

## GRSP INFORMAL GROUP ON PEDESTRIAN SAFETY

### 8th meeting

**Brussels, 11-13 July 2005**

#### Draft detailed meeting minutes:

#### 1. Welcome

The chairman, Mr Mizuno opened the meeting and welcomed everyone. He thanked ACEA for hosting the meeting. Mr Mizuno stressed that this meeting should finalise the draft gtr for presentation as an official document for next GRSP. He referred to the feasibility studies and the EU decisions which should help us to make some decisions. He also mentioned the remarks given by the US during last GRSP, calling for clarifications in the preamble. Mr Césari supported these comments and stressed that this is the time for conclusions, discussions were held during previous meetings.

Mr Van der Plas, reminded the group of the documents distributed prior to the meeting and relating to the agenda:

INF GR/PS/117	Preamble and draft gtr off doc for GRSP 37
INF GR/PS/118	Provisional agenda for the 8th meeting
INF GR/PS/119	ISO Activities for Pedestrian Safety
INF GR/PS/120	EC final feasibility study
INF GR/PS/121	GRSP/2005/3 as amended during GRSP/37
INF GR/PS/122	GRSP-37-18
INF GR/PS/123	GRSP-37-15
INF GR/PS/124	GRSP-37-16
INF GR/PS/125	Short report on comments received during GRSP-37
INF GR/PS/126	July meeting task list

#### 2. Adoption of the agenda INF GR / PS / 118 / Rev 1

OICA suggested adding under item 7.4 some observations on head tests in the centre of the windscreen. The agenda was adopted with this amendment.

#### 3. Review of the minutes of the 7<sup>th</sup> meeting INF GR / PS / 115 / Rev 1

Some small editorial changes were made based on comments from Korea and OICA. INF GR / PS / 115 / Rev 1 was adopted without comments.

#### 4. Report on GRSP/37 INF GR / PS / 125

Mr Van der Plas reported on last GRSP (May 2005). The draft gtr was presented as TRANS/WP29/GRSP/2005/3. The document was presented by Mizuno san and some comments were received. The details of these comments can be found in INF GR / PS / 125 and in informal document GRSP-37-18 (INF GR / PS / 122). Additionally an update was presented by Japan on the work of the TEG for the FlexPLI (GRSP-37-15 and 16; INF GR / PS / 123 and 124).

#### 5. Report from EC on the technical feasibility study results and recommendations for the draft gtr INF GR / PS / 120

Mr Doyle gave a presentation on the proposal to amend EU Phase 2 (INF GR / PS / 127). He thanked the group for agreeing to postpone the April meeting in order to allow the EC to come forward with some ideas on Phase 2. The EC is very interested in gtr's and the development of gtr's and harmonisation. The EC is actively looking at the potential to move more towards the 1958 Regulations and this is a clear sign that the EC is serious about harmonisation.

Mr Doyle briefly went through the background of the EU Directive reflecting the content of Phase 1 and the current requirements for Phase 2. Phase 2 is under review based on a feasibility study as requested in Article 5 of the Directive, not only looking at passive safety measures but also at active safety measures. The feasibility study, made by TRL showed that the necessary changes provide 79% effectiveness (when the current Phase 2 is 100%). Active safety measures were looked upon as well and Brake Assist Systems (BAS) was the only system which is possible to include in a directive text. The use of BAS would provide an effectiveness of 85%. At the same time ACEA made its own study which was more or less in line with the findings of the TRL study. Additionally ACEA calculated an effectiveness of 133% for BAS and passive safety measures. Due to the differences between 85% and 133% an extension to the EC feasibility study was made. This study showed that the use of BAS and passive safety measures as proposed by ACEA provides an effectiveness of 116%. Based on this result a proposal was drafted which is available on the EC website as part of a public consultation. The end result will consist of a Regulation and a Commission decision. The reason for a Regulation is to make it easier on the Member States from an administrative point of view. The proposal consists now of 4 tests (the upper legform is for monitoring only) and mandatory use of BAS. Both the headform weights and test speed were revised. The legform test is now: 40 km/h; 19° bending angle; 6 mm knee shearing; 170 g acceleration and a 264 mm relaxation zone to 250 g. The upper legform to bumper test is now: 40 km/h; force of 7,5 kN; bending moment of 510 Nm and is mandatory for high bumpers (500 mm). The child / small adult headform is now: 35 km/h; 3,5 kg headform; 50° impact angle; HIC < 1000 over 2/3 of test area and 1700 over 1/3 of test area. The adult headform test: 35 km/h; 65° impact angle; 4,5 kg headform; HIC < 1000 over 2/3 of test area and 1700 over 1/3 of test area.

The EC is happy to consider taking into account any considerations coming from the gtr discussions. He suggested members of the informal group could officially comment through the EC public consultation. Based on the result of the consultations the proposal may or may not change. That proposal will then go to the college of commissioners and after that go through co-decision. This process will take 12 to 18 months and throughout the process the proposal may or may not change.

Mr van der Straaten asked when the internal Commission consultation process be ready, with other words when will the Commission proposal be sent to Parliament and Council? Mr Doyle replied that end of July the consultation will be finished and end of November probably the proposal will be put forward within the Commission and sent to the Parliament and Council by the end of this year.

Mr Kinsky thanked Mr Doyle for the explanation and the proposals taking into account the industry point of view and acknowledged that the new proposal is a big step forward towards harmonisation.

Mr Notsu said the Commission document does not include an impact angle. Mr Doyle clarified that this is part of the Commission Decision.

Mr Saul asked what the baseline was for the effectiveness study, the figures above 100%, do they include effects beyond pedestrian protection. Mr Doyle clarified that the effectiveness only addresses pedestrians and cyclists. Mr Saul understood that the 100% baseline is thus the current Phase 2 requirements which was confirmed by Mr Doyle. Mr Lorenz asked how to deal with collision avoidance systems. Mr Doyle answered that the EC recognised that active systems will be more important and this was included in the proposal as a discussion item on how to bring these systems closer to the market.

Mr Mizuno said that also cyclists are included in the presentation but did EEVC really study the cyclist problem?

Mr Doyle said that it is better to address it as vulnerable road users including skateboarders, in-line skaters, ... Mr Césari said that TNO and INRETS did some work in the past comparing pedestrians and cyclists and especially for the head injuries the same trajectories were found for pedestrians and for cyclists. The issue for the leg is somewhat more complicated. However, a considerable part of the cyclist accidents have similar kinematics as pedestrian accidents.

Mr Kumita asked why the proposal is a Regulation and not a Directive. Mr Doyle said that the process for accepting is exactly the same however with a Directive the Member States have to transpose it into their own national law. In order to avoid this cumbersome administrative process, a Regulation is used which should not be transposed into national law. Mr Kumita asked if the Regulation can be part of the framework Directive. Mr Doyle confirmed that the Regulation can be part of the framework Directive without any problem.

Mr Notsu said that Japan can not accept a gtr which is less stringent than the national requirements already enforced. The proposed impact speed of 35 km/h is no problem for Japan but having only one impact angle is difficult to accept. Mr Doyle said that the impact angles are not part of the EC proposal. The discussion on the impact angle is still to come during this meeting. As the impact angle is not part of the Regulation but part of the Commission Decision, it is easier for the EC to make changes as there is no need for a co-decision procedure.

Mr Mizuno said that this meeting indeed will discuss and will have to decide.

Mr Doyle suggested to go through the gtr text and discuss when we come at the respective §§.

Mr Notsu stressed that Japan needs 2 justifications: why a certain angle was chosen and secondly a comparison between the Japanese legislation and the EC proposal.

Mr Ries said that one should also remember as already stated by Mr Doyle that harmonisation is important for everyone. OICA has prepared a presentation on this and also a comparison on the Japanese standard and the EC proposal.

Mr Mizuno agreed but stressed that harmonisation is not only important, it is essential.

Mr Doyle said that if there are areas that are difficult to find unanimity upon, a consideration may be to allow for options. Mr van der Straaten said that last WP29/AC3 discussed this issue in detail and AC3 made it very clear to avoid options as much as possible. Options could only be contemplated for minor issues that do not affect the vehicle architecture. Mr Mizuno agreed that the group should aim for one single proposal without options.

Mr Kinsky presented INF GR / PS / 128 on the need for harmonisation. OICA outlined the risks if no gtr is agreed upon ranging from different or unique legislation in different countries, to the exclusion of certain vehicles from some markets and increased consumer costs. The presentation also outlined the problems for certification if there are different legislations as is the case today (EU and Japan). OICA firmly believes that harmonisation is possible given that existing requirements are rather similar.

