

Transmitted by the chairman of the informal
group GTR9-PH2

Informal document GRSP-53-28
(53rd GRSP, 13 – 17 May 2013,
agenda item 3(a))

Draft fourth progress report of the informal group on Phase 2 of gtr No. 9
(IG GTR9 - PH2)

The text reproduced below was submitted by the chairman of the informal group on phase 2 of gtr no. 9 and proposes the 4th progress report on the activities and work of this informal group (ECE/TRANS/WP.29/AC.3/24).

I. Objective of this proposal

1. The representatives of Japan and Germany proposed the development of Phase 2 of gtr No. 9. The main objective is the development of a draft proposal to amend the UN global technical regulation No. 9 - Phase 2 on pedestrian safety by introducing the flexible pedestrian legform impactor (FlexPLI) as a single harmonized test tool in order to enhance the level of protection for lower legs of pedestrians.

The work of the informal group shall not be limited to draft proposals to amend Gtr No. 9, but shall cover the development of a complementary draft proposal to amend the draft UN Regulation on pedestrian safety.

The group may also review proposals to improve and / or clarify aspects of the legform test procedure.

II. Background

2. At the 154th session of the World Forum for Harmonization of Vehicle Regulations and the 32nd session of the Executive Committee of the 1998 Agreement it was agreed to set up an informal group to solve the pending issues for the incorporation of the FlexPLI in Phase 2 of the UN Gtr No. 9 and in the draft UN Regulation on pedestrian safety, subject to the submission to WP.29 and to AC.3 of appropriate terms of references (document ECE/TRANS/WP.29/1091, paras. 36 and 100).

Japan and Germany have informed the World Forum for Harmonization of Vehicle Regulations and the Executive Committee of the 1998 Agreement that this informal group named IG GTR9 - Phase 2 will be co-sponsored by Japan and Germany.

3. The informal group has started its work on 03 November 2011 with a Constitutional Meeting in Bonn, Germany, to draft a document on the terms of references, the operating principles, the schedule and the work plan. At this occasion the participants agreed to the proposal of Japan and Germany that the informal group will be managed by Germany (chair), Japan (vice-chair) and OICA (secretary).

4. At the 155th session of the World Forum for Harmonization of Vehicle Regulations and the 33rd session of the Executive Committee of the 1998 Agreement Japan and Germany have informed delegates about the ongoing activities of the informal group on UN Gtr No. 9 Phase 2 (document WP.29-155-35). The delegates were informed about the constitutional meeting and the management of the group. The information was given that the first meeting was planned for 01 and 02 December 2011 to start the technical discussion and to finalize the draft terms of references as well as the work plan for submission to GRSP in December 2011.

5. The first meeting of the informal group was held on 01 and 02 December 2011 in Geneva, Switzerland. The technical discussion was started and the draft document on the terms of references, the operating principles, the schedule and the work plan for submission to GRSP in December 2011 was finalised. The first progress report was submitted to GRSP in December 2011 and to the World Forum for Harmonization of Vehicle Regulations for the 156th session and to the Executive Committee of the 1998 Agreement for its 34th

session in March 2012. At the 156th session the World Forum endorsed in principle the above mentioned terms of references, pending the adoption of the report of the December 2011 session of GRSP. AC.3 endorsed in principle the terms of reference of the informal working group and requested the secretariat to distribute document ECE/TRANS/WP.29-156-11 with an official symbol for June 2012.

6. The second meeting of the informal group took place on 28 and 29 March 2012 in Osaka, Japan. The discussion was focused on the technical aspects including the accident and benefit analysis. Main priority was also given to discuss the activities on the further development of the certification procedures. For one further work item a task force was initiated to work on the bumper test area for the lower legform impact.

7. The second progress report was submitted to GRSP in May 2012 and to the World Forum for Harmonization of Vehicle Regulations for the 157th session and to the Executive Committee of the 1998 Agreement for its 35th session in June 2012. During these sessions the first progress report (ECE/TRANS/WP.29/2012/58) and the terms of references including the operating principles, the schedule and the work plan were adopted. The second progress report (document ECE/TRANS/ WP.29-157-21) was distributed with an official symbol for November 2012.

