



Economic and Social Council

Distr.: General
20 December 2013

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

162nd session

Geneva, 11-14 March 2014

Item 17.5 of the provisional agenda

Progress on the development of new UN Global Technical Regulations (UN GTRs) and of amendments to established UN Global Technical Regulations (UN GTRs) - Gtr No. 9 (Pedestrian safety)

Fifth progress report for Phase 2 of gtr No. 9 (Pedestrian safety)

Submitted by the Chair of the informal working group on Phase 2 of gtr No. 9 *

The text reproduced below was prepared by the Chair of the informal working group. It is based on informal document WP.29-161-21, distributed at the 161st session of the World Forum for Harmonization of Vehicle Regulations (WP.29) (ECE/TRANS/WP.29/1106, para. 99). This document, if adopted, shall be appended to the amendment to the gtr in accordance with the provisions of paragraphs 6.3.4.2, 6.3.7 and 6.4 of the 1998 Agreement.

* In accordance with the programme of work of the Inland Transport Committee for 2012–2016 (ECE/TRANS/224, para. 94 and ECE/TRANS/2012/12, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

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I. Objective of this proposal

1. The representatives of Germany and Japan 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 (gtr) 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.
2. The work should not be limited to draft proposals to amend gtr No. 9, but shall cover the development of a complementary draft proposal to amend Regulation No. 127.
3. The work should review proposals to improve and/or clarify aspects of the legform test procedure.

II. Background

4. At the 154th session of WP.29 and the thirty-second session of the Executive Committee of the 1998 Agreement (AC.3), it was agreed to set up an informal working group (IWG) to solve the pending issues for incorporating the FlexPLI in PH2 of gtr No. 9 and in Regulation No. 127 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).
5. WP.29 and AC.3 noted that this IWG, named GTR9-PH2, would be co-sponsored by Germany and Japan.
6. The IWG held a constitutional meeting (3 November 2011, Bonn (Germany)) to draft the terms of references, the rules of procedures, the time schedule and the work plan. The participants also agreed with the proposal by the co-sponsors that the IWG would be managed by Germany (Chair) with Japan (Vice-Chair) and the International Organization of Motor Vehicle Manufacturers (OICA) as secretariat.
7. At the 155th session of WP.29 and the thirty-third session of AC.3, Germany and Japan informed delegates about the activities of the IWG (WP.29-155-35). The first meeting of the IWG was planned for (1– 2 December 2011, Geneva) to start the technical discussions and to finalize the draft terms of references and the work plan for submission to GRSP at its December 2011 session.8. The first meeting of IWG was held on 1 and 2 December 2011 in Geneva (Switzerland). The technical discussion started and the draft document on the terms of reference, the rules of procedures, the time schedule and the work plan for submission to GRSP in December 2011 was concluded. The first progress report was submitted to the Working Party on Passive Safety (GRSP) in December 2011 and to WP.29 at its 156th session as well as to AC.3 at its thirty-fourth session in March 2012. At its 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 also endorsed in principle the terms of reference of the IWG and requested the secretariat to distribute WP.29-156-11 with an official symbol for consideration at the June 2012 session.
9. The second meeting of the IWG took place in Osaka (Japan) on 28 and 29 March 2012. The discussion was focused on the technical aspects including the accident and benefit analysis. High priority was given to discuss the activities on the further development of the certification procedures. As a further work item, a task force was established to initiate the work on the bumper test area for the lower legform impact.

10. The second progress report was submitted to GRSP in May 2012, to WP.29 at its 157th session and to AC.3 at its thirty-fifth session in June 2012. The first progress report (ECE/TRANS/WP.29/2012/58), the terms of references, the rules of procedures, the time schedule and the work plan were formally adopted at these sessions. The second progress report (WP.29-157-21) was distributed with an official symbol at the November 2012 sessions of WP.29 and AC.3 (ECE/TRANS/WP.29/2012/120).

11. The third (29–30 May 2012, Paris) and fourth (17–19 September 2012, Washington, D.C.) meetings of the IWG During the meetings, the experts discussed main topics related to accident data on pedestrian injuries, the cost-benefit assessment and the setup of certification corridors. 12. The fourth meeting of the IWG took place on 17 to 19 September 2012 in Washington DC (United States of America). The group resumed 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 an international Round-Robin vehicle test programme with the FlexPLI.

13. The draft third progress report was submitted to WP.29 at its 158th session and to AC.3 at its thirty-sixth session. 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).