Mr Mizuno suggested starting discussing on the detailed requirements. Firstly the adult head impact speed needs to be decided.

Mr Césari said that the head velocity changes throughout the trajectory of the head. From PMHS tests the speed is slightly below the car impact speed. There is no big difference between 32 km/h and 35 km/h but 35 km/h seems to be more realistic and closer to what is seen during PMHS tests.

Mr Ries said that the velocity and the angles can not be separated and should be discussed together.

Mr Saul agrees with these comments. He acknowledges that decisions need to be taken but also a rationale is necessary to justify the decisions which will also help the development of the preamble.

Mr Kumita said that OICA prepared a presentation on the angles and speed. Mr Ries presented INF GR / PS / 130 on a comparison of the severity between the Japanese regulation based on IHRA and the EU Ph 2 proposal. The main conclusion is that the EC proposal is more stringent. The comparison is a theoretical one based on comparing the necessary strokes for both requirements and the assumption that the entire impact energy is absorbed by the bonnet. A comparison was made for the sedan, SUV and one-box type of cars and for the adult and child head tests. In all cases and over the complete range of bonnet angles the EU Phase 2 proposals are more stringent (need more stroke) than the Japanese regulation. Also a FE simulation was made for different bonnet angles. Also here the EU Phase 2 was more stringent (higher HIC was produced). Also a study was done on the vehicle distribution by bonnet angle in Japan which is at least similar to the EU fleet. In summary the EU Phase 2 proposals are more stringent and for those theoretical cases where the Japanese standard is more stringent there is no car on the market with such a bonnet angle. In addition, the EC specifies a maximum HIC of 1700 which is also severer than the Japanese regulation.

Mr Notsu asked what the reason is for the differences between the stroke approach and the FE approach. Mr Ries explained that the FE approach was done by calculating 3 bonnet angles, the intermittent numbers were found by interpolation. The stroke approach was calculated for every angle and is a theoretical assessment. However, both methods show the same trends.

Mr Notsu asked if the bonnet used in the FE model is representative for the market. Mr Tanahashi said that JARI made this FE model. Mr Konosu said he believes the bonnet is representative but can not guarantee the result is representative for all vehicles. Mr Tanahashi said that the bonnet used was an existing bonnet. The purpose for doing the FE study was to identify the general trend found by the theoretical study. Mr Césari asked if this bonnet provides HIC values below 1000. Mr Ries said that it is in the range of 1000 or lower. The bonnet was optimised to be pedestrian friendly. Mr Césari said the result as explained can be expected as the main difference between both methods is the speed. However for the one-box vehicle the angle also is important. Mr Saul asked if everything under the bonnet is the same for the different vehicle types. Mr Konosu confirmed this is the case: the HIC is coming only from the bonnet not from any parts under the bonnet. Ms Fujita asked what the basis was for the angles used in the EU Phase 2 proposal. Additionally is it really the case that angles for which the Japanese requirements are more stringent do not exist today is this really the case. Mr Ries said indeed today there is no car with a 0° bonnet angle and the vehicle fleet in the presentation is the one in Japan and this is representative of the world fleet. Mr Césari explained that the angles come from EEVC and they based their angles on a simulation just as IHRA did. EEVC looked mainly at conventional cars, not the wide range that IHRA looked at. Mr Mizuno added that IHRA collected data from Japan, Europe and US for a sedan, SUV and one-box type. IHRA found that the shape of cars is similar in Japan, EU and US. Mr Césari added that the confidence for child impacts is lower because the basic knowledge is so weak due to the lack of PMHS data.

Mr Notsu said that EEVC has some justification based on simulation. He asked for a written document which is necessary as rationale and for use in the preamble. Mr Césari said that the reference is included in the 1999 EEVC report and he will provide the group with a copy. Mr Ries said that there is one reference from Mr Glaeser of Bast that determined the impact angles based on PMHS data for the adult head and from dummy results and simulation results for the child. This data was used as basis for EEVC and is outlined in INF GR / PS / 130. Mr Notsu says that just referring to the documents is not enough as justification. Mr Césari said that the graph included in the paper just presented shows that the concentration of all PMHS tests is for an impact angle of 60 to 65°. Mr Ries said that the EEVC WG10 report as presented at the 13<sup>th</sup> ESV conference confirmed these angles also by using simulation. Mr Saul assumes that the IHRA work is more recent and would have considered the older EEVC work. So how make it rationale in the preamble that the group went for the older EEVC work and not for the newer IHRA findings. He

agrees that one angle is the better way forward for various reasons. Mr Césari answered that for the adults for two vehicle categories the IHRA proposal is very close to the EEVC / EU proposals, a 5° in angles is neglectable. The third vehicle category is the minority of the fleet. If one looks at the combination of angle and speed then clearly the EEVC / EU is more demanding. Additionally it does away with splitting the vehicles in different categories. This can be used as justification in the preamble. Mr Lee stated the results of a Korean study and said they could not find any differences between SUV and sedans. So he can support at least the integration of sedans and SUVs in one category and to use only one angle. Mr Notsu asked if there are any difficulties with a test of 35 km/h and the IHRA angles. Mr Ries said that this would be 'cherry-picking' and this combination as proposed is not feasible. Mr Notsu asked what kind of cars are problematic. Mr Ries said that for sure but not only SUVs will have problems. Mr Mizuno asked if the EC can still accept different angles. Mr Doyle said that angle and speed indeed go together. The current speed of 40 km/h is proposed to be lowered to 35 km/h in order to make it feasible. The EC proposal of speed and angle is more stringent than 32 km/h and various angles. Additionally the EC is somewhat hesitant to change the angles as they believe more validation would be necessary to justify a change to the angles. The package of speed and angle is just that, a package and it is a reasonable and pragmatic approach. It is either this or go into even more details and define the exact impact angle for the impact point. However, the most pragmatic way forward is the package as outlined here with a 35 km/h and a fixed angle. Mr Césari agreed that we are not fully confident today with simulations in order to define for one specific car what the impact angle is. In the future we can be more precise but now we have to be pragmatic. Mr Saul agreed and underlined that the very same remark was made in IHRA. Mr Notsu said that there are three arguments: justification for EEVC angle, feasibility and simplicity. Mr Notsu can agree to the EC approach on condition that these three arguments are used in the preamble and that the preamble also addresses what needs to be done on the angles in the future. Ms Fujita asked if there is anything public on technical feasibility. Mr Ries clarified that both the IHRA and the EU Phase 2 proposals are feasible on their own, however a combination of both sets of requirements is not feasible. Mr Tanahashi and Mr Kumita said that JAMA agrees with this comment. They added that 35 km/h and 3 angles have no safety justification. Mr Doyle agrees that the 3 angles need more work and this can be included in the preamble just as was done for the FlexPLI. Mr Césari said the adult head angle comes from PMHS data. The velocity is less straightforward. From the most recent tests it seems more likely that the head speed before impact is lower than the car-pedestrian crash speed. For the child, simulation was used because it is the only tool available. The question is not who to believe or which one is best, they used a different approach. Mr Lorenz said that in an accident we can not decide the impact direction. All of this was taken into account. This together with vehicle shapes results in a wide possibility of impact angles and the compromise was found to be the angles as today in the EEVC and EU Phase 2 proposal. Mr Konosu said that EEVC never showed these data. Mr Césari said that he understood it is agreed that one angle and one speed is acceptable as long as the preamble can explain in detail the justification for EEVC angle, the technical feasibility and the need to have a pragmatic approach. Mr Mizuno repeated this agreement and Mr Notsu and the complete group confirmed its agreement. Mr Mizuno said the preamble will be written as explained and Mr Césari will provide the necessary EEVC documentation. Mr van der Straaten said that in any case the preamble has to be tuned to the decisions taken at this meeting anyway and the preamble text can be drafted later in a small group. Mr Lee confirmed that this conclusion is also acceptable for him. Mr Mizuno summarised that the 35 km/h and that one impact angle of 50° for the child and 65° for the adult was accepted as long as the preamble correctly reflects the necessary background and the need to address the angles in the future.