8. The third meeting of the informal group was held on 29 and 30 May 2012 in Paris, France. Main topics discussed during the meeting were related to accident data on pedestrian injuries, the cost benefit assessment and the setup of certification corridors.

9. The fourth meeting of the informal group took place on 17 to 19 September 2012 in Washington DC, United States of America. The group carried on the discussions of the third meeting, while the main focus was given to the finalisation of certification corridors and the cost benefit assessment for the introduction of the FlexPLI. Further priority was given to agree on the plan for an international vehicle test programme with the FlexPLI.

10. The draft third progress report was submitted to the 158th session of the World Forum for Harmonization of Vehicle Regulations and the 36th session of the Executive Committee of the 1998 Agreement. AC.3 requested the secretariat to distribute the draft third progress report (WP.29-158-28) with an official symbol for consideration at the next session and adopted the second progress report (ECE/TRANS/WP.29/2012/120).

11. The fifth meeting was held on 6 and 7 December 2012 in Bergisch Gladbach, Germany. Main subjects of this meeting were a review of the cost benefit analysis, an exchange of information based on the first results of the repeatability and reproducibility testing of the FlexPLI with vehicles and a discussion of the threshold values for the injury criteria. Additionally, the informal group agreed to ask GRSP and WP.29/AC.3 for an extension of the mandate (working schedule) to take all testing results into account for the amendment.

12. At the 159th session of the World Forum for Harmonization of Vehicle Regulations and the 37th session of the Executive Committee of the 1998 Agreement it was reported that concerning the development of Phase 2 of the UN GTR on pedestrian safety based on

the original mandate (working schedule) GRSP had adopted the revised terms of reference of the informal working group as reproduced in Annex II to the GRSP report. The World Forum endorsed the extension of the mandate of the informal working group until June 2014 (adoption at WP.29/AC.3) and, in principle, the revised terms of references, pending the adoption of the GRSP report of its December 2012 session at the 160th session of the World Forum in June 2013.

13. The third progress report (ECE/TRANS/WP.29/2013/36) was recalled at the 159th session of the World Forum and the 37th session of AC.3 as amended (WP.29-159-20) at the December 2012 session of GRSP. AC.3 adopted ECE/TRANS/WP.29/2013/36, as amended by Annex III of the report of the World Forum (ECE/TRANS/WP.29/1102).

14. The sixth meeting of the informal group took place in Washington DC, United States of America from 19 to 20 March 2013. The group agreed on the approach to review the FlexPLI drawing package to prepare the addendum for the Mutual Resolution No. 1 (M.R.1). The review of the controversial discussion on the cost-benefit studies was finalised and the results of the different regions and laboratories on the vehicle repeatability and reproducibility testing were shared for discussions.

III. Subjects for review and tasks to be undertaken (terms of reference)

15. The informal group has set up an activity list to address remaining items for the introduction of the FlexPLI:

1. Review and consideration of remaining items
 - a) Review of Flex-TEG activities → to reach common understanding
 - b) Assessment of biofidelity (comparison of FlexPLI and EEVC lower legform impactor)
 - c) Assessment of benefit and costs (injury reduction, additional benefit compared to EEVC lower legform impactor)
 - d) Technical specifications (drawings) and PADI (user manual)
 - e) Evaluation of durability
 - f) Test procedure (rebound phase, best practice, velocity measurement etc.)
 - g) Certification tests
 - h) Review and exchange of test results
 - i) Evaluation of reproducibility and repeatability
 - j) Evaluate and decide on performance / injury criteria and threshold values
 - k) Evaluation of vehicle countermeasures (assessment of technical feasibility)
2. Develop a draft proposal to amend UN Gtr No. 9 - Phase 2
3. Develop a complementary draft proposal to amend draft UN Regulation on Pedestrian Safety (including a recommendation for transitional provisions based on item 1).

