

## **DRAFT REPORT**

### **19<sup>th</sup> meeting of GRRF informal group on**

### **Automatic Emergency Braking and Lane Departure Warning Systems**

Venue: OICA offices (4 rue de Berri – 75008 Paris – France)  
Chairman: Mr. Johan Renders (EC) ([johan.renders@ec.europa.eu](mailto:johan.renders@ec.europa.eu))  
Secretariat: Mr. Olivier Fontaine (OICA) ([ofontaine@oica.net](mailto:ofontaine@oica.net))  
Dates: 30-31 January 2013

#### **1. Welcome and Introduction**

#### **2. Roll call of delegates**

#### **3. Approval of the agenda**

The agenda was adopted with no change

#### **4. Approval of the minutes of the last meeting**

Document: AEBS/LDWS-18-04

The minutes were adopted with no change.

#### **5. AEBS (Automatic Emergency Braking Systems):**

Documents: AEBS/LDWS-17-02-Rev1  
AEBS/LDWS-17-04 – Annex 1(Proposal from CLEPA/OICA for AEBS step 2)  
AEBS/LDWS-19-02 (J)  
AEBS/LDWS-19-03 (J)  
AEBS/LDWS-19-04 (NL)

##### **5.1. Reflection and proposals on warning time for row 2 vehicles for both scenarii**

J and NL presented their respective documents (AEBS/LDWS-19-03 and AEBS/LDWS-19-04).

OICA questioned the value of 45km/h mentioned in the second bullet of the NL document justifications. NL clarified that the value of 1,2 seconds referred to in the document addresses the TTC, which varies as long as the vehicle decelerates.

F was of the opinion that the warning time exists to permit the driver to react, hence must be adapted to the driver's reaction time. In addition, the expert from F wondered why the reaction time is different for the light and the heavy vehicles, while the drivers are all human.

OICA pointed the equal importance of nuisance of too early warnings and the driver's reaction. The system would become counterproductive should early warnings be too frequent. A too early warning in addition would be design restrictive.

Mr. Clasen referred to the document WP29/1091/Add.1, paragraphs 64-66, which urges the designers to avoid too early warnings.

J acknowledged this document and recalled the row 1 performance requirement (warning time). The delegate from J stressed that the current discussion addresses Row 2 vehicles, and J believed that the J proposal for 0.8s is acceptable in terms of nuisance. Mr. Clasen recalled that the light vehicles are more agile, hence the driver's reaction by avoidance via steering can occur later, and recalled the existence of the build-up time on hydraulic braking vehicles.

The Chair recalled that NL requested at the previous meeting some figures about the pressure build-up time for hydraulic braking systems.

CLEPA answered that the Industry experience of build-up time for these vehicles and systems is rather inexistent, the reference value would address ESP, and this would apply to 2 wheels only. The expert from CLEPA informed that a value between 0.8 and 1.5 seconds can be reasonable.

The Chair pointed out that the consequence of such pressure build up time would be that there would be not a full braking during the emergency braking phase.

Mr. Clasen informed that the temperature influences the pressure build-up time due to the transmission oil viscosity and the brake disks friction coefficient.

As a summary, the Chair pointed out that 3 Contracting Parties (J, NL and F) are asking to specify a value for the advanced warning timing, and that D had already indicated their support for the joint OICA/CLEPA proposal at the previous meeting. ROK took no position on this issue.

The Chair suggested, in an attempt to make progress, to separate in the discussions for the stationary target the cells B2 (early warning) and C2 (late warning) and to do the same afterwards for the moving target.

In response, industry presented their proposal for flexibility for the moving target scenario (document AEBS/LDWS-19-05), indicating that they could accept a 0.8 sec value for the 1<sup>st</sup> warning provided this could be done by optical means.

#### Moving target scenario

The Chair then suggested to discuss first the moving target scenario.

J could not accept the Industry proposal because they considered braking more important than the warning annoyance. J confirmed their support of the NL proposal. For the moving target scenario in the Industry position, J could not accept "Optical only".

NL could not accept optical only for the 1<sup>st</sup> warning. In the case of the moving target scenario the expert was of the opinion that the nuisance is not that critical.

F pointed out that the distance between the target and the subject vehicle with 1s TTC in the moving target scenario is 4m and proposed the 1<sup>st</sup> warning at 1.4 s and asked Industry about the driver's acceptance with that limit (same as in Row 1).