14. The fifth meeting was held on 6 and 7 December 2012 in Bergisch Gladbach (Germany). Main subjects of the discussion during this meeting were a review of the cost-benefit analysis, an exchange of information on the first results of the repeatability and reproducibility of the FlexPLI tests with vehicles and a discussion on the threshold values for the injury criteria. Furthermore, the IWG agreed to seek the consent of GRSP and WP.29/AC.3 for an extension of the mandate (working schedule) to take all test results into account for the amendment of the gtr.

15. At the 159th session of the World Forum for Harmonization of Vehicle Regulations and the thirty-seventh 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 (ECE/TRANS/WP.29/GRSP/52). 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.

16. The third progress report (ECE/TRANS/WP.29/2013/36) was recalled at the 159th session of WP.29 and at the thirty-seventh session of AC.3 together with the amendments proposed by GRSP (WP.29-159-20) at the December 2012 session. 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).

17. The sixth meeting of the IWG 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 tests were shared during the discussions.

18. The draft fourth progress report of the IWG was presented at the fifty-third session of GRSP. It was added that the group had made good progress and that it was ready to submit an official proposal to the December session of GRSP with possible pending

decisions on threshold values of injury criteria. GRSP agreed to resume consideration of this subject on the basis of a proposal submitted by the IWG.

19. At its 160th session, WP.29 was informed by the United States of America that GRSP was ready to recommend Amendment 2 to the UN GTR and that the definition of the head form impact point be included into the UN GTR No. 9 test and UN Regulation No. 127. He also announced the submission of an Amendment 1 (Phase 1) to the UN GTR on pedestrian safety on an updated definition of the head form impact point.

20. At the same session of WP.29, the Vice-Chair (Japan) of the IWG on Phase 2 of UN GTR No. 9 introduced the fourth progress report of the group together with a presentation. He explained that the IWG had made good progress and that an official proposal for incorporating the flexible pedestrian legform impactor would be submitted to the December 2013 session of GRSP. AC.3 adopted the fourth progress report and requested the secretariat to distribute it with an official symbol at its November 2013 session.

21. The seventh meeting of the IWG was held as a telephone and online meeting on 3 July 2013. The group discussed issues such as the threshold values for the injury criteria, the definition of the rebound phase and the tolerances of FlexPLI output values during the free-flight phase. The latter two were agreed upon, in principal, and a decision on the threshold values is still pending. A further work item agreed was to perform an analysis on the necessity and possibility to introduce certification corridors for the femur bending moment.

22. The eighth meeting of the IWG (9–10 September 2013) discussed the injury criteria, the femur certification corridors and reviewed the preamble and the regulatory text of the gtr No. 9.

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

23. The IWG listed the following remaining items for the introduction of the FlexPLI:

- (a) Review and consideration of the remaining items:
 - (i) Review of Flex-TEG activities to reach common understanding;
 - (ii) Assessment of the biofidelity (i.e. comparison of FlexPLI and European Enhanced Vehicle-Safety Committee (EEVC) lower legform impactor);
 - (iii) Assessment of benefits and costs (injury reduction, additional benefit compared to EEVC lower legform impactor);
 - (iv) Preparation of the technical specifications (drawings) and user manual (PADI);
 - (v) Evaluation of the durability;
 - (vi) Test procedure (rebound phase, best practice, velocity measurement etc.);
 - (vii) Certification tests;
 - (viii) Review and exchange of test results;
 - (ix) Evaluation of reproducibility and repeatability;
 - (x) Evaluation and decision on performance/injury criteria and threshold values;
 - (xi) Evaluation of vehicle countermeasures (assessment of technical feasibility).

- (b) Development of draft amendments to gtr No. 9 on PH2.
- (c) Development of complementary draft amendments to Regulation No. 127 on Pedestrian Safety (including a recommendation for transitional provisions based on item (a) above).

IV History of the discussions

A. Technical specifications and user manual

24. The dummy manufacturer provided the full drawing package for the FlexPLI in December 2012. At the seventh and eighth meeting of the IWG, the results of the drawing review were discussed. Apart from some smaller issues, the mistakes found were seen to be uncritical. The dummy manufacturer reviewed the comments and will take them on board during the update of the drawings. The design of the title block for the drawings was discussed and will be designed in accordance with the approach in other informal groups within GRSP.

25. Further work was put in updating the user manual. The expert from the International Organization of Vehicle Manufacturers (OICA) asked for getting a more detailed description on the procedure to prepare the impactor for vehicle testing which was taken into account by the dummy manufacturer. The Transport Research Laboratory (TRL) stated that further clarification would be needed in the manual on the method to remove the offset of the measurement signals before testing.

26. The updated drawing package and the updated user manual will serve as input for preparing the draft addendum of the FlexPLI for the Mutual Resolution No. 1 (M.R.1).

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

27. Further results of the testing with the FlexPLI were reported. The National Highway Traffic Safety Administration (NHTSA) informed the participants that their test programme was finalized and that a report would be available in late 2013, but currently no issues were expected.