IV History of the discussions

16. Benefit and costs

During the fifth and the sixth meeting the pedestrian experts reviewed further information from JASIC and BAST on the calculation of the benefit that would result from the introduction of the FlexPLI.

The Alliance of Automobile Manufacturers in the United States of America repeated once again the concerns that the two approaches presented may not be valid for every market depending especially of the accident situation and the vehicle fleet.

The informal group agreed that this argument may be valid for some regions which would it make necessary that individual countries or regions have to undertake a cost-benefit analysis using their unique accident and vehicle fleet situation to clarify the scope of the vehicle fleet for an introduction of the FlexPLI into their country. It was agreed that this topic will be reflected in the preamble of the amendment to the global technical regulation no. 9.

17. Technical specifications and user manual

Humanetics has provided the full drawing package for the FlexPLI in December 2012. The group discussed the planning to review the drawing package. It was agreed that a comparison of 100% of the parts of one impactor will be done with the drawings. Additionally the drawings will be checked if they confirm to the requirements as defined by the IG Head Restraints Phase II, the IG Child Restraint Systems and the IG GTR9-PH2.

A further part is the review of the user manual to check compliance to the defined requirements. Humanetics confirmed that updating of the drawing and the user manual will be done with guidance by the informal group. A draft version of the addendum for the Mutual Resolution No. 1 will be prepared by the informal group by the 7th meeting (Sept. 2013).

18. Review and exchange of test results / Evaluation of reproducibility and repeatability

The informal group has started an international vehicle round robin test programme in September 2012. The testing was finalised before the 6th meeting. Results were presented by test houses coming from Europe, Korea and the United States. Apart from minor issues the results of the different test houses showed a stable performance of the legform impactors with a good repeatability. Problems in durability did not occur during vehicle testing. The lower output levels during the vehicle testing at BAST with the master legs compared to the test results with former flexible legform impactors tested with the same cars led to discussions about the threshold values for the injury criteria (see paragraph 21). OICA also showed test results with FlexPLI in vehicle testing where the output values were not lower compared to former FlexPLI.

Further information on the influence of friction with regard to the test device used for inverse testing was shown by the different laboratories that investigated their test apparatus. Based on the presentations and the conclusions the informal group agreed the limit for the friction of test devices for inverse testing. OICA and BAST presented information for the definition of tolerance of FlexPLI output values during the free-flight phase for vehicle testing. This topic will be considered further.

19. Test procedure

BASt, JASIC and OICA presented proposals for the definition of a rebound phase for the testing with the FlexPLI. While JASIC and OICA were of the opinion that a definition can currently not be introduced in the GTR No. 9, BASt has shown a procedure to define a Biofidelic Assessment Interval (BAI). The decision on this topic is planned to be taken until the 7th meeting of the informal group.

Within the informal group a task force bumper test area (TF-BTA) was established after the second meeting of the informal group based on a request of the the European Commission. The necessity was shown to improve the procedure for the lower legform test, as the size of the area of the bumper tested is quite limited due to some design features on the front of some vehicles that interact with the current test procedure. The European Commission is chairing this activity.

Up to now three meetings of the TF-BTA took place. The European Commission has sought guidance for this topic by commissioning a contractor to investigate the different issues. First results of this work show that for newer vehicles the test area for the lower legform impact is narrowed. It was recognised that testing outside the current bumper test areas would lead to problems in testing and the reliability of the test results would be questionable. This will be given further consideration and an assessment is planned if the current pedestrian lower legform impactors (EEVC PLI, FlexPLI) can be used for testing outside the current bumper corners.

The Task Force will assess all information that is available and will be provided. The next meeting of the TF-BTA is planned to be held in conjunction with the next meeting of the informal group.

OICA has presented a proposal for the definition of the vehicle setup in terms of riding height. The proposal will be added in square brackets to the draft informal document for discussion.

