

**Draft minutes of the 7th Session
GRSG informal group on
awareness of Vulnerable Road Users proximity
in low speed manoeuvres (VRU-Proxi)**

Dates: 25-27 September 2018
Time: Start at 10:00 am on the first day and finish at 4:00 pm on the last day
Venue: Federal Highway Research Institute (BASt)
Brüderstraße 53
51427 Bergisch Gladbach
Germany

Chairs: Mr. Matsui (Japan) and Mr. Broertjes (EC)
Secretary: Mr. Broeders (OICA)

1. Introduction

Participants were welcomed by the representative of BASt, Mr. Matsui (Chair) from Japan and Mr. Broertjes (Co-chair) from DG-Grow (European Commission) thanked BASt for their flexibility to provide venue for the meeting upon such short notice, as this meeting was originally planned to take place in Stuttgart. The chairs expressed regret that neither of the local vehicle manufacturers or suppliers had been capable of hosting the session in Stuttgart as discussed at previous sessions.

In the introduction the Co-chair addressed the following:

- Next 8th VRU-Proxi meeting is planned at 5-7 February 2019 in Yokohama and the focus there will mainly be on reversing detection aiming to provide a working document for GRSG early 2019. After the 8th meeting this document shall be translated to informal document for GRSG 116th session.
- The IWG shall aim for achieving the deliverables according the time plan as defined in the Terms of Reference. Delay of input to GRSG might result in delayed finalization of the regulations but will not result in postponing the mandatory introductions. Therefore the IWG shall put more effort and provide balanced input to the meetings in order to proceed towards these deliverables.
- The EU General Safety Regulation (GSR) proposal is aiming to introduce VRU-detection front, side and rear at the beginning of 2022 for new types but EP and politicians from CP's are pushing for earlier introduction.

2. Adoption of the agenda

Document: VRU-Proxi-07-01 (Chair)

Some changes to the order of the agenda subjects were proposed and agreed.

3. Adoption of the report of the 6th session (AstaZero, Sweden)

Documents: VRU-Proxi-06-13 (Chair)

The report of the 6th session was adopted by the group.

4. Terms of Reference

Document: VRU-Proxi-03-06 (Secretary)

As more new members are attending the VRU-Proxi meetings the Co-chair explained the dates in Terms of Reference (ToR) for the work of the GRSG informal working group VRU-Proxi and showed the time lines:

- Vehicle moving forward and turning (BSIS) → October 2018 to GRSG
- Reversing motion → April 2019 to GRSG
- Vehicle driving straight or taking off from standstill → April 2020 to GRSG
(*Currently not in line with GSR (2022), similar regulation to be adopted at EU level might even be necessary earlier*)
- Direct vision: April 2021 to GRSG

Conclusion:

The IWG reviewed the ToR and agreed that no changes are needed.

5. Accidentology

Document: VRU-Proxi-06-06 (OICA)

There was no update from OICA. Meanwhile the EC has commissioned TRL for accident analysis that will not be based on UK data only. TRL may send request for data to members of the group but also other parties may be asked to deliver data.

Conclusion:

EC will ask TRL to contact OICA and CLEPA for providing accident data.

6. Forward motion Vehicle turning - Blind Spot Information System

Document: VRU-Proxi-06-11 (Germany)
VRU-Proxi-06-12 (Germany)
VRU-Proxi-07-03 (Germany)

After the 6th VRU-Proxi meeting DE has submitted the final proposal for BSIS as working document to the 115th session of GRSG (see: [ECE/TRANS/WP.29/GRSG/2018/24](https://www.ece.org/trans/wp29/grsg/2018/24)).

The IWG discussed the working document:

General:

- Some improvements on wording and textual changes were agreed and the document will be modified accordingly by DE.

Scope of BSIS:

- It was questioned if M2, M3, N2 ≤ 8t and N3G categories are also included. EC answered that N3G shall be included and M2, M3 and N2 ≤ 8t shall be decided later in GSRG. Inclusion of M2 and M3 shall be argued based on accident data. OICA stated to submit an informal document on the scope to the 115th GRSG session.