Mr Mizuno said that the next issue for the head testing is a relaxation zone. The EU Phase 2 proposal calls for HIC < 1700 for 1/3 for the bonnet. The EU proposal has this 1/3 for every test area (adult and child). Mr Kinsky said that last meeting detailed information on technical feasibility was provided (INF GR / PS / 91) and showed a need to have relaxed requirements for certain areas. These relaxation needs are not connected to the test but to the car structure itself. The relaxation area of 1/3 should however not be connected to the test area for child and adult but the 1/3 are should relate to the complete bonnet area. Mr Fredriksson asked how it is done in the Japanese standard. Mr Notsu said that the 1/3 relates to the complete bonnet. Mr Doyle said that Phase 1 indeed talks about the whole area as only the child head is tested. For Phase 2 the 1/3 area is related to each zone and the EC wants to avoid that the 1/3 area of the bonnet completely falls in the child area whilst this is exactly the area one would like to protect the most. Mr Saul said that for self certification it is going to be very critical to define the relaxation area. Mr Saul presented INF GR / PS / 131 on the analysis of pedestrian accident situation and portion addressed by this gr. It showed that the hood and fender constitute 41% of the AIS2-6 head injuries. If one takes only the accidents with a speed of 40 km/h, the injuries addressed by the gr for head testing is about 20% of all child pedestrian head injuries. For adult head injuries the same exercise was made and 12% of adult head injuries. This should be included somewhere in the preamble as it will be very useful for countries that will look at the gr for adoption at a later stage. Mr Césari said some care should be taken as the definitions are not harmonised. Mr Clor asked if this is based on PCDS data. Mr Saul confirmed this.

Mr Mizuno said that relaxation zones are necessary for technical feasibility. Mr Ries said that relaxation zones are indeed necessary and the relaxation area has to be 1/3 of the complete head test area and not split up for the adult and the child area. Mr Doyle stated that the US data shows that children are the most vulnerable and thus need to get the most protection. Thus it should be avoided that the 1/3 area falls completely in the child test area. He did admit

that for bonnets with a very small adult test area it will be difficult to decide upon the 1/3 area given the number of tests to be done. Mr Saul asked how the 1/3 area is being dealt with in the EU. Ms Fujita explained that it was looked at in the past in the US but it was very difficult to write such a regulation. Mr Doyle explained that the manufacturer is allowed to state which area(s) of the test surface makes up the 1/3 area. Ms Fujita said that the issue to be avoided is that a manufacturer says after a test showed a point is not complying with the stringent limit, the point is actually part of a zone where a less stringent limit applies. With other words: recall or not? Mr Mizuno asked if NHTSA can ask the manufacturer for the relaxation zone after the vehicle selection. Ms Fujita confirmed that they can do that but if the regulation does not specifically say which area is 1/3, the manufacturer can after the test say that a point not meeting requirement A but meeting requirement B in fact is not a non compliance but an error of the manufacturer in wrongly specifying the A and B area. Mr Kinsky showed INF GR / PS / 91 to clarify the discussion with some pictures of bonnets. It illustrates the technical difficulties to make bonnets compliant and clearly shows how the problematic area shifts from one car to another. Mr Ries said that for a small adult area it is difficult to fulfil the 1/3 requirement because some structures at the top of the bonnet need this relaxation area. That is why the 1/3 requirement needs to apply to the complete head test zone. Mr Mizuno concluded that everyone agrees to have a relaxation zone and that the zone should be 1/3. Mr Notsu suggested to have the 1/3 zone for the complete head zone and also 1/3 for the child zone but not for the adult zone. This will guarantee that the child is protected but would allow having more than 1/3 area for the adult head zone. Mr Yamaguchi said that for SUVs the child head area is small and that will then be a problem for the 1/3 area. Mr Doyle said that the fear is when both areas are combined that most of the hard area is part of the child area and some of the slides in INF GR / PS / 91 shows that is already the case. So a relaxation can only be allowed for each test and under the conditions of that test. Mr Showler argued that the reason to have a relaxation zone is feasibility and not the benefit for children or adults. By arbitrarily dividing the area in adult and child an unfeasible situation is created. For most cases the problem area is the adult area and the suggestion from Mr Notsu could solve this. However there are other cases as pointed out that are not solved. Thus it is necessary to have the relaxation area relating to the complete test area and not split up by adult and child area. Mr Saul presented INF GR / PS / 132 on gr testing and what it means for the US situation. The tests run used the IHRA tests of 32 km/h and the three impact angles. 43 tests were run on 6 different vehicles. For one of these vehicles it showed that the worst results all are in the small child area. However all the results will tend to shift up when tested against the just adapted new test requirements. Mr Showler said some vehicles also showed that all difficult areas are in a very small adult test zone. Mr Mizuno repeated that everyone can agree on the 1/3 area and the HIC < 1700 limit. The only open issue is how to define the 1/3 area: complete head test area or split up for adult and child area. Mr Ries repeated that it should be on the complete test area as everyone is familiar with it as it is part of current EU Phase 1 and part of the Japanese regulation. Additionally is the pragmatic way to go and the best for simplicity. It is the only way to assure technical feasibility. Mr Mizuno asked Mr Doyle if he can discuss this with industry. Mr Doyle said that the current Phase 1 is different as it only has one test to one area whilst Phase 2 has two tests to two areas. The proposal is undergoing a consultation process and anything can be brought forward under that consultation process. Mr Mizuno asked if the EC could discuss this issue with industry during the Monitoring Committee meeting which is planned as part of the consultation process. Mr Doyle said that if changes are made to the proposal because of the consultation process, he will inform the informal group. Mr Kumita asked what will happen if the EU keeps their position. Mr Ammerlaan said that the current Phase 1 includes the 1/3 rule which is used for the complete bonnet, not for the adult and child test zone separately. Mr Doyle confirmed this is indeed the case because Phase 1 only deals with the child test on the bonnet. Mr Saul asked if the rationale is part of the TRL feasibility study. Mr Doyle said it started in the 1998 EEVC report and was expanded in the TRL study. Mr Saul said that the current text does not include a relaxation zone so we need justification. Ms Fujita also said they need explanation on why 1/3 was chosen. Mr Doyle said the 1/3 issue goes back a long way maybe even to EEVC WG10. The HIC < 1700 is not only related to feasibility but the acceptance of both was looked upon in the feasibility study. Mr Césari said a compromise could be 1/3 zone except if one zone is 20% smaller. Mr Doyle said that another solution could be to look at the number of tests to be performed in the area. Mr Lorenz repeated the Japanese proposal (1/3 for child zone and 1/3 for complete area). Mr Doyle admitted that such a proposal could have potential. Ms Fujita does need explanation of why 1700 was decided. Mr Mizuno said it was agreed to have a relaxation zone of 1/3 with a HIC limit of 1700. The definition of the 1/3 area will have to be between square brackets and justification needs to be given on the 1/3 and HIC<1700 values. The four proposals on the table are: 1/3 for each test zone (adult and child); 1/3 for the complete test area; 1/3 for the child area and 1/3 for the total area; 1/3 for the smallest area (20% (?) smaller than the other zone) and 1/3 for the total area. Mr Mizuno asked for proposals by the end of the meeting. He reminded the group that September 16 is the last date for submission of an official document to GRSP and the aim is to have a document ready by that time. Mr Mizuno asked if Mr Doyle can confirm that 3,5 and 4,5 kg can be agreed for the impactor mass. Mr Doyle confirmed this is the case.

Mr Mizuno said that also the sensor issue needs to be addressed as last meeting JARI promised to offer a solution for the undamped accelerometer. Mr Konosu presented INF GR / PS / 133 proposing a solution to solve the undamped accelerometer problem. It shows that at least one good damped accelerometer exists (mass production to start around December 2005) that falls within the original recommended 10 mm tolerance. Mr Mizuno concluded

that the damping ratio should be specified (the existing damped accelerometers use 0,7) and the tolerance should be 10 mm. Mr Kinsky asked if this creates a problem in the US if a device can only be supplied by one manufacturer. Mr Konosu said that next to Kyowa there is also another supplier. Ms Fujita said that if there are good reasons to specify it then it is legally justifiable. Mr Fredriksson asked if damped accelerometers are specified in any other Regulation as there is a risk to miss a peak with the damped accelerometer. Mr Konosu said that the damping is only for the high frequencies (above 1000 Hz) and not for the frequencies we are interested in. Mr Mizuno said that the gtr includes windscreen testing and that JARI reported before that problems were seen in windscreen testing with very high HIC results. That was the background for the accelerometer issue. Mr Ries asked if the tolerance is again 10 mm, we are limiting only to two suppliers who can market their products. Is this in the advantage of our gtr? Mr Saul has the same concerns and prefers broader specifications as is specified today in the gtr. Ms Fujita said one does not want to over specify in a Regulation. Mr Konosu said that the variation of the HIC value is affected by the location of the accelerometer, so the narrower the tolerance, the better the results (so 10 mm is better than 30 mm). Ms Fujita said it means that the newer damped accelerometers cut down on the variability. Mr Mizuno asked if the gtr should specify the use of a damped accelerometer. Mr Saul said that the issue could be addressed in the preamble and not specified in details in the gtr text. He also does not want to jeopardise the measurements in other regulations where undamped accelerometers are used. Ms Fujita said that undamped is satisfactory but damped is maybe better so maybe no need to specify this. Mr Doyle asked that if an undamped is used can this give a lower result compared to damped accelerometers. Mr Konosu said this could be possible. Mr Doyle said it is acceptable to have the 10 mm as this is also specified in the Directive. Mr Mizuno concluded that the current specifications will be kept including the tolerance of 10 mm and that the preamble may address the issue of damped accelerometer.