20. Evaluation of vehicle countermeasures (assessment of technical feasibility)

During the 5th and 6th meeting information on the technical feasibility and possible vehicle countermeasures was shown by OICA, by JASIC and by NHTSA. OICA informed the informal group that feasibility may be a problem for some small volume products for which currently no information on the performance with the FlexPLI is available. Automakers from the United States of America explained that for some heavier trucks and SUV there would be a conflict between the customer requests for the US-market and the pedestrian bumper requirements. The informal group agreed that it may be necessary for some markets to further consider the scope of the regulation and the lead time for specific vehicles during the transposition of the GTR No. 9 in the regional or national law.

21. Evaluate and decide on performance / injury criteria and threshold values

The discussion on the injury threshold values was started at the 5th meeting. While the injury criteria were agreed by the group, a long discussion about the threshold values for the different injury criteria was held. While BASt has proposed to lower the threshold values, OICA is clearly supportive of keeping the threshold values as proposed by the Technical Evaluation Group (TEG on FlexPLI). At the 6th meeting OICA has presented further test data obtained using their FlexPLI, same build level as the “master legs”, which showed a higher output than the output seen with the three master legs during vehicle

testing. The decision about the threshold values was postponed until a later stage of the work.

22. Activity list and schedule

The informal group has reviewed the activity list in terms of identifying outstanding issues to be resolved. It has to be noted that all item of the activity list were addressed, but some items still need further consideration before a decision can be made.

The informal group is planning to hold a WebEx meeting in between the 6th and 7th meeting to discuss and resolve some specific issues, especially regarding the threshold values for the injury criteria, the definition of a rebound phase and the tolerances of FlexPLI output values during free-flight phase. It is planned to come to an agreement between participants on these topics till the 7th meeting.

According to the overall schedule the informal group will provide a draft informal document of gtr9 phase 2 for review and discussion at the 7th meeting of the informal group. Based on the discussions an official working document will be submitted for detailed discussion at the GRSP session in December 2013. It is also planned to submit a proposal for an addendum for the FlexPLI for the incorporation into the Mutual Resolution (M.R.1) for the session of GRSP in December 2013.

V. Work schedule

23. Work schedule

Overall Schedule													P.R.: Progress Report																								
Year	2011					2012					2013					2014																					
Month	10	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6						
WP29		Report					P.R. & ToR						P.R.																								
GRSP																																					
IG-GTR9-PH2		const	1st					2nd		3rd			4th		5th		6th																				

May 2011	Proposal of Draft ToR to GRSP (informal document)
June 2011	GRSP to seek consent of WP.29 and AC.3 to mandate new informal group on pedestrian protection
03 November 2011 (Bonn, DE)	Constitutional meeting of the IG GTR9-PH2
November 2011	Report to WP.29 on activities of IG
01/02 December 2011 (Geneva, CH)	First meeting of the IG GTR9-PH2
December 2011	Progress Report to GRSP, submission of Draft ToR to WP.29
March 2012	Progress Report to WP.29 and adoption of ToR by WP.29 / AC.3
28 and 29 March 2012 (Osaka, JP)	Second meeting of the IG GTR9-PH2
May 2012	Progress Report to GRSP

29 and 30 May 2012 (Paris, FR)	Third meeting of the IG GTR9-PH2
June 2012	Progress Report to WP.29
17 to 19 Sept. 2012 (Washington DC, USA)	Fourth meeting of the IG GTR9-PH2
November 2012	Draft Progress Report to WP.29
06 and 07 December 2012 (Bergisch Gladbach, DE)	Fifth meeting of the IG GTR9-PH2
December 2012	Progress Report and submission of informal documents to GRSP
March 2013	Progress Report to WP.29
19 to 20 March 2013 (Washington DC, USA)	Sixth meeting of the IG GTR9-PH2
May 2013	Draft Progress Report and submission of informal proposal for discussion to GRSP
June 2013	Progress Report to WP.29
June/July 2013	WebEx meeting is planned
09 and 10 September 2013 (Paris, France)	Seventh meeting of the IG GTR9-PH2
November 2013	Draft Progress Report to WP.29
December 2013	Progress Report and submission of formal proposal to GRSP, agreement by GRSP
June 2014	Adoption by WP.29