Definition of lighting conditions above [1000] lux:

- Concerns were raised on the minimal lighting requirement. German accident data does not support system availability at dark situations but the lighting situation at 1000 lux seems to be on the level of a cloudy day so not really dark.
- Some members expressed their opinion that system should work independently of the lighting situation and others explained that this will exclude some (vision based) technologies. Industry stated that they can support lower light conditions.
- EC expressed that if lighting conditions are implemented in the regulation the system performance beyond the defined boundaries shall be as best as possible and not switched off. The manufacturer shall demonstrate this, to the satisfaction of the Technical Service and Type Approval Authority.
- As no consensus (diverging conclusions) was achieved within the group on the lighting condition the IWG agreed to move this decision forward to GRSG.

Location of information signal:

- Horizontal angle of more than 30° position seems not to be feasible in right-hand driving vehicles in right-hand traffic (like road sweepers) where the detection will be on the right hand side. In vehicles with central driver position and vehicles with small sized cabs the horizontal angle of 30° seems to be feasible by positioning on the A-pillar or outside the (small) cab. The IWG agreed to add an extenuation for this requirement in case the driver's seating position is located on the near side, in that case the value of 30° may be reduced.

Detection zone at front wheel:

- CLEPA expressed concerns on the closest detection distance of 0.25m near the front wheel as the front wheel will move out of the vehicle boundaries and might be detected or block the sensor view in case of turning. DE responded that this would not be an issue as the vehicle is driving straight in the test cases; however systems in the market shall be able to cope with this issue. IWG agreed that related to this subject no changes are needed in the document.

Dummy size (5.3.2):

- Child dummy is now also defined in the ISO but standard is in [WD] status. IWG agreed to not modify the proposed Regulation. For time being this link to the ISO shall be maintained, later this can possibly be replaced by definition of child dummy or implementation of the full specification into regulation.

Ambient conditions (6.2.2):

- Ambient operating temperature range has been discussed. The IWG decided to not change the range and keep as minimum operating range 0 to 45 °C.

Test cases:

- According market surveillance procedures the type approval authorities are allowed to test the system with other vehicle speeds, cyclist speeds and lateral distances than specified in table, however it is not clear how to determine the FPI and LPI distances for other speeds and distances. Therefore it was agreed to add an annex with description of the calculation method to determine the requirements based on OICA input.

Conclusions:

DE will submit a supplemental document (informal document) to working document GRSG-115-24 to the 115th session of GRSG with following subjects for discussion:

- Scope
- Lighting condition
- Addition of annex (calculation method of performance requirements)

OICA will submit an informal document on the scope of BSIS to the 115th session of GRSG.

7. Status and developments of detection and vision technologies

There was no update or new input from CLEPA. The Co-chair indicated that this information is needed especially to detect human beings also in relation to reversing detection. Former studies showed that acoustic warnings for reverse detection are being ignored as the current systems on the market do not distinguish between people and objects. If these kind of detection systems are not available a camera monitor system might be the only solution.

Conclusion:

CLEPA is asked to provide an update of sensor capabilities in relation to detection around the vehicle and in particular in distinguishing between humans and non-humans.

8. Direct Vision

Document: VRU-Proxi-07-02 (TFL-LDS)

Presentation Transport for London (TFL)

TFL presented an update of the implementation of the Direct Vision Standard (DVS) for heavy trucks (>12t) in London. The DVS will go “live” in October 2020 with the enforcement of 1 star and as from 2024 with the enforcement of 3 stars. The permit length for the 3 stars is 10 years after 2024. For trucks that do not meet the respective star rating, as an alternative the ‘safe system’ provisions can be applied instead. The safe system alternatives include detection systems, turning indicator warning sound (exterior), side

guards, additional mirrors, etc. still to be confirmed.