#### 6. Final recommendations from other members for the bracketed items.

See item 5 and 8.

#### 7. Review of preamble and completion of missing items:

##### 7.1 Existing ISO PS recommendations INF GR / PS / 119

Mr Mizuno explained this will be added to the preamble.

##### 7.2 US comments INF GR / PS / 122

Covered during the discussions.

##### 7.3 Japan information on FlexPLI INF GR / PS / 123 and 124

Mr Konosu explained documents INF GR / PS / 123 and 124. He requested to be informed of the delegates who will be member of the Technical Evaluation Group at the latest by the end of August.

##### 7.4 Other

The issue of windscreen testing as requested under item 2 was discussed under point 8 below.

#### 8. Final review of updated PS gtr proposal (how to reflect above mentioned discussion results to the draft PS gtr INF GR / PS / 121

The group went through INF GR / PS / 121. The preamble was left aside for the time being as first the gtr text has to be finalised.

§1 to 1.2 adopted.

§2 Mr Mizuno said that the current approach is not appropriate. There should be a full set of tests and not the possibility to select one or only a few tests. However it may be necessary to specify the categories of vehicles. Mr Doyle agreed that the table was developed at a very early stage but now we are talking about a package of agreed tests. The vehicle types maybe need some more reflection. There is no need for a table anymore. Instead we need options for the vehicle category scope. Mr Saul agreed. Mr Ries asked what to do with the “derived from” definition. Mr van der Straaten explained that the easiest way is to insert a definition for “derived from” as this would clarify the categories. It is not because the definition does not exist in SR1, that it can not be added in this gtr. SR1 allows that within a gtr subcategories can be made. Mr Kumita said that Category 2-1 does not exist only category 2 and if this group wants a weight limit, this group should decide this as well. The reason for the weight limit was to solve the problem for the US market. Mr Kinsky said that the validations are done up to 2500 kg so that should be the upper weight limit. Mr Doyle stated that the EU Directive is limited to 2500 kg but is in the future looking into 3500 kg. Mr Doyle suggested to have options for the categories. Mr Saul said that the pick-ups are part of the category 2 group. Mr Saul suggested to limit the scope and to leave it up to the regions who want to apply the gtr to do the validation if they want to extend beyond the scope. The same was done in the door locks gtr. The application of the gtr can always be amended at a later stage if necessary. Mr Saul suggested staying with the current categories with a limit of up to 2500 kg. And state in the preamble state that the aim was to cover all the vehicle fleet but that this needed to be limited due to validation of the test procedures. This was agreed.

OICA will rephrase parts of §2 – 2.6.

§3 The move of the text to §6.2 was agreed.

§3.1 - 3.2 adopted.

§3.3 and the reference below can be deleted as agreed earlier in this meeting.

§3.4 – 3.5 adopted.

§3.6 Ms Fujita suggested to delete “essentially” as this is open for interpretations.

§3.7 – 3.10 adopted.

§3.11 Mr Ries commented it is linked with §3.22. The text is not clear in explaining what happens if the WAD is in the windscreen. In order to solve this OICA proposes to amend §3.11 to “and, at the rear by the WAD1700, as defined in § 3.31, and ...” And deleted §3.22. As a result §7.3.3 should be amended as well to read “be forward of the WAD1700 line, defined in §3.31, or a min ... in §3.7, whichever is most forward.” And “be forwards of the WAD1700 or a min... in §3.35, whichever is most forward.”

§3.12 – 3.15 adopted

§3.16 Mr Mizuno said that US during GRSP asked why 15 ms was used. He explained that the situation is completely different to FMVSS208 which is a test inside the car. Mr Césari says that the time duration is very short anyway and a longer time measurement can include a part of the rebound. Hence it is best to work with a small time interval. Mr Saul said that 15 ms is fine for this short duration and avoids the rebound effects. However in 208 some comments were given that in such a case the HIC should go to 700. Mr van der Straaten said the situation is not comparable as in a front impact the duration can indeed be more than 15 ms. So downgrading from 36 ms in such a case indeed means the HIC limit should be revised. However for pedestrian impacts the impact time is very short and whether 15 ms or 36 ms is used is irrelevant. Mr Césari said that if you have a long duration pulse and you move from 36 to 15 ms you may use only a part of the pulse and as HIC is an integration versus time the HIC needs to be adapted. However for a very short duration impact like in pedestrian head testing there is no problem with 15 ms and no need to revise the HIC value. This explanation was confirmed by Mr Lorenz. Mr Saul can agree with square brackets and requests to have it explained in the preamble. EEVC (Mr Césari) to provide the wording for the preamble.

§3.17 – 3.19 adopted.

§3.20 Mr Saul refers to INF GR / PS / 122 where a more detailed proposal is made. Mr Ries asked what the difference is with the current proposal. Ms Fujita said that some issues are important for pedestrian protection like pop-up headlamps. Mr Van der Plas clarified these issues are part of §6.2.3 and 6.2.4. Mr van der Straaten said that the “normal ride attitude” wants to specify that how a car sits on the road. Mr Saul said that the cargo, the tyre pressure and the fluid levels are important to specify. Mr Césari said that in EU and Japan no cargo weight is specified. Mr van der Straaten said that luggage load was discussed many times in GRSP and it was shown that most of the boots are empty. The issues of tyre pressure and fluid levels are already included in the current text. Mr Ammerlaan agrees not to add luggage to the test. Mr Césari concluded it was agreed to keep the text as it is but include the seat positioning from the US proposal. Mr Massaia said it is not necessary to specify a certain liquid. Mr Saul agreed and said that just saying “max capacity representing all fluids” would be sufficient. This was agreed. Mr Saul asked that for category 2 vehicles the cargo is important. Mr Césari said that for these vehicles the complete vehicle is pushed down and not inclined so much. The worst case for the leg is when the vehicle is empty as it stands highest from the ground. However it would also change the WAD. Mr Ammerlaan said the cargo capacity also changes from one car to another. Mr van der Straaten explained that SR1 defines the mass in running order which includes a driver but no front passenger. However we could copy SR1 but specifying that in addition a front passenger is included and that the seats are in the mid track position. This was agreed.

§3.21 adopted.

§3.22 deleted (see §3.11).

§3.23 – 28 adopted.

§3.29 Mr van der Straaten said we should refer to SR1 §2. This was agreed. Remark: change “vehicle mass” to “unladen vehicle mass” throughout the gtr text. Additionally the comment is deleted. Mr Saul asked if this definition is necessary as the term is not used anywhere in the text. It was agreed to delete the definition.

§3.30 – 32 adopted.

§3.33 Mr Ries presented INF GR / PS / 135 that proposes to use the UNECE 43 approach as basis using a 5° line touching the dashboard. The lower windscreen reference line is half a diameter upwards of this line. Mr Doyle can not agree to it at this time because it is determined by the internal fittings of the vehicle and not by the external fittings. Mr Saul also needs to reflect on it. Additionally he asked if under the 1998 Agreement the gtr needs to stand alone on its own definition or can it reference to UNECE 43 or FMVSS or ... Mr van der Straaten believes this question was not addressed by AC3. However the UNECE Regulations are considered as direct candidates for gtr's and they are international regulations also under the United Nations. Mr Kinsky said there is no need to refer to UNECE43 we can just use the same approach. Mr Notsu says the 5° comes from driver vision so he also questions how this is related to pedestrian protection. Mr van der Straaten says the 5° line must fall within the windscreen. Mr Lorenz agrees with the concerns of Mr Doyle, Notsu and Saul as this proposal excludes a big area which is known to be pedestrian unfriendly. Mr Kinsky said the area is the stiffest structure in the front end and includes devices for defrost / demist and there is no chance to make these stiff parts compliant. Mr Ammerlaan understands this but if the 5° hits the dashboard it has nothing to do with the defrosting and the windscreen attachments. Mr Doyle agrees there needs to be structural rigidity but windscreen fitting can be changed and

solutions can be found. With the proposal on the table it will give a very big exemption zone which is not acceptable. Mr Saul said this is related to the relaxation zones. Should the exclusion zones be considered in the same spirit of the relaxation zones? What we need to know is how much of the front do we cover. Mr Ries said that windscreen testing is very new so there is less experience what can be done in design so this proposal is a good start. Mr van der Straaten said that it is also related to the bonnet rear reference line which already exempts in reality some part of the bonnet. Mr Doyle agreed that both have to be looked upon together. We already have a rear reference bonnet line. Would it be possible to start with the 5° line on the bonnet rear reference line? Mr Saul agreed this could be a good idea.

