

Transmitted by the chairman of the informal
group GTR9-PH2

Informal document **WP.29-161-21**
(161th WP.29 session, 12-15 Nov.,
agenda item 17.5)

Draft fifth 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 draft 5th 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.

15. The draft fourth progress report of the group was presented at the 53rd 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.

16. At the 160th session the experts of WP.29 were informed by the representative of the United States that GRSP expected to recommend that Amendment 2 (Phase 2) of the UN GTR on pedestrian safety, aimed at including the Flex-PLI and the definition of the head form impact point be included into the UN GTR No. 9 test. These provisions would also be included into 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.

17. At the same session of WP.29, the representative of Japan, Vice-Chair 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.

18. The seventh meeting of the IWG was held as a telephone and online meeting on 03 July 2013. The group discussed some specific issues, especially regarding 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 ones were agreed in principal while 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.

19. The eighth meeting of the IWG was held on 09 and 10 September 2013. The meeting was dedicated mainly to discuss the open items like the injury criteria, the femur certification corridors and to review the preamble and the regulatory text of the gtr No. 9.

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

20. 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

21. Technical specifications and user manual

Humanetics has provided the full drawing package for the FlexPLI in December 2012. At the 7th and 8th meeting of the informal group, the results of the drawing review were discussed. Apart from some smaller issues, the mistakes found were seen to be uncritical. Humanetics has 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.

Further work was put in updating the user manual. OICA asked for getting a more detailed description on the procedure to prepare the impactor for vehicle testing which was taken into account by Humanetics. TRL stated that further clarification would be needed in the manual on the method to remove the offset of the measurement signals before testing.

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.

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

Further results of the testing with the FlexPLI were reported. NHTSA informed the participants that their test programme is finalised. A report will be available in late 2013, but currently no issues are expected.

Testing results were also shown by OICA from vehicle tests. It was highlighted, that results can differ between legs. However, the group 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.

23. Test procedure

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

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 four meetings of the TF-BTA took place. The Task Force will assess all information that is available to prepare a proposal for amendment.

The current time schedule of the task force is behind the schedule of the informal group. A proposal is planned to be submitted to GRSP how the activities of this task force can be finalised.

24. 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 at the 6th, 7th and 8th meeting. It was finally supported to keep the threshold values as proposed by the Technical Evaluation Group (TEG on FlexPLI). However the threshold values will remain in square brackets and will be discussed at GRSP.

25. 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 items of the activity list were addressed. Apart from the injury threshold values, which have to be discussed at GRSP, some items still

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
03 July 2013	Seventh meeting (WebEx) of the IG GTR9-PH2
09 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

27. 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	BASSt	FlexPLI Prototype SN04 Robustness Test results
GTR9-3-06	BASSt	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
GTR9-4-03r2	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
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
GTR9-5-31r1	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	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
GTR9-6-23r2	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	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
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	BASt	FlexPLI Logbook - legform SN-01
GTR9-7-11	BASt	FlexPLI Logbook - legform SN-03
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 Injur 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
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
