

**Revised Draft report of the 19th Session
GRSG informal group on
awareness of Vulnerable Road Users proximity
in low speed manoeuvres (VRU-Proxi)**

Dates: 8th, 9th and 10th of June 2021
Venue: Webex meeting
Chairs: Mr. Peter Broertjes (European Commission)
Mr. Yasuhiro Matsui (Japan)
Secretary: Mr. Johan Broeders (OICA)

1. Adoption of the agenda

Document: VRU-Proxi-19-01 (Chair)

The agenda was adopted.

2. Adoption of the report of the 18th VRU-Proxi session (online meeting)

Document: VRU-Proxi-18-07 (Chair)

As there were no comments, the report of the 18th VRU-Proxi session was adopted.

3. Forward motion regulation

3.1. Vehicle turning (Blind Spot Information System Regulation No. 151)

Documents: VRU-Proxi-19-04 (CLEPA)
VRU-Proxi-19-05 (OICA-CLEPA)
VRU-Proxi-19-06 (OICA-CLEPA)

CLEPA presented in VRU-Proxi-19-04 (slide 3) possible sensor blockages by auxiliaries in special purpose vehicles or by opened doors in buses. There was understanding from the group and the Chair asked to prepare a draft amendment for these stationary situations which shall only be temporary as these applications shall not be fully exempted.

CLEPA raised the long time-to-collision (TTC) issue in VRU-Proxi-19-04 (slide 2). Initial feedback from BAST is that a TTC between 4 and 8 sec. seems to be fine, further discussion with CLEPA needed before next meeting. Also the discussion and proposal from slide 4 shall be prepared for the next meeting.

OICA presented in VRU-Proxi-19-06 (slide 3) a scope exemption proposal in paragraph 1.3. for the situations where the trailer is wider than tractor. The Chair stated that the scope of the BSIS regulation is motor vehicles and the system must comply without trailer connected. It was also questioned why to address this in the R151 as there will not be an issue for type-approval or market surveillance as it would be obvious that VRU may not be detected in

certain specific use cases not normally foreseen and not specifically covered. Conclusion: no change to the regulation needed as it is not deemed appropriate.

OICA proposed in VRU-Proxi-19-06 (slide 2) a BSIS scope exemption for special purpose or special operation vehicles (with a snow plough or mowing equipment). There was some consensus in the group to exempt these vehicles or to allow an on-off switch when they are deemed incompatible with their on-road use. OICA and CLEPA were asked to work on a draft text for amending the regulation as discussion document for the next VRU-Proxi meeting.

BASSt gave an update regarding the alternative (robotized) test method for BSIS. A small working group is working on this alternative test and will work on a text proposal. The informal document will be shared with the group before the next meeting.

3.2. Performance of current AEB-VRU with respect to VRU-Proxi

Document: VRU-Proxi-19-02 (BASSt)

The Chair of the IWG AEB-HDV presented VRU-Proxi-19-02 and explained the current status of the performance of AEB-VRU with respect to VRU-Proxi objectives. It was stated that close proximity direct vision has small effect on reaction time for blind spot accidents for crossing VRU scenarios, AEB-VRU is more effective in these situations.

It was questioned where AEB-VRU could be addressed, in regulation R131 (AEBS for HDV) or as an extension of R159 (MOIS). As AEB-VRU is a GRVA activity and the AEB systems requires more advanced sensors it will most likely be an update of R131. CLEPA argued that coordination between GRSG and GRVA is needed on how to actually prevent accidents with VRUs, with warnings only or with the need of active assistance systems. The Chair of the IWG AEB-HDV (CP in question is Germany) agreed and stated that regarding the GSR2 wording “reduce the blind spot to the greatest possible extent” active systems may be more beneficial than direct vision alone.

D stated to read the wording in GSR2 such that blind spot accidents must be reduced to the greatest possible extent. Accidents also caused by ‘driver failed to look properly’ situations can be addressed by active safety systems. Other solutions than direct vision can offer at least the same benefits. The Chair stated that direct vision was at one time considered to be applied only for new type of vehicles due to expected impact on existing vehicle designs. However, the European Parliament and Member States in the Council eventually adopted the GSR provisions to explicitly include the requirement also for existing types. Furthermore, automatic braking is not in the scope of this group. D understood but indicated to look for solutions for the safety problem. To a certain extent direct vision limits can be set at a high ambition level (higher than the performance of the current vehicles) together with considering active safety systems. The Chair (EC) indicated that diverging from the current GSR rules for existing types would need to be addressed by a new proposal to amend the GSR which would then have to be accepted by EP and Council. Such initiative for the EU is not foreseen.