Loughborough Design School (LDS)

LDS presented a review of the work performed so far:

- DVS progress since last VRU-Proxi meeting.
- Definition of a physical test by using manikins around the truck and cameras on a rig installed in the cab for on the spot visibility checks
- Correlation between average VRU distance and DVS score not always perfect. Therefore the method will rather be a procedure to check the score in the graph “DVS scores versus average VRU distance” than being a replacement of the DVS CAD assessment (star rating).
- First proposal for differentiation between urban trucks versus long haul and construction trucks based on cab floor height above ground plane (1500 mm was proposed for differentiation).

Discussion:

- EC proposed to maintain the vehicle pass/fail criteria of 1 star for all vehicles as discussed in the 6th VRU-Proxi meeting. This essentially eliminates the existence of blind zones (direct and indirect view) in which small persons could be completely hidden.
- OICA: would it be possible to rate the trucks according the DVS approach and put labels on the trucks so it is visible if they are permitted to certain areas or not.
EC: could be possible but vehicle labelling is not an objective of the IWG.
- T&E asked what would be next step. The Co-chair indicates that the IWG has to decide how to proceed and where to aim for. The Industry responded that requirements need to be clear as soon as possible. The Co-chair responded that according to ToR detection at reversing and forward motion will have a higher priority.
- The Co-chair asked CP’s to react on the proposal from LDS and to all members if a differentiated approach is preferred rather than setting up a general requirement for all trucks and, if so, how this should be realized. It was noted that the GSR also requires a detection system but for CP’s outside EU this might not be a requirement. A quick opinion check around the table was made:
 - FR: differentiation will make sense but might be difficult for type approval: different performance levels within 1 type approval for different floor heights.
 - JAMA: cab with floor heights of 1500 mm and higher will also enter urban areas
 - T&E: supporting differentiated approach with 1 star requirement for long haul trucks and maybe 3 stars for urban trucks. The so-called ‘VECTO classification’, which is an EU specific methodology for determining emissions of truck configurations, might be applied here as well. T&E will present 3 possible ways for classification in next meeting.
 - OICA: focus shall be on holistic approach including active safety systems, for detecting obstacles around the vehicle. Detection systems can be implemented in existing cab designs. Direct vision can only be taken into

account for new cab designs. Furthermore cab design is not only determined by direct vision but is based on a balance between different properties like also crash safety. In cases where the driver might be stressed or distracted, active safety systems will be more effective and the regulation should be open for the contribution of active safety. EC: active safety would not be a full alternative; there will be at least a direct vision requirement for all trucks.

- TFL: as from 2024 trucks with 0 stars will be permitted to London if these trucks have active safety systems. However these warnings can be ignored or annoying and the systems can fail or can give false warnings. The final requirements for these systems are currently not clear and will be subject of discussion.
 - LDS: driver reaction time shorter with direct vision compared to indirect vision and warnings based on active safety systems. EC might support a dual system first getting the attention/attraction of the driver and subsequently he can see directly what is going on.
- JAMA expresses concerns that the lower door window is not used for real world test as the visibility is 10-15% better with a lower door window. LDS confirmed that the head and shoulders need to be visible for the VRU analysis and that this test is only to check the score in the graph “DVS scores versus average VRU distance”.
 - EC emphasized to aim for generic requirements (e.g. 1 star) for all trucks and to not prefer differentiation within one vehicle category (or cab type).

Conclusions:

- The Co-chair asked TFL/LDS to continue thinking about the process of real world test. **LDS** will work on prototyping of the test rigs for the real life tests.
- The members of the group were requested to respond to the proposals
 - Common requirement for all trucks
 - Differentiated requirements for urban versus long haul /construction trucks depending on seating height of the driver
 - **T&E** will present 3 possible ways for classification in next meeting.
- Discussion to be continued in 9th meeting in March in Brussels.

9. Evaluation of Pedestrian and Cyclist Warning Systems for Trucks

Document: VRU-Proxi-06-07 (Canada)
VRU-Proxi-06-10 (Mobileye)

No updates discussed in this session due to absence of CA and Mobileye.

