Draft report of the 3rd Session GRSG informal group on awareness of Vulnerable Road Users proximity in low speed manoeuvres (VRU-Proxi)

- Dates: 18-19 July, 2017
- Venue: Federal Highway Research Institute
  (Bundesanstalt für Straßenwesen, Germany)
- Attendance list: Annex 1

EXECUTIVE SUMMARY

a. Establishment of a task-force for **regulatory text drafting**
   - Pilot: D (BASt)
   - Aim:
     - re-structure the text,
     - improve the test method taking into account feasibility and repeatability,
     - review test matrix (Table 1 in Appendix 1 to GRSG/2017/11 – p10)
     - finalisation of working document (to be submitted as informal document at GRSG-114 of April 2018)
   - Input to be provided by the 19th of January 2018 to the Secretary (ofontaine@oica.net) and Dr. Seiniger (Seiniger@bast.de)
   - Timeline: final revision at the latest at GRSG-115, aiming adoption by WP29 of November 2018 (176th session)

b. Establishment of a task-force on **data collection**
   - Pilot: OICA
   - Aim: define the priorities of the group at VRU-Proxi-04 (November 2017)
   - OICA to set up a matrix to be filled in by the stakeholders, input expected by GRSG-113
   - Input to be provided to the Secretary (ofontaine@oica.net) and Mr. François Boulay (francois.boulay@renault.com).

c. Establishment of a task-force on **Human-Machine Interface** (HMI)
   - Pilot: OICA
   - Aim: draft regulatory proposal for Blind Spot Information System (BSIS) HMI
   - Proposal should address “smart switch-off strategy” and indication of the direction of the hazard

d. Revision of the **terms of reference** for accommodating the new priorities

e. German approach **GRSG/2017/11**:
   - Good basis for the scenario
   - Proposed test method seems relevant, needs further review

f. Final regulatory proposal to be **limited to vehicle approvals** (introduction of component separate approvals remain possible) in the first step

1. Adoption of the agenda

Document: VRU-Proxi-03-01 (J-European Commission)

The agenda was adopted with the insertion of new items 3.a and 3.b

2. Adoption of the report of the 2nd session

Document: VRU-Proxi-02-13 (chairs)
The adoption of the report of the 2nd meeting was postponed to 4th meeting (Tokyo, November 2017) due to the short notice between the issuance and the 3rd meeting.

3. New regulation on close proximity vision of trucks

Document: ECE/TRANS/WP.29/GRSG/2017/11 (D)
VRU-Proxi-03-04 (D)

a. Introductory presentation

Dr. Seiniger (D – BASt) presented the document VRU-Proxi-03-04.
Note of the Secretary: In slides 9 & 10:

- GT = fatality
- SV = severely injured
- LV = light injured

The study was conducted independently, i.e. without specific input from vehicle manufacturers nor suppliers. According to the data available, it seems that most fatalities/severely injured cases occur in the "turn right" scenario on bicycles, impacting light and heavy commercial vehicles.
TRL committed to provide UK data as well.
NL informed about different particular situations in their territory, e.g. at roundabouts. The expert informed that some more data details will be available later.

Action point:

- NL to provide data on national fatalities/severely injured cases
- All parties to provide data as well, if possible.

Dr. Seiniger explained the difference BASt make between "information" and "warning". Taking as main criterion the intensity of the signal, it seems that, according to BASt, an information signal can be acceptable by the driver even when it is too often issued, e.g. in case of false alarm. Dr. Seiniger stressed that the key for BASt is to get a signal early enough to permit a reaction from the driver, despite it might be too often issued, which should however be prevented. The evidence of this acceptability by the driver is the existence of such systems on the market (notably passenger cars) with no complaints from the users; Dr. Seiniger confirmed that no study on psychology or human behaviour was conducted prior to their decision for this approach. Dr. Seiniger also voiced that information systems are moreover assumed more robust against systems failures.

BASt was of the opinion that a coverage of 80% of the accident cases is sufficient, hence the subject vehicle speed was limited to 20 km/h. A speed of 30 km/h would cover 90% of the cases.
The test method ensures that the bicycle is positioned in the "heatmap" area (see slide 27).