D could support the Industry proposal.

ROK had no opinion but welcomed the flexibility of Industry.

The Chair considered that the discussions indicated some possibility of compromise about the warning timing for the moving target scenario (except from France)

F repeated their support for "optical only" but wanted 1.4 s warning time delay, with 0.8 s for the 2<sup>nd</sup> warning signal.

Mr. Clasen pointed out that long warning time would jeopardise the manufacturer's wish to increase the speed reduction because the total time would then not be acceptable. OICA added that such warning time would question the speed reduction, in addition to the security margin and the vehicle dynamics. Also, Industry pointed out the fact that the regulation provides only the minimum values and provides freedom to the manufacturer to do better. One manufacturer gave the example of one of his production

line, where 10% of the production are N2, the others are N1. The warning time at 0.8s would permit to use the N1 category AEBS system on the N2 vehicles, while forbidding this would make the AEBS too expensive.

F pointed out the EuroNCAP draft protocol of 1.2 s for driver's reaction and could agree with this value of 1.2s.

It was stressed that EuroNCAP only addresses the M1 vehicles and that the protocol is still under discussion.

The Chair cautioned that the lack of flexibility by one Contracting Party would entail the risk that the informal group has to turn to its parent body, i.e. GRRF, for seeking guidance or even resolution on this technical matter.

F confirmed its position, and repeated to agree with 1.2 s for the 1<sup>st</sup> warning.

The Chair concluded by regretting that the informal group could not find a compromise for the warning time for the moving target scenario and announced his intention to request guidance from GRRF.

The Chair suggested to discuss the "optical only" 1<sup>st</sup> warning based on the assumption that a compromise could be later found for the value of warning time.

F confirmed the willing of 1.2s for the 1<sup>st</sup> signal.

OICA stressed that there is currently no experience of the system on these vehicles, and the need to get millions of kms with different drivers before making a decision on a possible compromise, in view of the risk to completely jeopardise the market confidence in this system.

The Chair therefore suggested asking guidance to GRRF on this issue as well.

#### Stationary target scenario

The group then started discussions on the stationary target scenario. The Chair recalled his proposal for a compromise for B2 and C2 cells, i.e. separating the values for the 1<sup>st</sup> warning from those for the 2<sup>nd</sup> warning.

OICA recalled their offer for flexibility for moving target scenario, and could not be more flexible for the stationary target scenario. The expert recalled the distance of 40 m in front of the target in case of a 0.8s warning time, in particular in view that the system is currently purely theoretical. The proposal is to amend the text such that the warning time is given BEFORE the start of the emergency braking phase. OICA was cautious in accepting an "optical only" warning in this case in view of the fact that the Contracting Parties did not accept the "optical only" for the moving target scenario.

NL found that the parameter for the stationary target scenario is the sensor recognition of a stationary target. NL recalled that a TTC of 1.8 sec provides at least 30m between the subject vehicle and the target. NL could accept optical only.

D supported the Chair's proposal.

J could support 0.8s for the timing, and could not accept "optical only".

F could accept the Chair's proposal.

ROK could also support the Chair's proposal.

OICA could not accept the J position, and was willing to have a further Industry internal consultation about the Chair's proposal.

Temporary conclusion: no conclusive decision on warning times. See also item 5.2. below.

5.2. Speed reduction for row 2 vehicles + target speed for row 2 vehicles

1<sup>st</sup> day

The Chair reminded his recollection of the previous sessions that there is consensus on the speed reduction in the case of the stationary target scenario.

NL accepted this, at least for the 1<sup>st</sup> stage.

D, J, F and ROK agreed with the 10 km/h speed reduction as well.

Conclusion: agreement about the speed reduction in the case of the stationary target scenario.

For the moving target scenario, the Chair recalled the principle of a non-impact scenario.

All the Contracting Parties confirmed their agreement with the proposal, except France which abstained.

F found the Industry proposal of 67 km/h for the target vehicle speed not demanding enough and was keen to get a more severe performance requirement: the expert was of the opinion that the speed reduction is not related to the warning time, rather to the power of the brakes.

OICA recalled that the arguments valid for the warnings apply to the speed reductions. The values proposed by OICA/CLEPA are based on tests performed at Jeversen (see AEBS/LDWS-18-03), and have scientific background. OICA was lacking flexibility on this.