VI. Documents

24. Documents for the meetings

ECE/TRANS/WP.29/ GRSP/2011/13	Japan	Proposal for Amendment 2 to global technical regulation No. 9 (Pedestrian safety)
GRSP-49-38	Japan and Germany	Draft terms of reference for the informal group on pedestrian safety phase 2 (IG PS2)
ECE/TRANS/WP.29/ 1091		Reports of the World Forum for Harmonization of Vehicle Regulations on its 154th session, Administrative Committee of the 1958 Agreement on its forty-eighth session, Executive Committee of the 1998 Agreement on its thirty-second session, Administrative Committee of the 1997 Agreement on its eighth session
GTR9-C-01	Chair	Agenda for the constitutional meeting of the Informal Group on Pedestrian Safety Phase 2 (IG PS2)
GTR9-C-01r1	Chair	Agenda for the constitutional meeting of the Informal Group on Pedestrian Safety Phase 2 (IG PS2)
GTR9-C-02	Chair/Secretary	Minutes of the Constitutional Meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2)
GTR9-C-02r1	Chair/Secretary	Minutes of the Constitutional Meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2)
GTR9-C-03	Japan/Germany	Informal document GRSP-49-38: Draft Terms of Reference for the Informal Group on Pedestrian Safety Phase 2 (IG PS2)
GTR9-C-04	Japan	History of Development of the FlexPLI
GTR9-C-05	Japan	Review of the FlexPLI TEG Activities
GTR9-C-06	OICA	Comments on the Draft Terms of Reference for the Informal Group on Pedestrian Safety Phase 2 (28/10/2011)
GTR9-C-07	Chair	Final Operating Principles and Terms of Reference for the IG GTR9-PH2
GTR9-C-07r1	Chair	Final Operating Principles and Terms of Reference for the IG GTR9-PH2
GTR9-C-08	Secretary	TEG document matrix
GTR9-1-01	Chair/ Secretary	Agenda for the 1st meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2)
GTR9-1-01r1	Chair/Secretary	Agenda for the 1st meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2)