10. Reversing motion

Documents: VRU-Proxi-07-04 (Japan)
VRU-Proxi-07-05 (Japan)

Japan showed document VRU-Proxi-07-04 which contains a correction of document VRU-Proxi-06-03 (modification on slide 4).

Document VRU-Proxi-07-05 presented by Japan:

- Proposal for reverse detection as amendment of R46
- Multi-modal approach: regulation for “reversing safety” to be achieved with direct vision, mirrors, CMS or detection system or a combination of these devices.
- In case of CMS and mirrors it is accepted that only a part of the cones is visible whichever part this is.
- Not all the poles shall be visible at the same time, may be sequential (to be added to the document).

Feedback from the IWG on proposal from Japan:

- Proposal is currently not technology neutral and the detection system as proposed will not inform the driver on the type of obstacles (objects versus human beings). It also may cause misunderstanding as the driver gets the information from the detection system in another way compared to (in-)direct vision. Object recognition and classification is probably needed for achieving effectiveness. Further investigation on HMI (directional indication/location information) is needed as NHTSA confirmed that people ignore beeps and just drive. OICA will work on a proposal.
- Turning the head seems to be allowed but visibility is limited if there are passengers or goods on the back seat. According R46 for Class I mirror blockage between the eyes and the mirror is not allowed, blockage between mirror and FoV is permitted. This might raise a discussion on fulfilling the requirements by means of direct vision (turning head).
- There are currently various definitions of the FoV length (US: 6m , Korea: 2.3m , Japan: 3.5m). It was questioned what FoV is required, feasible and useful based on accident statistics and acceptable annoyance levels. The KMVSS proposal from Korea proposal has been discussed and the Co-chair asked if more info can be collected on this proposal. Furthermore the position of OICA and CLEPA is requested.
- OICA: running conditions needed for test procedure, e.g. with loading platforms while reversing. These special conditions are not included. EC not in favor of exclusions because you have to be complete and very careful for exclusions. OICA will provide a proposal for text to exclude special conditions.
- LDS has done some assessments with direct vision to the rear; this info will be shared with the IWG (to the Secretary).

Discussion on implementation of regulation:

The different options for regulations are:

- 1) R46 Amendment with if-fitted option
- 2) New regulation
- 3) Both regulation option 1 and 2 with link in R46 to new regulation

- FR noted a reservation whether or not the proposal should be an amendment to R46 because CP can decide not to implement the amendment. Possible to implement Class VIII mirror and Class VIII CMS in R46 and detection device in a separate regulation.
- OICA supports stand-alone regulation but raised concerns about interface of optical data between trailer and towing vehicle (for object detection data there is an

interface available). Proposal is to not include trailers in regulation at this moment (GSR has not been adopted yet and the scope may change in the course of the EU negotiations).

- Proposals were also made from an approval perspective:
 - a) Implement detection system, CMS for Class VIII, Class VIII mirror and CMS for Class I in R46 as if-fitted (1 approval, obliged by CP's);
 - b) If-fitted or on request of manufacturer with reference in R46 to new regulation (2 approvals, obliged by CP's);
 - c) Define component approvals for both CMS Class I and CMS Class VIII (2 approvals).
- EC would prefer option a) as allowed by Rev 3 of the UN Regulation 1958 Agreement. The IWG is asked to give feedback on this in the next session.

Conclusions:

- In principle option 1) is selected for the moment, **FR** will check feasibility in relation to application of the WVTa.
- **OICA** will work on a proposal for HMI.
- Position of **OICA** and **CLEPA** needed on FoV of Class VIII device.
- **OICA** will provide a proposal for text to exclude special conditions.
- **LDS** will share assessments with direct vision to the rear (info to be sent to the Secretary).