DK stated to focus on direct vision as this IWG has no mandate for active safety. SE responded to also think about ambitious levels but to think out of the box as well. The ToR may give no mandate but GSR2 also mentioned “or avoidance”. A good balance is needed here but SE has no a final position and is still open for all options.

The Chair (EC) noted that accident avoidance (MOIS and BSIS) and direct vision are regulated separately in GSR and one cannot substitute the other.

3.3. Forward motion: Vehicle taking off from standstill (M1/N1)

Document: VRU-Proxi-19-03 (CLEPA)
VRU-Proxi-19-07 (Japan)
VRU-Proxi-19-08 (Japan)

J presented the elaborated proposal for a regulation for vehicle taking off from standstill considering categories of vehicles M1/N1 with following key changes:

- Moving head / bending (stretching) of driver to front and side is now taken into account (original eyepoint and 3 stretching eyepoints).
- Pole behind A-pillar/mirror on passenger side is now exempted as this pole is in a blind spot, as soon as driving off the pole will be visible through the side screen. Argumentation is based on a Japanese study from the past.

The Chair welcomed the approach of looking into stretching/moving drivers to increase their view. UK expressed concerns about the complexity of this in a regulation but may be considered as B-pillars are getting wider and waistlines are getting higher due to side impact protection. J stated that movement of eyes is important to consider for static situations but agreed that this may cause complexity of testing although the number of tests is limited.

CLEPA showed in VRU-Proxi-19-03 comments on the proposal.

- Why only passenger side? J: Driver side is visible and not needed to be exempted.
- Proposal to increase distance of poles to 0.2m from side and front of the vehicle. J: this 0.2m distance is already included in the test section for detection systems (and 0.1m distance from pole to pole. Different poles are defined for detection (width 0.1m) and vision (width 0.3m).

J proposed to submit a working or informal document for next GRSG as preparation of a final delivery for GRSG in April 2021. Chair agreed in general but asked for more feedback from CPs on the stretching idea as it is a new regulation and to avoid questioning from other CPs at GRSG. FR and D indicated to need more time to think about the proposal. It was agreed to prepare an informal document for October GRSG (visual presentation with description of requirements and testing and to ask interested CPs to join VRU-Proxi for line-by-line discussion). This presentation will be discussed in the next 20th VRU-Proxi meeting.

4. Direct Vision regulation

4.1. Differentiation between groups of vehicles

In this meeting there was no further discussion on the proposed differentiation between vehicle groups regarding the direct vision requirements. The proposed methodology is broadly endorsed and the draft regulatory text is therefore deemed as finalized.

4.2. Physical Method Testing

Loughborough Design School (LDS) explained the status of the analysis and testing of the physical method:

- A concern was raised earlier by OICA regarding the mismatch between the height of the stick and the height of the assessment volume which effectively could lead to a disadvantage for very high vehicles. LDS agreed to align the stick height to the height of the assessment volume which will probably also improve the correlation between the two methods.
- The view through the lower door window is taken into account even when the head is not visible but the VRU is clearly visible by another part of the body. LDS explained that the procedure accounts for this and will explain the method in a next taskforce.
- Plan is to finalize testing at Millbrook in July / early August 2021.

4.3. Assessment approach and limit values for different groups of vehicles

Documents: VRU-Proxi-19-10 (Taskforce DV)
VRU-Proxi-19-12 (LDS)
VRU-Proxi-19-13 (Secretary)

The Chairs of the Taskforce Direct Vision (DV) presented document VRU-Proxi-19-10 containing the status of the Taskforce discussions concerning the direct vision assessment approaches and corresponding limit values for the different groups of vehicles. The following items were discussed:

VRU-visibility

- Current info is based on head + neck. It was questioned if half the head was meanwhile also considered. Not in general but LDS found around 10% difference with allowing half the head instead of head + neck based on two vehicle samples.