GTR9-1-02	Chair/ Secretary	Minutes of the 1st meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Draft
GTR9-1-02r1	Chair/ Secretary	Minutes of the 1st meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Final
GTR9-1-03	Japan	Work plan of Task Force Review and Update of Certification Corridors (TF-RUCC)
GTR9-1-03r1	Japan	Work plan of Task Force Review and Update of Certification Corridors (TF-RUCC)
GTR9-1-04	OICA	FlexPLI Version GTR Prototype SN-02 - Durability Assessment
GTR9-1-05	JASIC	Technical Discussion - Biofidelity
GTR9-1-05r1	JASIC	Technical Discussion – Biofidelity (revised)
GTR9-1-06	JASIC	Technical Discussion - Injury Criteria
GTR9-1-06r1	JASIC	Technical Discussion - Injury Criteria (revised)
GTR9-1-07	JASIC	Technical Discussion - Benefit
GTR9-1-07r1	JASIC	Technical Discussion – Benefit (revised)
GTR9-1-08	Humanetics	FlexPLI GTR status 1 / 2 December 2011
GTR9-1-08r1	Humanetics	FlexPLI GTR status 1 / 2 December 2011
GTR9-1-09	Japan/ Germany	Informal document WP.29-155-35: Report to the November session of WP.29 on the activities of the IG GTR9-PH2
GTR9-1-10c1	Humanetics	Flex-GTR changes list since prototype built, status 02 Dec. 2010 (corrected)
GTR9-1-11	Bertrandt	Pendulum Test Scatter
GTR9-1-12	United States	Informal document GRSP-49-23: Update on Pedestrian Leg Testing
GTR9-2-01	Chair/ Secretary	Agenda for the 2nd meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Draft
GTR9-2-01r1	Chair/ Secretary	Agenda for the 2nd meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Final
GTR9-2-02	Chair/ Secretary	Minutes of the 2nd meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Draft
GTR9-2-02r1	Chair/ Secretary	Minutes of the 2nd meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Final
GTR9-2-03	BASSt	Proposal for a Modification of the Bumper Test Area for Lower and Upper Legform to Bumper Tests
GTR9-2-04	BASSt	Robustness of SN02 prototype test results
GTR9-2-05	BASSt	Comparison of Filter Classes for FlexPLI
GTR9-2-06	OICA	Technical Specification and PADI
GTR9-2-07	JASIC	Technical Discussion – Benefit; Updated Version of Document GTR9-1-07r1 (Note: The document was not presented since a revision 1 of the document was already available for the meeting)
GTR9-2-07r1	JASIC	Technical Discussion – Benefit; Updated Version of Document GTR9-1-07r1
GTR9-2-08	Humanetics	Flex PLI GTR meeting actions
GTR9-2-09	Humanetics	FLEX PLI GTR –FE v2.OIG FLEX GTR9-PH2
GTR9-2-10	OICA	FlexPLI Comparison (Impactors: SN02, SN04, IND-Impactor - Test experiences)
GTR9-2-11	Chair	Informal document WP.29-156-11: First progress report of the informal group on Phase 2 of gtr No. 9
GTR9-2-12	JASIC	Re-examination of Number of Pedestrians by Injury Severity
GTR9-2-13	Humanetics	FLEX PLI Update for Alliance of Automobile Manufacturers
GTR9-2-14	JARI	Updated Japan Progress Report: Review and Update Certification Test Corridors and Test Methods (added pendulum Test data)
GTR9-3-01	Chair/ Secretary	Agenda for the 3rd meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Draft
GTR9-3-02	Chair/ Secretary	Minutes of the 3rd meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Draft
GTR9-3-02r1	Chair/ Secretary	Minutes of the 3rd meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Final
GTR9-3-03	Germany	Informal document GRSP-51-15: Draft second progress report of the informal group on Phase 2 of UN GTR No. 9 (IG GTR9 - PH2)

GTR9-3-04	Humanetics	Flex PLI GTR User Manual Rev. C
GTR9-3-05	BAST	FlexPLI Prototype SN04 Robustness Test results
GTR9-3-06	BAST	Draft future work plan - testing
GTR9-4-01	Chair/ Secretary	Agenda for the 4th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Draft
GTR9-4-01r1	Chair/ Secretary	Agenda for the 4th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Final
GTR9-4-02	Chair/ Secretary	Minutes of the 4th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – Draft
GTR9-4-02r1	Chair/ Secretary	Minutes of the 4th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Final
GTR9-4-03	Secretary	Status of activity list items
GTR9-4-04	United Kingdom	EEVC WG10 report, Nov. 1994
GTR9-4-05	United Kingdom	EEVC WG10 report, 15.ESV paper, May 1996
GTR9-4-06	United Kingdom	EEVC WG17 report, Dec. 1998, update Sep. 2002
GTR9-4-07	Chair of TF-RUCC	Activity report TF-RUCC
GTR9-4-08	Chair of TF-RUCC	Guideline to conduct FlexPLI round robin car tests, smooth and effectively
GTR9-4-09	Humanetics	Round robin certification test results
GTR9-4-10	Chair	Draft document “Special resolution No2” (WP.29-157-16)
GTR9-4-11	Concept Tech	Investigation of the influence of friction within the inverse certification test setup
GTR9-4-12	Alliance / JP	Letter of JP Research report on benefit assessment of the FlexPLI
GTR9-4-13	Alliance / JP	JP Research presentation on benefit assessment of the FlexPLI
GTR9-4-14	BAST	Comparison of FlexPLI performance in vehicle tests with prototype and series production legforms
GTR9-4-15	Chair	Informal document WP.29-157-21: Second progress report of the informal group on Phase 2 of gtr No. 9
GTR9-4-16	BAST	Pedestrian lower extremity injury risk
GTR9-4-16r1	BAST	Pedestrian lower extremity injury risk – updated information
GTR9-4-17	Vice-Chair	FlexPLI round robin car test schedule
GTR9-4-18	BAST	FlexPLI vs. EEVC WG17 PLI, benefit estimation
GTR9-4-19	NHTSA	Overview of pedestrian protection activities for USA
GTR9-4-20	JASIC	Validation of Pedestrian Lower Limb Injury Assessment using Subsystem Impactors (IRCOBI paper Sept. 2012)
GTR9-4-21	USCAR / Alliance	USCAR/OSRP Pedestrian Lower Leg Response Research test series
GTR9-4-22	IG GTR9-PH2	Checklist for Vehicle Testing
GTR9-5-01	Chair/ Secretary	Agenda for the 5th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Draft
GTR9-5-01r1	Chair/ Secretary	Agenda for the 5th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Final
GTR9-5-02	Chair/ Secretary	Draft Minutes
GTR9-5-02r1	Chair/ Secretary	Draft Minutes (this document) - Final
GTR9-5-03	NHTSA	Pedestrian Injuries By Source: Serious and Disabling Injuries in US and European Cases (Mallory et al. Paper for 56th AAAM Annual Conference)
GTR9-5-04	Humanetics	Flex PLI GTR User Manual Rev. D, Oct. 2012
GTR9-5-05	Bertrandt	FlexPLI - Round Robin Tests
GTR9-5-05r1	Bertrandt	FlexPLI - Round Robin Tests, Rev. 1
GTR9-5-05r2	Bertrandt	FlexPLI - Round Robin Tests, Rev. 2
GTR9-5-06	Chair	Informal document WP29-158-28: Draft 3rd progress report
GTR9-5-07	OICA	Discussion on Feasibility of FlexPLI Countermeasures