Q&A:

- Is the analysis relevant for other European countries?
  - Answer: cannot be answered as there is a lack of data base to analyse. TfL informed their data are similar in some aspects but different in others. TfL informed that in the UK the blind spot fatalities are 50-50 cyclist-pedestrians, where blind spot accidents with pedestrians mainly are forward driving accidents with pedestrians in front of the vehicle, while bicycle accidents - as in the German data - mainly are those accidents with a turning vehicle.
- The group confirmed that the scope must be based on accident data
- NL was supportive of the principle of the German proposal.
- Cones and a traffic sign are used to identify false positive signals (trees, cones …)

b. **Outdoor demonstration**

Dr. Seiniger explained that the intention of the demonstration is to show the way the test would be conducted, rather than showing the real test method, because the demonstration facilities at BASt do not reflect those of a Technical Service (e.g. with regard to available space) and because the vehicle at disposal was not equipped with Blind Spot Detection System.

Recap and Q&A:

- Does the test conditions well reflect the urban environment?
  - The speed and positioning of the vehicle do represent real world situations. Yet, a test method always "simulates" the reality, hence not all the diverse urban situations can be reflected in one test method.
- The system may be confused by e.g. the bicycle path markings and hedges, hence may alert while there is no bicycle or not alert when there is one.
  - Answer: reluctant to define a hedge, leading to complex discussions and definition. The development of the current test method should be such to permit detecting the bicycle in spite of the presence of a hedge.
- The test method is a very good basis for development of an ultimate test method.
- Information independent to the DI: is there any objection in the group?
  - The group did not raise major objection
- Why alerting before the driver decided to undertake the manoeuvre?
  - For ensuring a certain level of safety and taking into account the driver's reaction time. This leads in certain cases to the necessity to inform the driver before the turning process has started. This is why D proposes an "information system", which permits avoiding annoying activations.

- Traffic sign:
  - "randomly" (see paragraph 6.5.2. of the proposed text) is an error, the traffic sign should be positioned as described elsewhere in the regulation.
- Target bicycle:
  - Comes from the Euro-NCAP, yet there are some ISO activities (ISO 19206-4) addressing the definition of a standard bicycle. Dr. Seiniger stated that the proposed target bicycle seems appropriate for the different sensor technologies.
  - The chair pointed out that, under the new revision of the 58 Agreement, the description of the target bicycle could go into SR2
- Some experts found the number of scenarii too high in the German proposal:
  - BASt had anticipated this concern, and was ready to decrease the number of scenarii.
  - The European Commission would prefer an unlimited package of scenarii, where a selection should be chosen for the purpose of Type Approval. All the group was keen to avoid that the system is developed to pass the test. The experts envisaged different approaches:
    - Selection of a few scenarii from a large quantity, or
    - Defined test conditions, and the manufacturer must demonstrate compliance in the other conditions
  - NL raised the question of frontal impact to cyclists and pedestrians. The European Commission was reluctant to already change UN R131 as it is a quite new regulation and this regulation is under GRRF responsibility. In addition, such active systems were not part of the task given to BASt. it was pointed out that automatic emergency braking systems for bicyclists are included in the terms of reference of the GRRF informal working group on AEBS.
- Repeatability of the test is not obvious and some experts had the following concerns:
  - Cyclist dummy is subject to direction changes with side wind (this can be adjusted for constant

side wind of lateral track inclination) and does not withstand gusts.

- Vehicle speed is “manual”, vehicle trajectory is depending on driver.
- The LPI is defined from the impact point, which must be calculated from the speed and depends on the shape of the vehicles
- Testing material costs a few K€, and the testing procedure is of a certain level of complexity.