Mr Césari recalled the discussion on the relaxation zone. It is not possible to have a very short adult zone as it also includes the windscreen. Mr Ries said this would not be comparable with the Phase 2 of the Directive. Mr Doyle said it is not possible to compare the details. And anyway Phase 2 does not include the windscreen. Mr Ries said that this will drive the design in two different directions: 1/3 relief for bonnet area or 1/3 relief for bonnet / windscreen area.

Mr Kinsky said the proposal is not workable for certain vehicles like the FIAT Multipla as the proposal would mean the reference line would be in the middle of the stiff structure and not in the windscreen. Mr Césari said we can not only look at existing cars. Mr Kinsky said that the cars for 2010 are already in design especially the structure. Mr Mizuno said that never a date was specified for the gtr but everyone knows that 2010 is a good date as it is the date Japan has in mind and the date for Phase 2 of the EU. Mr Césari suggests that Mr Doyle makes a proposal for this definition.

§3.34 - 3.36 may need revision pending the decision on §3.33.

All figures are Ok except of Figure 13c which is put in square brackets.

§4 – 4.4 adopted.

§5 – 5.1 adopted.

§5.1.1 Mr Césari recalled the proposal presented by Mr Doyle in INF GR / PS / 127. Mr Saul asked where the justification can be found. Mr Césari said that this can be found in EEVC and IHRA. There is some data available but we have to bear in mind that we use a rigid impactor meaning that the injury parameters needs to be adapted to that because the rigid impactor does not have the same stiffness as the human bones. Mr Saul said that such an explanation is very important in the preamble. Mr Mizuno asked for background data to be made available by EEVC. Ms Fujita said this is important because throughout the discussions the requirements were changed so we need to explain why the values are changed throughout the documents. Mr Doyle asked if all PS documents will be part of US docket system. Ms Fujita said the documents are available on the web today and thus explanation is needed. We need to explain if more or less injuries are covered when different limits are proposed. Mr Césari said that the original 15° was determined at a time when the FE models were very simple and only the full cadaver tests were used. So based on some assumptions amongst others of ligament elongation the 15° was decided. With later developments and research the knowledge was build up and the bending angle was adapted accordingly. Mr Césari agreed this can be explained in the preamble. It was agreed to copy the EU proposal in the gtr text in square brackets. Mr Saul agreed as long as the preamble explains the reason properly. Mr Kinsky asked how to include the relaxation proposal from the EU: 264 mm relaxation zone to 250 g. Mr Doyle agreed that this should be included. Mr Kinsky said the justification can be found in INF GR / PS / 89. Mr Saul asked where this can be found in the document. Mr Kinsky said it is on page 202. Mr Saul asked if a study was done based on NCAP results and where the 264 mm comes from. We need some detail in the preamble. Ms Fujita asked why there is a problem. Mr Ries quoted from the document on page 106 amongst other mentioning the towing eyes. Mr Kinsky said the critical areas could also be the headlamp or the headlamp washers / wipers. Mr Ammerlaan asked how far one can go with splitting up the 264 mm. Is it possible to have 264 times 1 mm? Mr Ries explained 250 g was chosen because the manufacturer designs to a target 20% less which is 200 g and that is the limit of EU Phase 1. Mr Kinsky said the 264 mm is twice the impactor width and we need two widths because there are two towing eyes, two headlamp cleaning devices and so on. Ms Fujita said that in such a case it should not be allowed to split the area in more than two parts. Mr Kinsky said there is no use to define a 1 mm relaxation area as the test authority will test just next to this area and physically still test it. Mr Saul asked if there is NCAP data underlying these proposals. Mr Césari said that the feasibility study is a mix of research and expert opinions. As a result not everything is justified by a pure scientific approach hence all justification may not be available. Ms Fujita said that transparency is in this case a concern as it needs to be explained in the preamble. What means not feasible, is it for present vehicles or for future developments? Mr Césari said that NCAP experience was taken into account and it was investigated what is solvable in short and long term and what is not. Mr Doyle explained that the feasibility study served to find out what the difficulties are to comply with Phase 2. There was not the intention to have years of research but to get independent expert advise on what needed to be done. The study and proposals that came out of it are very reasonable and defensible. Mr Kinsky explained that the feasibility issues have been defined as documented in INF GR / PS / 91. It was agreed to add following text in square brackets but only for improving the text as the group agrees to have a relaxation area: “In addition the manufacturer may nominate bumper test widths up to 264 mm in total where the acceleration measured at the upper end of the tibia shall not exceed 250 g.”



§5.1.2 Mr Césari said this identical to the EU Phase 2 proposal. Mr Mizuno asked to have background and a text from Mr Césari for the preamble. Mr Césari agreed to do this. Mr Saul asked if the aim is to prevent femur fractures. Mr Doyle agreed this is the aim. Mr Van der Plas quoted from the preamble on page 10 which reflects the decisions taken before on the test tool and test procedures. Mr Mizuno confirmed that IHRA started to look at this. Mr Saul agrees that there will continue to be high bumpers also in the US as the compatibility agreement allows for these as well. The question remains how far the proposed test will help in reducing the injuries. Mr Césari says this can be described in the preamble based on existing data.

Mr Césari suggested deleting the brackets but that the preamble will explain in detail the justification of the leg injuries. This was agreed.

§5.2.1 – 5.2.2 Mr Ries explained OICA has a proposal in line with the EU proposal of Phase 2 with the HIC limits of 1000 and 1700. This includes also the 1/3 relaxation area. The wording for this is in square brackets to take care for the open issue to what the 1/3 area should apply. Mr Mizuno said that it seems that the majority supports the idea of applying 1/3 to the complete area. Mr Mizuno suggested to send a comment to the EU on this issue. Mr Doyle said that there is an open consultation ongoing and any comment can be given from this body. Mr Césari said OICA wants it to apply only to the bonnet but it could also apply to the complete test area including the windscreen. Mr Doyle said that both test areas are defined and the areas include the windscreen. Mr Notsu said that the 1/3 requirement came from feasibility for the bonnet. For the windscreen we may need another approach. Mr Saul agreed that the difficult area is the hood, not the windscreen so the application should be to the bonnet area. However, we will need to think about this further so we need square brackets. Also it should be made clear what the justification is for the 1/3 and the HIC 1700 value. Mr Ammerlaan asked if the relaxation areas be included as well in the gtr or should the gtr be more severe and leave it up to the countries to introduce the relaxation areas based on their own feasibility studies. Mr Ammerlaan does support the argument that the child should be protected so we have to avoid that the relief area falls completely in the child test zone. Mr Césari asked if relaxation issues should be included in the gtr. Mr Doyle said that in addition to the gtr a Contracting Party may require something else. There is a need for a degree of flexibility and the maximum flexibility needs to be included in the gtr. Mr van der Straaten said that additional requirements can be imposed nationally but the gtr should be applied in all countries that sign up to it. Implementation of the 1/3 can not be left up to national decisions otherwise there is no harmonisation. Mr Césari concluded that relaxation areas need to be included. Mr Mizuno said that the EU feasibility study was based on the bonnet and not on the windscreen. Mr Césari concluded that it was agreed to split the head area in bonnet and windscreen area. The windscreen area should meet  $HIC < 1000$  and the bonnet area should get a relaxation area. Mr Doyle said this is reflected in the OICA proposal. Mr Mizuno said that all square brackets around the values can be deleted. Mr Saul asked to keep them as long no justification is available. Mr Kinsky said the 1/3 value for example comes from the JRC study in 1999 or 2000. Mr Saul said this may be reviewed by a body in the EU but as long this is not presented in this forum it can not be accepted. Mr Césari concluded that the brackets around 1700 and 1/3 will remain.