GTR9-5-07c1	OICA	Discussion on Feasibility of FlexPLI Countermeasures (corrected)
GTR9-5-08	OICA	Proposal for Procedure to Process FlexPLI Measurements in Rebound Phase
GTR9-5-09	JAMA	Applicability Information
GTR9-5-10	JAMA	FlexPLI Durability Against Larger Vehicles
GTR9-5-11	JAMA	FlexPLI Repeatability in Car Tests
GTR9-5-12	JASIC	Experimental Validation of Human and FlexPLI FE Models
GTR9-5-13	JASIC	FlexPLI vs. EEVC LFI Correlation
GTR9-5-14	JASIC	Benefit and Cost; Additional Analysis based on GTR9-2-07r1
GTR9-5-15	JASIC	Moving Ram Friction Effect
GTR9-5-16	KATRI	Round Robin Test Result (E-Leg)
GTR9-5-16r1	KATRI	Round Robin Test Result (E-Leg), Rev. 1
GTR9-5-17	Concept Tech	FlexPLI Test Results (SN-03)
GTR9-5-18	BGS Boehme & Gehring	Flex PLI Logbook for the IG GTR9-PH2 Round Robin Tests
GTR9-5-19	BASt	Estimation of Cost Reduction due to Introduction of FlexPLI within GTR9
GTR9-5-20	BASt	Verification of Draft FlexPLI prototype impactor limits and application to FlexPLI serial production level
GTR9-5-21	US	US Round Robin Test Status
GTR9-5-22	NHTSA	Information on vehicle data used in NHTSA's studies
GTR9-5-23	OICA	Initial comments of OICA representatives to the 5th IG GTR9-PH2 meeting in response to document GTR9-5-20
GTR9-5-23c1	OICA	Initial comments of OICA representatives to the 5th IG GTR9-PH2 meeting in response to document GTR9-5-20 (corrected)
GTR9-5-24	OICA	Height tolerance for pedestrian protection
GTR9-5-25	BGS Boehme & Gehring	Flex PLI Inverse Test Setup - Moving Ram Friction
GTR9-5-26	Concept Tech	Investigation of the Influences of Friction within the Inverse Certification Test Setup of the FlexPLI - Lower Legform Impactor
GTR9-5-27	OICA	Clarification of Injury Threshold Determination Process Used by JAMA
GTR9-5-28	Chair	Operating Principles and Terms of Reference for the IG GTR9-PH2, updated version 5th meeting
GTR9-5-29	Chair/ Vice-chair	Draft gtr No 9 amendment, version 2012-12-06
GTR9-5-30	OICA	Discussion of the Rebound Issue, ACEA comments
GTR9-5-31	Humanetics	FlexPLI version GTR drawing package
GTR9-6-01	Chair/Secretary	Agenda for the 6th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2) - Draft
GTR9-6-02	Chair/Secretary	Minutes of the 6th meeting -Draft
GTR9-6-03	OICA	FlexPLI Testing: Propelling Accuracy
GTR9-6-04	Chair	Guidelines for the development of drawings for a test tool to be added as an Addendum to UN Mutual Resolution No. 1 (M.R.1) - (ECE/TRANS/WP.29/1101)
GTR9-6-05	Chair	Schedule to prepare an Addendum for FlexPLI for the M.R.1
GTR9-6-06	Humanetics	FlexPLI GTR User Manual Rev. E 2013
GTR9-6-07	BASt	Definition of FlexPLI Biofidelic Assessment Interval
GTR9-6-08	BASt	Derivation of FlexPLI thresholds
GTR9-6-09	BASt	FlexPLI Drawings
GTR9-6-10	BASt	FlexPLI Pre & Post Test
GTR9-6-11	JASIC	Consideration of the Rebound Phase
GTR9-6-12	JASIC	Validation of Flex-GTR model
GTR9-6-13	OICA	Proposal for a wording to consider tolerances of the normal ride height
GTR9-6-14	NHTSA-VRTC	FlexPLI Round Robin Testing