Conclusion:

- All to check at home the different bicycle path configurations (road design) in their territories
- Data to be provided to OICA (francois.boulay@renault.com and ofontaine@oica.net).

c. Establishment of a task-forces

The group made the following decisions:

Establishment of a task-force for regulatory text drafting:

- BASt as pilot
- The parties were requested to provide their input by the 19th of January 2018
- In-depth revision at 5th meeting in March 2018.
- OF to distribute the mails.
- Core members are UTAC, RDW NAMI OICA and CLEPA. All parties are invited to contribute

Establishment of a task-force on data collection:

- OICA as pilot (francois.boulay@renault.com and ofontaine@oica.net)
- Accident data to be comparable, hence collection of data to be structured: OICA to set up a matrix to be filled in by the stakeholders, sent early September, input expected at GRSG-113, decision on the priorities expected for GRSG-VRU-Proxi-04.
- Aim is to define the priorities of the group already at the next session, will permit Industry to get a vision for the mid/long terms.

d. BAST approach to blind-spot detection

The group started reviewing the text of document GRSG/2017/11

Paragraph 1.1.: The group questioned the value of 8 tons. While the Japanese category definitions refer to 7,5 tons, BASt promoted consistency with UN R58 and UN R131. TfL pointed out that the accident data themselves make the breakdown at 7,5 tons. Yet no big influence is expected. The secretary and J proposed to put the breakdown value at 7,5 tons. OICA could support 7,5 tons.
Conclusion: 7, 5 t adopted.

TfL suggested to include the possibility to approve the equipment separately. D recalled that at GRSG the decision was to maintain the scope for vehicles. In the EU there are 2 categories of components, components, and separate technical unit. Addressing the components as a separate item would also help retrofitting.

NL was reluctant of such approach in this case, because the same component does not necessarily fit the different vehicle configurations, e.g. the different heights of the cabs.
D pointed out the need to maintain the deadlines and feared that addressing the components separately might delay the process. The European Commission pointed out that component level could be dealt in a later stage.

There was a debate on the aftermarket transformations. OICA stressed that the percentage of vehicles transformed within a multistage approval is huge (>50%) and that some problems can be anticipated at the Technical Service level and at the economic level since lots of small manufacturers may face problems in approving their vehicles. That might even prevent the EU to apply the regulation.

CLEPA had no real position as they are still considering the pros and cons of the component approach.

Conclusion:

- Component not addressed for the time being, scope restricted to the vehicles.
- Door remains open for further evolution for introducing the components

- Industry can cooperate for the component approach.
- Deadline is the 1st priority, component approach can be developed in parallel.

Paragraph 2.10:

TRL pointed out that the HMI should be well addressed.
OICA suggested addressing the definitions at the end of the discussions. In addition, the haptic means should be added into paragraph 2.10 for consistency with paragraph 5.4.1. D informed that "haptic" was not added on purpose, because haptic is a means that the driver cannot ignore, and this would be contradictory to their approach of a "non-annoying information signal".

Conclusion: item to be addressed at a further stage, Industry to provide a proposal at next meeting.

UTAC raised the concern of the efficiency of the system in countries where the direction of traffic is different. D was of the opinion that there is less danger in this case since the driver is sitting at the good side of the vehicle, and hence can see the approaching bicycle. The group agreed to check whether that case is relevant.
There was also a debate on the side of the traffic vs. the side of the driver (paragraphs 1.2. and 2.9.). It was agreed to focus on the side of traffic rather than the side of the driver because some vehicles are developed with the driver on the same side as the traffic.

There was a debate on the relevancy of the dummy bicycle. CLEPA informed that the dummy is not defined according to the sensing technology, in order to keep the provisions "technology neutral". D proposed that the different configurations are addressed in a separate part of the regulation, and to keep the definition of the dummy unchanged in the test procedure. OICA pointed out that at the end of the day the text must be practical and that the regulation should not multiply the number of tests and configurations.

Conclusion:

- D pilot for this item;
- The text must ensure a wide coverage of situations without burdening the Industry with multiple tests.

Paragraph 5.4.2.:

OICA raised concerns with regard to the approach of paragraph 5.4.2.: the spirit should be that all what is not prohibited is allowed. The expert was of the opinion that this paragraph does not provide additional value. The chair suggested the following wording: "without prejudice to regulation 46, the information may be displayed etc.".