28. OICA also showed results from vehicle tests. It was highlighted, that results can differ between legs. However, the IWG concluded that the performance of the legs was seen to be stable during certification tests and vehicle tests and that different aspects can influence the test performance of the legs especially during vehicle testing.

C. Test procedure

29. The IWG decided to define an Assessment Interval (AI) to introduce an objective method for the test procedure.

30. Within the IWG, a Task Force Bumper Test Area (TF-BTA) was established after the second meeting of the IWG based on the request of 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.

31. Four meetings of the TF-BTA have taken place. The Task Force will assess all available information and prepare a proposal for amendment.

32. The schedule of the task force lags behind that of the informal group. A proposal on how the activities of this task force can be finalised is planned to be submitted to GRSP.

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

33. Discussion on the injury threshold values began at the fifth meeting of the IWG. While the injury criteria were rapidly agreed upon by the group, threshold values for the different injury criteria continued throughout the sixth, seventh and eighth meetings. It was finally supported to keep the threshold values as proposed by the Technical Evaluation Group (TEG on FlexPLI). However discussion would continue at GRSP.

E. Activity list and schedule

34. The informal group noted that all subjects for review, tasks and activities had been addressed, though a few items needed further consideration before a final decision could be made at its ninth meeting.

35. According to the overall schedule the IWG would provide the following for the December 2013 session of GRSP:

- (a) An official working document for detailed discussion;
- (b) An official working document to amend UN Regulation No. 127 in accordance with the amendment to the gtr.
- (c) First draft proposal for an addendum for the FlexPLI for the incorporation into the Mutual Resolution No. 1 (M.R.1).

36. The ninth meeting of the IWG would take place in the week of the December 2013 session of GRSP.

V. Work schedule

Overall Schedule

P.R.: Progress Report

Year	2011			2012												2013												2014								
Month	10	11	12	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.				Draft P.R.		P.R.					P.R.					Draft P.R.								P.R. & DRAFT (Informal)		DRAFT (Formal)	
GRSP				P.R. & ToR					P.R.					P.R. & DRAFT (Informal)						P.R. & DRAFT (Informal)						P.R. & DRAFT (Formal)								P.R. & DRAFT (Formal)		Input if needed (Informal)
IG-GTR9-PH2		const.	1st		2nd				3rd				4th		5th					6th			7 th We box		8th								9th			

<i>Date</i>	<i>Venue</i>	<i>Title</i>
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 IWG
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, D.C., USA)	Fourth meeting of the IG GTR9-PH2
November 2012		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 draft documents to GRSP
March 2013		Progress report to WP.29
19 and 20 March 2013	(Washington, D.C., 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
3 July 2013		Seventh meeting (WebEx) of the IG GTR9-PH2
9 and 10 September 2013	Paris (France)	Eighth meeting of the IG GTR9-PH2
November 2013		Draft Progress Report to WP.29
16 and 17 December 2013	Geneva (CH)	Ninth meeting of the IG GTR9-PH2
December 2013		Final Report and submission of formal proposal to GRSP, agreement by GRSP
June 2014		Adoption by WP.29

VI. Documents

<i>Symbol</i>	<i>Transmitted by</i>	<i>Title</i>
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 Oct. 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

<i>Symbol</i>	<i>Transmitted by</i>	<i>Title</i>
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 2 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	BASt	Proposal for a Modification of the Bumper Test Area for Lower and Upper Legform to Bumper Tests
GTR9-2-04	BASt	Robustness of SN02 prototype test results
GTR9-2-05	BASt	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)

<i>Symbol</i>	<i>Transmitted by</i>	<i>Title</i>
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 v2.0IG 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
GTR9-4-03r1	Chair/Secretary	Status of activity list items, Rev. 1
GTR9-4-03r1	Chair/Secretary	Status of activity list items, Rev. 2
GTR9-4-04	United Kingdom	EEVC WG10 report, Nov. 1994
GTR9-4-05	United Kingdom	EEVC WG10 report, 15.ESV paper, May 1996

<i>Symbol</i>	<i>Transmitted by</i>	<i>Title</i>
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

<i>Symbol</i>	<i>Transmitted by</i>	<i>Title</i>
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

<i>Symbol</i>	<i>Transmitted by</i>	<i>Title</i>
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
GTR9-5-31r1	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
GTR9-6-02r1	Chair/Secretary	Minutes of the 5th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) – 2nd Draft
GTR9-6-02r2	Chair/Secretary	Minutes for the 6th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2) - Final
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	BASSt	Definition of FlexPLI Biofidelic Assessment Interval
GTR9-6-08	BASSt	Derivation of FlexPLI thresholds
GTR9-6-09	BASSt	FlexPLI Drawings
GTR9-6-10	BASSt	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

