

7. Discussion of Candidate Test Procedures

Mr Hogan stated that during its meetings the group had heard a number of good arguments for an oblique angle test, but as yet no reasons against it. He noted that pole side impact crashes appeared to be occurring at predominantly oblique angles; the oblique test was likely to load the dummy thorax better than a perpendicular test; manufacturers had indicated that the oblique test encouraged more robust sensors; data had been presented suggesting oblique impact was likely to be the more common for vehicles fitted with ESC; the impact statement for FMVSS had indicated that an oblique test would save at least 87 more lives than a perpendicular test; and repeatability did not appear to be an issue.

It had also been noted earlier in the meeting that an oblique test would ensure an extended

coverage area by head protection airbags.

Mr Hogan indicated that he now favoured an oblique angle test and invited members of the group to indicate a preferred angle of impact for a pole side impact test.

Mr Damm agreed that crash data indicated a tendency towards oblique pole impacts. The EEVC data had initially indicated perpendicular may be more common when ± 15 degree impact angle ranges were used to investigate the issue. However, BASt had since completed an analysis of impact angle using a ± 5 degree range. This updated analysis had shown a tendency towards oblique impact angles and Germany would support an oblique impact angle test in a pole side impact GTR, bearing in mind the existing US regulation.

Mr Pott stated that it was too early to decide the impact angle as he was not convinced a GTR would solve problems; the reasons for differences in French and German data needed to be understood.

Mr Hogan stated that WP29 had agreed that the informal group should work on a GTR in parallel with the establishment of safety need. Ultimately, benefit-cost analysis would need to be undertaken by contracting parties in implementing the requirements of a GTR. The group was well advanced in the establishment of a safety need case and it was time to move forward by beginning to draft requirements and start looking at benefits and costs in the same way other GTRs had, having regard to an agreed test procedure

Ms Meyerson stated that NHTSA considered any pole side impact GTR would need to have an oblique test, given no data presented had provided a justification for the USA going back to a perpendicular test.

Ms Constant stated that she would prefer not to withdraw the option of a perpendicular test and would like more time to review EEVC data.

Ms Tylko stated that she had no objection to an oblique test, but that it would be important to demonstrate benefits with WorldSID dummies. It would also be important to develop a regulation that was based on solid groundwork rather than copying FMVSS 214.

Mr Frost agreed with Mr Hogan's analysis supporting an oblique test, but believed a decision could be deferred, especially given issues with WorldSID, while further evidence was gathered.

Mr Broertjes stated that there had been enough time for compelling arguments to be made for either an oblique or perpendicular test and that it was reasonable to start focusing on a particular test method to ensure the GTR discussions would not go round and round in circles. While some detail was still required, the case for an oblique angle test was very strong.

Mr Hogan stated that a final decision on angle of impact was not yet required, but that it was reasonable to start progressing other work given the balance of information so far considered by the group. This included a survey of industry regarding costs and drafting of a regulation as focus for future discussion.

Ms Kim advised that industry would need to be given test details, dummy details and injury criteria threshold limits to be able to estimate costs.

Mr Ammerlaan stated that the working group could reasonably proceed with a recommendation, including a preferred impact angle, which would ultimately be reviewed by GRSP and voted on at WP29.

Mr Hogan stated that Australia would seek to move forward by surveying industry on costs and drafting a GTR. A survey would be undertaken on the basis of provisional consensus that an oblique test was likely to be the most appropriate option.

8. Establishment of Countermeasures (available and prospective technologies)

Discussions were reserved for future meetings (included as a standing item on the agenda).

9. Benefit Cost Analysis

Discussions were reserved for future meetings (included as a standing item on the agenda).

10.Future Work

Discussions were reserved for future meetings (included as a standing item on the agenda).

11.Next Meetings

Mr Hogan undertook to advise the date of the next meeting following further discussions with Mr Frost and Ms Meyerson.

ACTIONS

1. Australia to provide a written progress report to the next meeting of GRSP.
2. Further analysis to be provided on joint Australian/Canadian crash test program.
3. NHTSA/Australia to review current exemptions from FMVSS 214 pole test as starting point for PSI GTR Scope.
4. OICA (Ansgar) to prepare a presentation for next meeting on vehicles included in the current scope that should be excluded/exempted from a PSI GTR, including pictures of these vehicles and justification for exemption.
5. NHTSA to prepare detailed justification for the inclusion of Category 2 vehicles in PSI GTR presentation for next meeting.
6. All participants to think about options proposed for the inclusion of a 5 th female in the PSI GTR and to provide written comments/feedback on options proposed over course of next month.
7. Australia to survey industry on cost of PSI GTR countermeasures.
8. Australia to start drafting PSI GTR regulatory text for the next meeting.