Conclusion: paragraph 5.4.2 deleted.

Paragraph 5.4.3.:

OICA suggested to follow the spirit of ISO 2575 in the spirit of an increased harmonization. The chair saw three solutions on BSI on the market: interior tell-tale, mirror housing tell-tale, mirror glass tell-tale.

Conclusion: OICA named as pilot for HMI task-force.

Information system vs. warning system.
OICA could agree that the group focuses on information system, but was keen that the warning systems are not be prohibited. The chair suggested a smart switch-off strategy, e.g. starting with the switch-off of the haptic warning, yet never switching-off the information display.

BSIS effectiveness: D explained having not assessed the effectiveness of the BSIS, yet assumed of their efficiency since they are on the market.
There was a debate on the effectiveness of the current BSIS and TfL committed to provide information on a study conducted in the USA, whose conclusion is unfortunately "uncertain" (see document VRU-Proxi-08).
NL committed to provide information as well.

Paragraph 5.4.1.:

BASt informed having taken this paragraph from UN R130. The Secretary pointed out that the intention of the author is to indicate the origin of the hazard, yet limiting the information to left/right. Yet the question exists as

to whether the system should work on both sides of the vehicle.
OICA committed to collect and consider all inputs, yet pointed out that the information will be received by the driver only if he looks in the good direction.

Conclusion:

- Item to be addressed by the HMI task-force.
- Task-force to address the indication of the direction of the hazard.

Paragraph 5.3.1.6.

The experts had an exchange on the following concerns:

- Stationary: a radar may have difficulty in detecting a stationary object
- A side-guard could be detected as an object moving at the same speed as the subject vehicle.

Paragraph 5.2:

NL informed that the current version of UN R10 is the 05 Series. He recalled the text adopted in paragraphs 7.2, 17.2 and 35.2 in the AECS draft regulation (document GRSG/2017/12) after timely debates:

"The effectiveness of AECD shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the technical requirements and transitional provisions of Regulation No. 10, 04 series of amendments or any later series of amendments"

The group had a debate on dynamic vs. static references to UN R10. In the EU, compliance with UN R10 is mandatory anyway, hence the paragraph is not necessary for approval in the EU market. The European Commission in addition questioned whether the provision is relevant, as only immunity of systems that affect the direct control of vehicles is crucial, i.e. an information system like BSIS could 'fail' the immunity provisions, yet pass the UN R10 provisions since it does not affect the vehicle's direct control in such case.

Note of the secretariat:

Paragraph 1.3. of UN R10 reads:

"1.3. It covers:

(a) Requirements regarding the immunity to radiated and conducted disturbances for functions related to direct control of the vehicle, related to driver, passenger and other road users' protection, related to disturbances, which would cause confusion to the driver or other road users, related to vehicle data bus functionality, related to disturbances, which would affect vehicle statutory data;"

Conclusion:

- Item to be addressed at a later stage,
- All parties to review this at home.

Paragraph 5.3.1.4.

Means that the system must not warn if a bicycle arrives while the vehicle is stationary.
TfL wondered whether this covers the UK situation.
OICA also questioned the 30 km/h value.

Paragraph 6.1.

The Secretary explained the origin of the paragraph as the best way found by the author to cover all the multiple situations encountered in the life of a vehicle while limiting the number of tests as reasonable as possible. The regulation hence imposes one test scenario, yet the manufacturer must demonstrate compliance for all the other real world situations via documentation. This does not preclude the Technical Service to impose an additional test when they believe increased evidence is necessary.
The chair found it a good approach, perhaps with some rewording. NL was keen that the Technical Services get a means to recognize the type of BSIS with regard to the regulation in this documentation package, as well as the worst case scenario.

Paragraph 5.3.1.3.: seems obsolete for the same reason as for the deletion of paragraph 5.4.2.

TfL was keen to keep this provision since some current systems function only after the DI activation.

PB committed to address the activation strategy. As it is assumed to become a default-on system, the wording could be "*the driver shall not be obliged to make an additional action for activating the system*".
OICA pointed out the consequences of such provisions, generating lots of false alerts. D was keen to keep this provision.