§5.2.3 Mr Césari said he would have difficulties in keeping these brackets as HIC 1000 is very clear and not related to any problems. Mr Showler said this is exactly the problem: everyone assumed the centre of the windscreen is not a problem and suddenly we find it is a problem and we don't understand why. The brackets will remain for the time being as requested by OICA and explained in INF GR / PS / 134.

§6 – 6.1 adopted.

§6.1.1 The brackets are deleted around the temperature. Mr Doyle said that the Directive specifies 35 +/- 15 per cent. It was agreed to include 20 to 50 in the gtr text. Mr Saul agrees as long the preamble shows data that supports this. Mr van der Straaten questioned if such details need to be justified in the preamble. Mr Saul said that the standard is 10 to 70 and now we are differentiating from this so we need justification. Mr van der Straaten said that this is a new gtr so we do not have to justify changes compared to other rules. Additionally there is no time to waste on these details as time is running fast and a document is needed before September 16 in order to have an official document. This was supported by Mr Mizuno. Mr Kumita added that if there are two proposals and one of these is chosen then indeed we have to explain, however if there is only one proposal and the group agrees upon it, there is no reason to justify. Ms Fujita said that even in those cases it needs to be explained. Mr van der Straaten said that even in gtr 1 this was not done. Mr Saul said that countries who look at the gtr in the future should also know why the gtr requirements are what they are. Mr Notsu said that if 20 to 50 value is accepted in Japan it will mean that test houses will need to buy new equipment. He supports to have it explained in the preamble why the relative humidity value was chosen. Mr Lee supported this comment. Mr van der Straaten suggested to say "where all equipment is stored". This was agreed. Mr Konosu said the new values come from Japanese head certification testing which is completely different from the actual pedestrian test. Mr Césari said it comes from the leg test and not only from the certification test. Mr Ammerlaan clarified that the directive states 35 +/- 10% for the certification test. Also we need to specify a time in §6.1.1.1. Mr Césari concluded that the temperature is important for the complete test setup and the relative humidity is important for the test tools. Mr Doyle suggested to keep the current text as it is but to specify at §6.3 the new relative humidity is included. This was agreed.

§6.1.1.1 Mr Saul repeated the remark of Mr Ammerlaan what is sufficient time. Mr Doyle said that this § could be deleted and reinserted for the test tool.

§6.1.1.2 the number of the paragraph is deleted but the text is kept.

§6.1.2 – 6.2.1.1 adopted.

§6.2.1.2 – 6.2.1.2.1 Ms Fujita asked if this wording is specific enough. Mr Césari said it is for EU but maybe for self certification it is a problem. Ms Fujita agreed on the option to use a vehicle and or a cut-body.

§6.2.2 Ms Fujita asked if this was intended for BAS as well. Mr Césari said it is not, only for systems like pop-up bonnet, ... Mr Doyle suggested to specify all systems that are activated when impacted by the vehicle. Mr Fredriksson said there is a test method proposal from OICA/CLEPA and he asked if this should be referred to. Mr Kinsky presented a certification standard for deployable systems in INF GR / PS / 140. Mr Saul asked if this needs to be in the gtr or can also be left to the jurisdictions. The US would need more detail. Mr Doyle suggests it can be put as an annex to the gtr to give the basic guidelines which can be used as basis by the Contracting Parties who can then specify more where needed. Mr Doyle said that for example reliability concerns need to be imposed as well. Mr Saul said that it is difficult to set up a detailed procedure when the systems themselves are not developed or available yet. Mr Doyle suggested referring to a separate annex which would include the guideline. Mr Saul suggested to rephrase the paragraph to refer to an annex and the annex needs to be drawn up. In addition this has to be explained in the preamble.

§6.2.3 Ms Fujita said the wording is problematic for self certification testing. Mr van der Straaten also had some concerns because a gtr should be neutral to the certification process used. OICA suggests to delete the example and to rephrase the text to read “or position designated by the manufacturer to be the most appropriate for the use on public roads.” This is in line with what is done in gtr 1 for auxiliary latches. Mr Saul agrees to delete the example but for a popup light what is the most appropriate use: up or down? So actually it should be the worst case which is tested so he suggests to do it in the up position. Mr van der Straaten said this is not meaningful for windscreen cleaners which pop out only when the headlamps are being cleaned. Mr Notsu clarified that no such clause is existing in the Japanese regulation. The authority decides what the worst case is. Mr Notsu suggested using in all positions. It was recognised this will be difficult for some systems. Mr Ammerlaan said that it seems that in all regions the authorities will decide in what position to test. Mr van der Straaten said this works perfectly in the 58 Agreement but it does not work in the 98 Agreement as there is no mutual recognition. In addition a gtr implementation is a sovereign matter so there is no control on what the differences would be in interpretations. Mr Saul agreed with Mr Ammerlaan to explain in the preamble that a popup light is important but a headlamp cleaner is not important to take into account. Mr Césari concluded that the preamble will explain this and the wording suggested by Mr Showler was: “for vehicle components which could change shape or position, other than active devices to protect pedestrians, where such devices have more than one stable position the vehicle shall comply with all requirements for all of these positions. Where such devices have only one stable position, only the stable position shall be considered.” Ms Fujita asked what a stable position is. It was suggested to say “fixed position”. This was accepted.

§6.2.4 – 6.3.1 adopted.

§6.3.1.1 The brackets are removed.

§6.3.1.1.1 Mr Saul questioned if it is not better to define the Confor foam instead of quoting it. He asked if another foam is used but passes that certification test shouldn't this be acceptable as well? Mr Césari said that the material is velocity sensitive and one certification test can not show this. Mr Lorenz said that there is at least one other manufacturer using the same material so the trade name should not be used. He suggested to use “Confor type”. Mr Doyle clarified that there are so many problems associated with the foam that it is easier to specify the foam itself than to specify it in a general form. Mr Césari suggested to add the words “equivalent material”. This was agreed.

§6.3.1.1.2 – 6.3.1.1.5 adopted.

§6.3.1.1.6 All brackets can be deleted.

§6.3.1.1.7 “or equivalent” was added in accordance to §6.3.1.1.1.

§6.3.1.1.8 – 6.3.1.1.9.1 adopted.

§6.3.1.1.9.2 Mr Saul questioned if this text is necessary in the gtr. Mr Doyle said it should be included as there is a need for a control that the device meets the certification requirements and how long in terms of useage the device can be used. Mr van der Straaten clarified that after 20 impacts the tool needs to be recertified because beyond that one is not certain if it is still within the certification specifications. Mr Césari agreed with this explanation. Mr van der Straaten clarified that the 20 tests are a maximum so if the US wants the US could certify after every test. Mr Konosu says the § refers to the CAC. However in CAC the bending angle is defined as 50° but the max bending angle of the impactor is in fact 30° so the requirement is meaningless. So the text should not refer to CAC but to the maximum achievable angle. The same is true for the shearing. Mr Fredriksson said the intention is to check if the maximum output is achieved so that should be mentioned. It is proposed to modify the sentence to add: “or has reached the mechanical limits of the leg impactor deformation capability.”

§6.3.1.2 adopted.

§6.3.1.2.1 Mr Ries presented INF GR / PS / 136 which calculates the mass for the upper leg impactor. Mr Doyle says the formula used is of no relevance for this test, it is only meaningful in the bonnet leading edge test. So it was agreed to delete the text in the brackets.

§6.3.1.2.2 adopted

§6.3.1.2.3 Mr Ries said there is a need for a tolerance on the 650 Nm otherwise one could weld it and it needs to have some bending capabilities. It was agreed to write “set to 675 +/- 25 Nm”.

§6.3.1.2.4– 6.3.1.2.5 adopted.

§6.3.1.2.6 add “or equivalent” as in §6.3.1.1.1

§6.3.1.2.7 – 6.3.2 adopted.