Subjects for discussion in next 8th VRU-Proxi session:

- 1) For detection system: recognition VRU or other obstacles needed or not
- 2) Head rest position
- 3) For rear end distance, 3.5m or other suitable distance
- 4) Scope for application or exemptions
- 5) Transitional provisions

Preliminary status on these topics:

- Ad 1) CMS and detection could be considered equivalent; however an acoustical warning is always there and cannot be missed by the driver. Visual warning can be missed by the driver if he/she fails to look.
- Ad 2) Different technologies might be sufficient for the different rows of cones. Occupants on back seat will probably cause an obstruction issue but also transparency of rear window can be less than 70% transparent
- Ad 3) Rear end distance: 3.5 m is based on Japanese accident data, if other data is available then it can be reconsidered. In US this is larger because of higher reversing speeds, in Japan speed average is 6 km/h and max. is 10 km/h. IWG members are asked to send info on accident speeds to group.
- Ad 4) Not clear yet if trailers will be included. It is in GSR scope but as it is complicated it will for now not be proposed in the regulation. Also concerns about various different types of bodies on rigid trucks, CLCCR to be asked for feedback if this regulation is feasible on every kind of bodywork (**OICA**). Exemption for tractors to be considered because tractors are very limited driving as solo vehicles.
- Ad 5) Transitional provisions have to stay open for the moment. As on most trucks the bodybuilder will build the body equipment there might be a multi-stage approach needed.

Follow-up shall be discussed in more detail in the 8th VRU-Proxi meeting in Yokohama.

It was further agreed that a working document will be prepared for the 116th GRSG session in April 2019 prior to the next IWG meeting, however, that the 8th VRU-Proxi meeting planned in the first week of February will focus on finalising a line-by-line reviewed and accepted informal document that will then replace the aforementioned document.

Time plan:

- 1) Informal document to 115th GRSG October 2018 session with reflections of the 7th VRU proxy meeting (Japan)
- 2) Comments on proposal from Japan before 7 December 2018 for draft to 116th GRSG
- 3) 4 January 2019*: Deadline for Submit Draft Working Document to 116th GRSG
- 4) 5-7 February 2019: VRU-Proxi 8th meeting at Yokohama
- 5) [TBD] 2019: Submit Informal Document for 116th GRSG
- 6) 26-28 March 2019*: VRU-Proxi 9th meeting at Brussels
- 7) 2-5 April 2019*: GRSG 116th Session

** as in the meantime 116th GRSG has been shifted from 9-12 April 2018 to 2-5 April 2018 these dates have been moved forward with 1 week.*

11. State of play of close-proximity vision and detection rulemaking in the contracting parties

Document: VRU-Proxi-05-04 (France)

As discussed in 5th VRU-Proxi session feedback from experts of the group is expected on possible ways forward as follow-up on presented regulation articulation proposal from FR. Due to the absence of most CP's this subject has not been discussed and is postponed to the next meeting.

The Co-chair stated in the introduction of the meeting that the General Safety Regulation will introduce VRU-detection front, side and rear at the beginning of 2022 for new types but EP politicians and several Member States are pushing for earlier introduction. Feedback from EP on GSR proposal expected by the end of this year.

12. Forward motion Vehicle driving straight or taking off from standstill

First proposals and thoughts on forward detection were addressed by the Co-chair to prepare for next meeting:

- Only for heavy vehicles (trucks and buses) in low speed and taking-off manoeuvres (definition of max. speed to be discussed)
- Regulation for a warning and not active braking according the ToR of the IWG. Triggering by engagement of a gear, operation of accelerator or clutch pedal,
- Detection / FoV area to be determined, Class VI mirror FoV and width of the vehicle as starting point.

- Could be multi-modal approach as discussed for reversing safety
- Is there accident data available
- Type of regulation: inclusion in Regulation for BSIS or in R46 or a stand-alone new regulation.

It was agreed in principle that this item will be dealt with in a similar fashion as reversing camera and detection. Work should commence as from the 10th VRU-Proxi session at the latest.

13. Next meetings:

8th meeting: 5-7 February 2019 in Yokohama, Japan, Nissan Global Head Quarter.

9th meeting: 26-28 March 2019 in Brussels, Belgium, European Commission.

14. Any Other Item

No further items discussed.