Paragraph 5.3.1.6.: CLEPA found this provision unclear, and questioned the presence of pedestrians in the requirement.

Conclusion: paragraph to be improved

Paragraph 5.3.1.1. vs. 5.3.1.7.: CLEPA raised the concern of some conflict.

e. Integration of D proposal into UN R46 (or other TBD)

The chair clarified that this item also addresses the possibility of the integration of the D proposal into the VRU-Proxi regulatory work.
D stated that the original wish was a stand-alone regulation yet GRSG-112 decided that the proposal should be discussed in the VRU-Proxi informal group.

Conclusion: VRU-Proxi informal group to develop regulatory text based on a new stand-alone regulation.

f. Position of Germany with regard to blind spot within the VRU-Proxi informal group with revision of TOR (time line)

The chair shared his opinion with regard to the D proposal:

- Convenient and ready-made for this informal group
- However, some attendees have comments:
  - Proposed values
  - Structure of the text
  - Principle and details in the test method
  - Repeatability etc.
- These stakeholders need time to confirm the feasibility of the proposed test method and probably need to put it in practice.
- Questions:
  - Do you need time?
  - If yes, how much time?

OICA stated that not all manufacturers have the system. In addition, the expert questioned the reproducibility of the test method and stated that the method needs improvements.
The chair suggested 6 months for revisiting the test method, i.e. the group would resume the work from there. This leads to early 2018, hence an informal document at the April 2018 session of GRSG (GRSG-114) amending the existing working document (GRSG/2017/11) and a final adoption at the latest at the October 2018 GRSG session (GRSG-115).

UTAC was also keen to check repeatability and harmonization of the test procedure. The expert proposed also to cross-check with GRRF since there may be conflict and/or overlaps with the detection requirements and the necessary technology.
The Secretary suggested nominating an ambassador between the groups.

The chair found it an Industry concern, because the key is that the decisions are not detrimental to the VRUs. The Secretary also raised the criterion of mandatory vs. optional equipment.

The chair found that sensor technology and HMI are probably the parameters of conflict/overlap.
RUS informed that the weather conditions in RUS often make the drivers switch off their systems, hence RUS will probably not make BSIS mandatory.

The group then started a revision of the terms of reference. The group agreed that noting "vehicle" in the terms of reference (paragraph 4) does not entail the group to cover all the categories, rather it is part of the process to

focus on the categories that are deemed relevant.

NL raised that sometimes the bicycle is impacting the front of the HGV, i.e. this scenario should be taken account.

OICA questioned whether there is an evidence that the Class VI mirrors are not efficient. The expert questioned the logics of working on front close proximity obstacle detection while there is already a mirror addressing this scenario? The European Commission then wondered why there are still accidents while the mirrors are present. The expert explained that this is why the European Commission is promoting warnings.

BASt and TfL supported a warning for forward vision as opposed to the concept of information.

UTAC pointed out that the Class VI is mandatory only on N2>7.5T/N3 categories, hence suggested to mandate detection (not image) on all categories, based on accident data. Yet, when there is good direct vision, there is by principle no need for a detection system. This would however be challenged in the case of a turn in the starting forward motion.

OICA recalled that the group decided to make their decisions based on sound "accidentology" and efficiency of the proposed solution. OICA suggested reviewing UN R46 in this frame. If detection systems are more effective than the mirror, then the mirror should become optional.

UTAC was of the opinion that the Class VI was devoted to the possible impact of the vehicle on a structure; this class is not dedicated to the detection/vision of VRUs.

There was a debate on the CMS vs. detection system optionally replacing the Class VI mirror. Paragraph 6.2.3.1.: "*The device shall perceive the visual spectrum and shall always render this image without the need for interpretation into the visual spectrum*.". if the group decides to permit a tell-tale then UN R46 should be amended.

D recalled that there had been a regulatory proposal at GRSG some years ago for direct field of vision for CVs.