§6.3.2.1 Mr Konosu said that IHRA decided on a 2 mm tolerance, and even in this case there is still a 3% variability. This 2 mm is feasible. Mr Kinsky asked if this would exclude existing test devices as this would be an issue for everyone who is already testing. Mr Ries said this comes from the ACEA specification. Mr Doyle said this is also the value in the Directive. Mr Yamaguchi said that 2 mm is better to use. Mr Mizuno said that it should be checked what the tolerance is of the existing headforms. Mr Kinsky said 2 mm is probably acceptable as headforms have to be bought regularly anyway. This was agreed. Mr Ammerlaan said the values in the Directive for the kgm<sup>2</sup> are much tighter than what is specified here. It was agreed to copy the EU tolerance as stated in EU Chapter 5 §4.3. Mr Ries explained that in IHRA it was shown that the influence of the tolerance is less than 1 or 2% so a broader tolerance was used and this was accepted from the EU side as their smaller tolerance falls into the broader IHRA tolerance. Mr Doyle explained that the values were decided in a meeting with EEVC and JAMA and ACEA representatives. And the figures in the Directive were agreeable for all. Mr Konosu says the narrower tolerance is also acceptable but there is no need to have narrow requirements. Mr Kinsky said that it was addressed in INF GR / PS / 74. Mr Césari suggested to use the EU values in brackets for confirmation by Japan. This was agreed. Mr Fredriksson said that the text is confusing as it could be misunderstood that the 14 mm skin is not included in the 165 mm. Mr Doyle said the drawing is clear.

§6.3.2.1.1 It was agreed to have a 10 mm tolerance instead of 30 mm. The brackets around 20 mm can be deleted.

§6.3.2.1.2 adopted.

§6.3.2.2 The brackets around the weight can be deleted. Mr Ammerlaan says the tolerance on the inertia is six times bigger than the one in the Directive even though the EU headform is 4,8 kg. So the tolerance for the 4,5 kg headform needs to be tighter. Mr Doyle does not know if the tolerance is affected much when changing the weight from 4,8 to 4,5 kg. Mr Césari and Konosu will check what the tolerance should be. The 5 mm can be replaced to 2 mm and the brackets deleted.

§6.3.2.2.1 10 mm and remove the brackets in line with §6.3.2.1.1.

§6.3.2.2.2 – 6.3.2.4 adopted.

§7 – 7.1.1 adopted.

Add to §7.1 the specifications for the temperature (20 +/- 4°C) and relative humidity (20-50%) and the time it should remain and the maximum time for testing of [1 hour]. Mr Kinsky said that for the legform the foam can be used only once and this needs to be specified as well. This can be done either by specifying a minimum time between tests in order to give it time to recover or to specify that the foam should always be exchanged for every test. Mr Lorenz agreed the foam should be changed for every test. Mr Mizuno asked if this should be specified in the text or not. Mr Lorenz said that it is important that the foam should only be used once. Mr Saul said there are three issues: the soaking conditions, the time between soaking and test and the time after the test. Are there test house guidelines that can be used? Is it possible to reference to test guidelines as a separate annex to the gr. If there are test house guidelines these could be attached to the gr. Mr Lorenz agreed to provide a text for the lower and upper impactor handling procedures.

§7.1.1.1.1 is deleted as it is part of the exemption area discussed before in §5.1.1.

§7.1.1.2 Mr Ries said it is very difficult to keep and measure the 1° in free flights. It is agreed to remove the brackets.

§7.1.1.3 Brackets are removed.

§7.1.1.3.1 adopted.

§7.1.1.3.2 Mr Doyle suggested bringing this down to 2°. Mr Kinsky said it is impossible to check this on a free flight legform. Mr Konosu said that the TRL legform can only bend in one direction. There is need for some more analysis before we can decide. Mr Ries said this is not the issue; the problem is in physically conducting the test at such small tolerances. Mr Saul said the influence is just a cos(2°) versus a cos(5°). Does it really matter that much? Mr Ammerlaan said that the tightening of this tolerance is not part of the feasibility study from TRL so we should not change it. It was agreed to delete the brackets and leave the value as it is.

§7.1.1.3.3 – 7.1.1.3.4 adopted.

§7.1.1.4 was corrected from 1,1 to 11,1 m/s and the brackets deleted for the tolerance.

§7.1.2 adopted.

§7.1.2.1 Mr Doyle clarified that in the proposal for Phase 2 there is no choice anymore. Above 500 mm it is the upper legform test that must be used. Mr Kinsky said that the 500 mm was related to the legform and the limit should be related to vehicles instead. So OICA suggests using the approach angle of 25° and a free space under the front axle of 180 mm. The same comments will be made to the Commission for the Phase 2. Also the test should be an alternative because some vehicles may be designed to meet the lower legform so it should be possible to use it. This was explained in INF GR / PS / 137. Mr Mizuno asked why OICA can not accept the 500 mm. Mr Kinsky said that it excludes nearly all vehicles. So far only one car can benefit from it. Also it is related to the impactor itself

and in the future the impactor may change so it is better to refer to vehicle parameters instead of impactor parameters. Mr Saul said that their bumper regulation has a requirement close to 500 mm. He asked if the Part 581 zone definition can be used to define if a bumper is a high bumper or not. Mr Kinsky said the idea was to use what we already have in the EU. Even the EEVC referred to the off-road definition. Mr Cor said Part 581 has a different vehicle application so it may not apply to the vehicles under consideration here. Mr Saul said it may be a more simplistic approach than the current proposals. Mr Doyle said he can not accept the proposal at this point. The EU Phase 2 proposal comes from the negotiated agreement. The 500 mm was necessary due to the construction of the legform. The definition proposed is an old one dating from the time that there was a clear difference between off-road and non off-road. Today this is much less the case as there is a big crossover between types. So the definition proposed is not sufficient. Mr van der Straaten clarified that the high bumper vehicles are not exempted. The only difference is that high bumper vehicles test with the upper legform. The issue is only to define which impactor to be used and what test to be done. Mr Doyle said that is also his understanding however it should be shown what vehicles fall under this definition. OICA agreed to do this. Mr Kinsky asked what the reason is for the EC to set this limit: is the upper leg test less severe? According to OICA's understanding the protective effect from both tests is the same. Mr Doyle said the lower impactor is mainly looking at knee injuries and with high bumpers this is not the case as they cause femur injuries. So the 500 mm should be related to the impactor (knee height) and not to the car. Mr Yamaguchi said it is an important issue that needs to be looked at carefully. Mr Mizuno concluded that the text will remain as it is with brackets.

§7.1.2.1.1 deleted as it is part of the exemption area discussed before in §5.1.1.

§7.1.2.2 brackets were deleted.

§7.1.2.2.1 adopted

§7.1.2.3 brackets were deleted.

§7.2 – 7.2.3 adopted

§7.2.4 Mr Ries proposed to include the explanation of the different 1/3 and 2/3 areas. The proposal comes from the current EU Directive. Mr Doyle said the proposal is not in line with 1/3 idea to be split for the adult and child area as proposed by the EC but agrees that somewhere in the text it needs to be explained how to work with the relaxation zones. Also it should be looked at where to best put this text. So Mr Doyle reserves his opinion on this issue. Ms Fujita said it looks like it is possible to have discreet lines on the hood. Will the 1/3 area include areas that were already excluded elsewhere in the gtr? Mr Doyle said the proposal comes from the Directive. The basis are the reference lines and an allowance of 82,5 mm. This makes up the test zone. Within that area the 1/3 area applies and several areas can make up the total 1/3. Sufficient x/y coordinates need to be supplied of course. Ms Fujita asked why not the complete bonnet is looked at. Mr Kinsky said that if the reference lines would be used as basis for the 1/3 calculation it would be in the benefit of the manufacturer as the area would become bigger but within 82,5 mm of these reference lines no test can be done anyway so they would be declared as part of the 2/3 HIC<1000 area. Mr Saul repeated the concerns that exactly those areas are problematic areas and these should be part of the HIC<1700 area. Ms Fujita suggested not to have excluded areas but include these in the relaxation areas. Mr Doyle said that some areas are recognised as unfeasible for testing others are feasible for testing but need some relaxation in some manner. Mr Saul agreed that some areas are unfeasible and also it may not be possible to do a realistic test in the area. Mr Kamm clarified that every impact test has 2 points: an impact and a target point. The actual impact point is actually closer to the reference line when the target point is done on the line 82,5 mm inside the reference line if for example the car has a curved bonnet. Mr Lorenz clarified the issue by showing some pictures showing why certain areas can not be tested and how the reference lines are marked on a car. Mr Mizuno concluded the OICA proposal will be included with square brackets.

§7.3 – 7.3.1 adopted.