Technology neutrality

- The limit value for the front zone in the current proposals is based on the visible area between the A-pillars. This might give a disadvantage for narrow (tapered) cabs that are now encouraged by the new EU weight & dimensions legislation for aerodynamic improvements.
- LDS stated that after summarizing the proposals a specific requirement to the front would be needed but volume is limited depending on the design of the cab. This can be solved by considering another area to the front. LDS offered to work close with OICA/ACEA towards the next meeting.
- The Chair raised the issue that aiming for technology neutrality will probably cause a delay in tabling a draft regulation. The group stated that the target of GRSG October 2021 for draft regulation is not feasible anymore, best case would be having a Working Document ready for GRSG April 2022 and WP.29 June 2022. This extra time may provide the opportunity to include technology neutrality later in the proposal. The summer break can be used to make up any further minds on this.

Proposals for Direct Vision approach

- The different possible proposals were listed again:
 1. Combined requirement + separate requirement to the front (hybrid approach)
 2. Combined requirement + separate requirements to all directions (L + F + R)
 3. Combined requirement only (with ambitious levels)
 4. Combined requirement (less ambitious levels) + assistance technology (note that Chair (EC) raised concerns about the acceptability of this option for the EU).
- ACEA stated that besides a camera monitor system for Class V and VI field of view also MOIS+ and/or BSIS+ could be considered for option 4.
- Chair questioned if the same approach shall be applied for the 3 levels. Apollo responded that if the gap between direct and indirect vision must be reduced then separated values might be less important for level 1 as the VRUs are (far) inside the mirror field of view. But if this is not sufficient then separated approach is needed with the consequence that this would be less technology neutral. ACEA stated that the combined approach is the only way to solve the issue of technology neutrality. EC agreed and expressed also advocating for a combined approach, however, with sufficiently-ambitious requirements, giving enough confidence that manufacturers will design in the right way.

The Chair asked the opinions from the CPs that were present in the meeting. An overview of these opinions is given in table 1 below.

Table 1. Overview of opinions from the CPs.

CP/Chair	Comment	Option 1 Combined + separate req's to the front (t.b.d.)	Option 2 Combined + separate req's to all directions (L+F+R)	Option 3 Combined requirement only (with ambitious levels)	Option 4 Combined requirement (less ambitious level) + assistance technology
DK	Also interest for FR proposal	X (1)		X (2)	
D	Not final position. One-fits-all approach is OK (technology neutrality)	[X] (3)		[X] (2)	[X] (1)
EC	Option 3 preferred, option 1 as alternative compromise	X (2)		X (1)	
SE	Not final position, prefers one-fits-all approach	[X]		[X]	
Co-Chair			X	X	
FR		X (for L2 and L3)	X (for L1)		
J	Depending on limit value, may support FR proposal	X	X (1)	X	
BE	Sympathy for FR proposal. Understand industry concerns about technology neutrality	X	X		
UK	Supportive to FR proposal but further reflection needed	X (for L2 and L3)	X (for L1)		

Explanation to the table:

X = proposed

[X] = proposed, not final

(1), (2), (3) = priority

L1, L2, L3 = Level 1 (urban), Level 2 (construction), Level 3 (highway)

Although the opinions of the CPs are not final the Chair concluded that there may be some consensus for the proposal from FR resulting in applying option 2 for Level 1 vehicles and

option 1 for Level 2 and 3 vehicles.

Limit values

Based on this direction the limit values were discussed with taken into consideration the visibility of half the head of the VRU. Therefore, a scaling factor of 87% was assumed for transition from head+neck to half the head as indicated by LDS based on a first estimation with two samples). The Chair compromised together with CPs the following table as proposal for discussion. The stakeholders were requested to give a reflection on these indicative values in the next meeting.

Table 2. Compromised proposal for limit values (indicative values for discussion).