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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
GTR9-6-23r2	Cellbond	FlexPLI Drawings Review - Rev. 2
GTR9-6-24	Bertrandt	Durability Study SN-03
GTR9-6-24	Bertrandt	Durability Study SN-03
GTR9-6-25	BASSt	Comments on GTR9-6-15 (JP Research review of JASIC & BASSt 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
GTR9-7-01	Chair/Secretary	Agenda for the 6th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Draft
GTR9-7-01r1	Chair/Secretary	Agenda for the 6th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - Final
GTR9-7-02	Chair/Secretary	Minutes for the 7th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2) - Draft
GTR9-7-02r1	Chair/Secretary	Minutes for the 7th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2) - Final
GTR9-7-03	Chair	Draft running order of the provisional agenda
GTR9-7-04	Secretary	Information on drawing package kindly provided by Humanetics
GTR9-7-05	JASIC	Result of drawing review (surface level)
GTR9-7-06	JASIC	Result of manual review
GTR9-7-07	JASIC	Injury Probability Function for Tibia Fracture and MCL Failure
GTR9-7-08	JASIC	Development of Flex-GTR Master Leg FE Model and Evaluation of Validity of Current Threshold Values
GTR9-7-09	JASIC	Flex-GTR Master Leg Level Impactor Test Data - Pendulum Test
GTR9-7-10	BASSt	FlexPLI Logbook - legform SN-01
GTR9-7-11	BASSt	FlexPLI Logbook - legform SN-03

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GTR9-7-12	BASt	FlexPLI Logbook - legform E-Leg
GTR9-7-13	JASIC	FlexPLI Rebound Phase
GTR9-7-14	BASt	Detailed Review of Drawing Package and Itemized Check against Master Leg Impactor SN03
GTR9-7-15	BASt	BASt comments on GTR9-7-13:JASIC position on FlexPLI rebound phase
GTR9-7-16	BASt	Collation of FlexPLI Pendulum Certification Test Results
GTR9-7-16r1	BASt	Collation of FlexPLI Pendulum Certification Test Results, Rev. 1
GTR9-7-17	BASt	Collation of FlexPLI Inverse Certification Test Results
GTR9-7-17r1	BASt	Collation of FlexPLI Inverse Certification Test Results, Rev. 1
GTR9-8-01	Chair/Secretary	Agenda for the 8th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2)- Draft
GTR9-8-01r1	Chair/Secretary	Agenda for the 8th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2) - Final
GTR9-8-02	Chair/Secretary	Minutes for the 8th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2) - Draft
GTR9-8-03	Chair	GTR9 – Working Document of IG GTR9 PH2; Version 1, 04 Sept. 2013
GTR9-8-03r1	Chair	GTR9 – Working Document of IG GTR9 PH2; Version 1, 04 Sept. 2013
GTR9-8-04	Chair	GTR9 – Draft Preamble of IG GTR9 PH2; Version 1, 04 Sept. 2014
GTR9-8-05	---	(not used)
GTR9-8-06	OICA	OICA comments on the draft text, based on document GRSP-53-29
GTR9-8-07	Humanetics	Proposed Title Block for Regulation Drawings
GTR9-8-08	Humanetics	Comments to JAMA presentation GTR9-7-06c and Proposed Changes, FlexPLI GTR Manual
GTR9-8-09	Humanetics	Comments to Cellbond Flex PLI Drawing Check Document GTR9-6-23
GTR9-8-10	Humanetics	Comments to JASIC's Comments Provided with Document GTR9-7-05c
GTR9-8-11	JASIC	Comparison of Effect of Different Approaches on Injury Risk Functions
GTR9-8-12	OICA	Possible Influence of Temperature and Humidity on the flexPLI Behavior
GTR9-8-13	OICA	FlexPLI Manual: FlexPLI Preparation before Car Testing
GTR9-8-14	OICA	Request for Transitional Provisions for FlexPLI Usage

<i>Symbol</i>	<i>Transmitted by</i>	<i>Title</i>
GTR9-8-15	BASt	FlexPLI Biofidelic Assessment Interval (BAI): Open Issues
GTR9-8-16	TRL	Change to foam flesh used by EEVC lower & upper legforms
GTR9-8-17	OICA	FlexPLI Version GTR - Testing of Vehicles with Different Bumper Systems
GTR9-8-18	JASIC	Femur Certification Corridors for the Inverse Test (Zero Cross Timing)
GTR9-8-19	JASIC	Femur Certification Corridors for the Pendulum Test (Zero Cross Timing)
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