§7.3.2 – 7.3.3.2 Mr Ries explained OICA proposes to revise this in line with the current EU Directive taking into account the 1/3 issue. Mr Lorenz said that for the time between the tests there is an EEVC recommendation. He will provide details. Mr Konosu said they are not so concerned about this as the head tolerance is rather big. Mr Lorenz said that the issue has been raised by industry within EURO-NCAP. Mr Kinsky said a best practice document was developed by TNO which specifies 3 hours or turn the impactor 120°. Mr Doyle said this should be treated in the same way as the legform handling procedures so it should become part of the annex of the gtr dealing with impactor handling in general. Mr Lorenz will provide details but he needs to check several suppliers. Mr Fredriksson suggested also to specify that several impactors can be used. Mr Mizuno said it will be necessary to specify that the time applies only if the same impactor is used again. On the OICA proposal Mr Saul asked if we need to specify “at positions judged to be the most likely to cause injury” as this will be difficult to enforce. Mr Doyle agreed that this text is not needed. This was agreed. Mr Saul asked if it is necessary to specify a minimum number of tests. Mr Doyle said it is necessary to assure a minimum representative area is tested. Mr Kinsky suggested that the specific type approval issues could be covered in another document when the EU implements the gtr. Mr Saul said that specifying 18 tests is too much. Mr Doyle said the second part of §7.3.2 the number of tests should be broken down depending on the division on the areas (1/3 – 2/3 or any other division). Mr Saul said it looks like industry is increasing the burden upon itself. Ms Fujita asked why the number of tests is specified. It should be the jurisdictions who decide how to test. Mr Saul asked what happens if there is a small bonnet? Mr Doyle said that is explained in

7.3.3.1. Mr Saul said the procedure could be described for the US in the test specification text. Can the same be done in other jurisdictions? Mr Kumita said that an ECE Regulation will be established based on the gtr and in ECE this should be clearly mentioned. Maybe we can include this in the ECE regulation when it is being established. Mr Doyle asked if the gtr will specify the tests and the Contracting Party would specify if it feels necessary how many tests need to be required. Mr van der Straaten said it would make sense to leave this open. Mr Doyle said this should also apply to the other impactor tests. Mr Kinsky said this needs to be explained in the preamble and that there should not be an unlimited number of tests. The §§ 7.1.1.1, 7.1.2.1 and 7.3.2 will be rephrased in accordance to this decision.

Ms Fujita asked if the 82,5 mm also applies to the border of the relaxation zone or if one tests 1 mm from this border is this allowed? Mr Ries said this is the case: 1 mm from the border this will be  $HIC < 1000$ . In fact a big part of the relaxation zone is also meeting the  $HIC < 1000$ . Ms Fujita said this intention should be mentioned in the preamble. Mr Doyle did not agree as this would mean explaining in the preamble something which is not in the text. We should not explain why there is no 82,5 mm boundary around the relaxation zone if we don't use this in the text. Mr van der Straaten said the situation is clear: a test zone is defined and all points have to comply either with  $HIC 1000$  or  $1700$ . The relaxation area only shows which points comply with  $1700$  the rest will have to meet  $1000$ . Mr Lorenz said one idea could be not to have the 165 mm spacing for two points that are in the different zones A and B. Mr Kinsky said that manufacturers do not know up front which test points will be tested so the relaxation zones will be set up so to be sure the points will comply. Mr Doyle said that if we leave it open to the Contracting Parties how many tests will be done we could also leave it open where these impact points should be tested and the spacing of 165 mm between these impact points. Mr Saul said the deletion of the 165 mm apart could also help in the 1/3 relaxation area discussion in the US. This approach was agreed upon. Mr Doyle said that for §7.3.3.1 the first sentence may still be necessary but maybe in another §. The second sentence should be deleted. This was agreed. §7.3.4 the brackets were deleted.

§7.3.5 It was agreed to amend the speed to 35 km/h and the brackets were taken away. The second part of the sentence starting with "which simulates ..." was deleted.

§7.3.6 – 7.3.6.1 adopted.

§7.3.6.2 – 7.3.6.4 Mr Mizuno said this will be rewritten based on the decisions taken earlier. The tolerance was agreed upon at  $2^\circ$ . Mr Konosu said the EU angles are not related to the windscreen angle. Mr Doyle said the angle represents the angle at which the head is going to hit irrespective of the structure: windshield or bonnet. We decided to have the angles independent of the vehicle shape. Mr Ries said that OICA has no experience with windscreen testing. Mr Doyle said the meeting already decided on the angles before so we should not reopen it again. Mr Konosu said the Japanese government accepted the EU angles only for the bonnet. More justification is necessary for the windscreen testing. Mr Doyle said this discussion was already over: either we stick to what we have decided upon or we have to start all over again. Mr Kinsky said OICA only needs to check with its members but could agree to it for the time being. Mr van der Straaten suggested to keep the agreement for the bonnet as it was decided before and to write that in the gtr text and only specify that the angles need to be confirmed for next meeting for the windscreen area. The justification for the windscreen is the same as for the bonnet as explained by Mr Doyle before. Mr Kinsky said the EU Phase 1 specifies  $35^\circ$  for the windscreen tests and this is the only test OICA has experience with. Any other test needs internal OICA confirmation. Mr Doyle said that Phase 1 windscreen testing was to get information only. If the same test is done for pedestrian protection, one has to take into account the pedestrian trajectory. This group decided before to go away from the vehicle shape but to look at the pedestrian trajectory irrespective of the shape. This means irrespective of the bonnet or windscreen. The rephrasing of §7.3.6.1 was agreed upon with square brackets.

§7.3.6.2 – 7.3.6.3.2 is deleted as a result of the decisions in 7.3.6.1.

§7.3.6.4 This was deleted as there is no need for this requirement.

§7.4 complete: Mr Mizuno said the text will be modified according to the discussions for the child test procedure (§7.3).

§8 Was adopted without discussion with the text in the brackets in §8.3.3.3 will be deleted. Mr Doyle said that it should be checked with the EEVC working group if the procedure for the 4,5 kg headform is ok. Mr Saul supported this as many changes were made during this meeting on the tolerances and he suggested IHRA should look at it as well. Mr Mizuno agreed.

## 9. Next steps

Mr Mizuno requested all governments to inform the group on any economic effectiveness study. Korea provided the group with document INF GR / PS / 138.

Mr Mizuno added that US requested detailed accident data. He said that the IHRA data will be circulated and requested NHTSA to draft some wording to be used as justification in the preamble.

Mr Van der Plas went through the list of actions (INF GR / PS / 139). Mr Saul said that the justification can be short but references should be open to the public. He agreed that documents on the UNECE website are acceptable as reference.

10. Next meeting

Mr Mizuno said that an official document fully translated has to be ready September 16. For an official document in English only the deadline is early November. Mr Doyle said if there is extra work to finish the document, another 6 months is not going to pose problems for the gtr. Mr Doyle advises to go for quality instead of trying to meet a deadline. Mr Mizuno said the goal is to harmonise with EC and the EC timeline. Also other jurisdictions will need time for implementation. Mr Doyle said a date can be fixed, when this date is coming closer and it becomes clear that the necessary data is not available yet, the meeting can be postponed.

Next meeting: October 5-6 at Washington DC.

11. A.O.B.

Mr Mizuno closed the meeting thanking all attendees for their constructive work and ACEA for their hospitality.

List of new documents:

INF GR/PS/115/Rev 1	Draft meeting minutes of the 7th meeting Rev 1
INF GR/PS/127	Presentation on EU Phase 2
INF GR/PS/128	The need for harmonised legislation on pedestrian protection
INF GR/PS/129	Comparison between the J standard and the EU Phase 2 proposal for head testing
INF GR/PS/130	List of references for EU / EEVC on head impact angles
INF GR/PS/131	Analysis of pedestrian accident situation and portion addressed by this gtr
INF GR/PS/132	gtr testing and what it means for the US situation
INF GR/PS/133	Proposal to solve the undamped accelerometer problem
INF GR/PS/134	Concerns on §7.4 with testing on the centre of the windscreen
INF GR/PS/135	OICA proposal for §3.33
INF GR/PS/136	OICA proposal for a mass for the upper leg impactor
INF GR/PS/137	OICA proposal on definition of high bumper vehicles
INF GR/PS/138	Economic effectiveness study from Korea
INF GR/PS/139	Action list of 8th meeting
INF GR/PS/140	Update of PS67 on certification standard for deployable systems
INF GR/PS/141	Update of PS67 on certification standard for deployable systems
INF GR/PS/142	Relative humidity of Korea
INF GR/PS/143	Draft gtr based on INF GR / PS / 121 as amended during the 8th meeting
INF GR/PS/144	Draft meeting minutes of the 8th meeting