			Level		
			1	2	3
Combined	Minimal combined visible volume [m³]		11.2	8.0	7.0
	Front VRU-distance [mm]	Head + neck visible	1700*	2050*	2150*
		Top half of head visible	1479*	1784*	1871*
	Passenger side VRU-distance [mm]	Head + neck visible	2500*	3550*	3775
		Top half of head visible	2175*	3089*	3284*
	Driver side VRU-distance [mm]	Head + neck visible	600*	710*	850*
Top half of head visible		522*	618*	740*	
Front	Minimal front visible volume [m³]		1.8	1.0	1.0
	Front VRU-distance [mm]	Head + neck visible	1900*	2250*	2250*
		Top half of head visible	1653*	1958*	1958*
Passenger side	Minimal passenger side volume [m³]		3.4	-	-
	Passenger side VRU-distance [mm]	Head + neck visible	3135*	-	-
		Top half of head visible	2727*	-	-
Driver side	Minimal driver side volume [m³]		2.8	-	-
	Driver side VRU-distance [mm]	Head + neck visible	920*	-	-
		Top half of head visible	800*	-	-

* Values in black to be considered as indicative / average values, not to be considered as limit values.

Remarks to the table:

- Values in red (volumes) to be considered as proposed indicative limit values
- "Top half of head" values are based on 87% of "head + neck" values (estimated in VRU-Proxi-19)

As discussed earlier the group recapped that no working document can and will be submitted to GRSG in October 2021. A progress report (informal document) will be presented by the Chairs. Apollo and LDS agreed to cooperate with EC in the course of the summer to prepare a presentation outlining the way forward. The Industry may also prepare a position for the GRSG session in October.

4.4. Direct Vision regulation for M2/N2

Document: VRU-Proxi-19-09 (OICA)

OICA showed a discussion paper regarding the direct vision regulation for M2/N2 where M2/N2 vehicles derived from M1/N1 vehicles/bodies are indicated as “low-end” (M2/N2 vehicles derived from M3/N3 vehicles/bodies would then be indicated as “high-end”). Different alternative procedures for DV assessment for low-end M2/N2 vehicles were presented as these vehicles are deemed not to be a main contributor to direct vision related accidents. Also different ways to discriminate between low-end and high-end M2/N2 vehicles were discussed.

- The Chair raised the issue that vehicles that meet the proposed form factor and assumed to be easily compliant with DVS regulation for heavy vehicles may in theory be equipped with e.g. blackened window and still meet the requirements (not the case for vehicles close to the limit). OICA: this shall be further considered as it will be an administrative burden to test and evaluate vehicles that will pass the regulations easily.
- Small trucks (in the middle range) could make use of both R125 and DVS on voluntary basis. Mixing in R125 can be problematic and with certain designs direct vision is not an issue. Chair proposed to add a criterium about the height of the waistlines (or downward angle of the vision line). This would guarantee a good direct vision. OICA will further evaluate a proposal based on R-point or E-point to avoid a complicated test protocol. Only the obvious points like downward vision angle or form factor + R-point + windows height shall be thought about.
- ACEA will look for data for N2 vehicles that correlate to DVS volumes (including city windows).
- FR: GSR2 is not mentioning any exemption for smaller N2/M2, direct vision has to be improved. Chair stated that it is not the intention to exempt but find another way to certify according to more simplified parameters. But certainty is needed that these vehicles are excellent in direct vision and not too close to the limit. It will depend on the data from OICA/ACEA which must be transparent and objective.
- ETSC suggested stricter requirements would be appropriate if they can meet the proposed ones easily. The Chair explained to first wait on results how good these vehicles are as we have to be realistic, based on realistic accidents.
- DK is most concerned about the N2 vehicles derived from N3 vehicles as this could lead to manufacturers trying to avoid the rules. Chair noted that this is in theory possible, but wondered about the likelihood as there does not appear to be an incentive.
- Discussion to be followed up in next meeting.

4.5. Direct vision draft regulation text

Document: VRU-Proxi-19-11 (Taskforce DV)

The draft text was provided by the Taskforce and uploaded to the UNECE website. The details were not yet discussed line-by-line in this meeting.

5. Next meeting

20th meeting: 7th, 8th and 9th of September 2021, location / web meeting TBD
- 7th and 8th of September 2021 (9.00-12.30 CET): VRU-Proxi subjects
- 9th of September 2021 (9.00-17.30 CET): drafting DV regulation

6. Any Other Item

No other items were discussed.