Conclusion:

- All (Industry and Technical Services) to internally review the number of scenarii, the testing matrix
- Regulatory proposal to be developed taking into account feasibility and reproducibility of the test method with active support from the Technical Services. BASt to kindly provide their expertise
- Need to be strict on the timing: **final document to be adopted at GRSG-115**. To be well indicated in the informal group report and the GRSG-113 report.
- All parties, mainly NL and UK (TfL) to share their data to align the test method
- VRU-Proxi informal group to take care of the progress of work at GRRF, yet making sure that the decisions are not detrimental to VRUs.
- Revision of the terms of reference per document VRU-Proxi-03-06
    - Corrected target completion dates for the work of the IWG to become:
        (a) Forward motion:
            - Vehicle turning: Completion of the proposal by Germany on new provisions for Blind Spot Information Systems (BSIS): 115th session of GRSG (October 2018);
            - Vehicle driving straight or taking off from standstill: 118th session of GRSG (April 2020) e.g. CMS or detection system

        (b) Reversing motion (e.g. Camera Monitoring Systems (CMS) or detection system): 116th session of GRSG (April 2019);

        (c) Direct vision: 120th session of GRSG (April 2021).

4. Accidentology

Document VRU-Proxi-03-05

- TfL presented the document.
- Direct vision protocol.
- 10 years accidentology statistics: 82 pedestrians (mainly forward moving) vs 15 cyclists (mainly

turning accidents) per year in average.

- Construction bodies trucks make the most of the problem when turning left, and tractors make the majority when moving off. Traffic light collisions mostly.
- Lateral distance is expected to be small in UK, where in D separation might be +4m.
- Sensor systems are now “popular” in London (as after-market), but effectiveness is not known.
- 4 different types of aids: field of view aid, proximity warning, collision warning, motion systems.
- Test scenarios. HMI is important: detecting is one thing, but what to do about the information?

5. Next meetings:

VRU-Proxi-04 dates changed due to the Impact assessment deadline at the European Commission, preventing the European chair to attend a remote meeting on 8-9 November 2017.

- **4th meeting**:
  - Dates: 21-22 November 2017
  - Time: Starting at 10:00 am the 1st day, and finishing at 6:00 pm the last day
  - Venue: JASIC offices in Tokyo

- **5th meeting**:
  - Dates: 20-22 March 2018 in Brussels (European Commission)
  - Time: Starting at 1:30 pm the 1st day, finishing at ca 4:00 pm the last day.
  - Venue: European Commission premises (details in near future)

6. **AOB**

Annex 1

Name	Affiliation	Country	Signature July 18	Signature July 19
Alburno, Paolo	CLEPA			
Andersson, David	Volvo	SE		
Benz, Stefan	CLEPA / Bosch	DE		
Bernd, John	CLEPA			
Boulay, Francois	Renault	FR		
Broeders, Johan	DAF	NL		
Broerijes, Peter	EC	BE		
Chazalette, Jean-Louis	Volvo	SE		
Fontaine, Olivier	CICA	FR		
Fuhrmann, Thomas	BMVI	DE		
Gerlach, Rudolf	TÜV Rheinland	DE		
Gerling, Tim	BDW	NL		
Herveleu, Fabrice	UTAC	FR		
Kawauchi, Hiroshi	Daimler	JP		
Knight, Iain	tf / Apollo	UK		
Kock, Peter	MAN	DE		
Lefevre, Henri	CLEPA	FR		
Matsu, Yasuhiro	NTSEL	JP		
Matthews, Stuart	CLEPA			
Moreau, Benoit	PSA	FR		
Panwinkler, Tobias	BASt	DE		
Pfeifer, Sascha	VDA	DE		
Sato, Atsuya	MLIT	JP		
Schmalriede, Tobias	Conti	DE		
Springer, Patrick	BASt	DE		
Serke, Allaksei	Autoliv	DE		
Shimizu, Morimichi	JASIC	JP		
Stankov, Pavel	NAMI	RU		
Schuhl, Jörg	Daimler	DE		
HYNDS DAVID	TRL	UK		
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