GTR9-6-15	Alliance/JP Research	Summary JPR Report Evaluating the Methodology and Assumptions Made in Doc. GTR9-5-14 and GTR9-5-19
GTR9-6-16	Alliance/JP Research	JPR Report Evaluating the Methodology and Assumptions Made in Doc. GTR9-5-14 and GTR9-5-19
GTR9-6-17	Alliance	Large Truck/SUV Challenges
GTR9-6-18	Ford	FlexPLI Round Robin Test Results
GTR9-6-19	Shape	FlexPLI Round Robin Test Results
GTR9-6-20	OICA	Discussion on Impactor Thresholds
GTR9-6-21	OICA	Flex-PLI Rebound Issue: Industry Proposal (Update)
GTR9-6-22	JASIC	FlexPLI Drawing Review (Surface Level)
GTR9-6-23	Cellbond	FlexPLI Drawings Review
GTR9-6-23r1	Cellbond	FlexPLI Drawings Review - Rev. 1
GTR9-6-24	Bertrandt	Durability Study SN-03
GTR9-6-24	Bertrandt	Durability Study SN-03
GTR9-6-25	BASt	Comments on GTR9-6-15 (JP Research review of JASIC & BASt FlexPLI Injury Reduction Estimate)
GTR9-6-26	JASIC	Development of Injury Probability Functions for the Flexible Pedestrian Legform Impactor
GTR9-6-27	JASIC	Comments on Alliance and JP Research Documents (GTR9-6-15 and GTR9-6-16)
GTR9-6-28	OICA	Certification test results of the OEM legform used in document GTR9-6-20
TF-RUCC-2-03	BASt	FlexPLI Inverse Certification Corridors-Further Test Results
TF-RUCC-2-04	ACEA	Comments on Inverse Certification Test Procedure
TF-RUCC-2-05	Humanetics	Humanetics Inverse and Round Robin Leg Preparation
TF-RUCC-2-06	BGS Boehme & Gehring	Status of the FlexPLI – Inverse Certification
TF-RUCC-2-07r1	TF-RUCC chair	Japan Progress Report: Review and Update Certification Test Corridors and Test Methods