The Chair invited the French representative be ready to present a consistent approach and arguments before the end of the 19<sup>th</sup> meeting. It would indeed be very difficult for GRRF to propose proper values to the experts group. Follow-up of this discussion can be found under item 5.5.

2<sup>nd</sup> day

The group reviewed the document proposed by the drafting group in order to simplify the number and quality of options to be presented to GRRF. The representative of NL found it essential that the issue of warning time be solved within the informal group in order to avoid increase of complexity of the options. He urged Industry to make efforts and be flexible. OICA recalled that 0.8 s would generate a warning 40 m before the target, and that for consistency in the driving information received by the driver, the criteria for the moving target scenario would have to follow the same logics.

It was recalled that the values are currently based on a 4m/s<sup>2</sup> deceleration, while the vehicles are usually able of 6 m/s<sup>2</sup>. The Chair pointed out that the wording does not prevent the manufacturer to design the system such that other warning modes can be used for the 1<sup>st</sup> warning. J continued to believe that the warning is very important and could not change its position. F, D and ROK remained flexible.

OICA repeated that OICA could accept 0.8s provided that “optical only” is permitted in the stationary target scenario for the 1<sup>st</sup> warning. It was proposed that “optical only” remains in the stationary scenario for the 1<sup>st</sup> warning, but be deleted from the moving scenario.

After some further internal considerations, Industry agreed to remove the “optical only” warning for the 1<sup>st</sup> warning of the moving target scenario, with the hope that Japan could offer similar flexibility for the stationary target scenario.

J was ready to provide their position on this item on Tuesday 12 February 2013.

Conclusion: document as in Annex 1 to be updated on the 12<sup>th</sup> of February for tabling at GRRF.

5.3. Revision of the new wording for footnote 4

The group confirmed its selection of the new wording for the footnote 4  
***Manufacturers of vehicles covered by row 2 may elect to gain vehicle Type Approval to the values specified in row 1; in this instance compliance shall be demonstrated with all the values contained in row 1.***

It was recalled that the purpose of this footnote is to avoid cross choices with *panaché*. OICA stressed that the manufacturer can benefit of the footnote for the case a light vehicle has a weight increase, an unique approval would then be sufficient. NL feared that the footnote would lead to interpretation problems. J, D, F and ROK could confirm the agreement.

Conclusion: confirmation of the agreement for the text of this footnote.

5.4. Revision of current provisions which may need to be adapted to the new adopted requirements for row 2 vehicles

The Chair suggested that a draft be ready for amending the core of the regulation in the case the option of having a unique optical signal for the 1<sup>st</sup> warning be chosen for row 2 vehicles.

OICA suggested to simply refer to paragraph 6.4.2.2., with the restriction that 6.4.2.2. applies to the whole column C.

The Chair suggested that a drafting group be set up for proposing a draft text for the second day of the meeting. This was agreed and the discussions about the drafting group's proposal can be found in item 5.2. above (2<sup>nd</sup> day of discussions).

It was also pointed out that an editorial error exists in the wording of paragraph 12.2 of the regulation on AEBS:

“12.2. As from the date of **entry** into force of the 01”

5.5. Reminder: thoughts on 2-step approach for row 2 vehicles

The Chair informed that whatever the outcome of the discussions about the warning time, the group could decide on a 2-step approach.

NL was of the opinion that, only if the informal group manages to find the criteria for the row 2, then there is a need to define the 2<sup>nd</sup> step with values.

D preferred to follow the natural process of amending the regulation;

J found the 2<sup>nd</sup> step a future work because the experts are lacking data and experience.

There is a need for the manufacturers to get experience in the field.

CLEPA pointed out the difficulty for the group to define the 1<sup>st</sup> step right now, and recommended to follow the natural approach.

NL could accept this opinion but stressed that the proposed values for the 1<sup>st</sup> step, if adopted, are a rather easy target.

F suggested adding a footnote with a commitment to find values for the 2<sup>nd</sup> step.

The Chair urged France to produce a written proposal in the course of the 19<sup>th</sup> meeting.

OICA and CLEPA found the idea of a commitment not realistic because the 1<sup>st</sup> step would be implemented in 2018 (registration date), i.e. leading GRRF to commit for 2020.

The group reviewed the proposal from France for a footnote (document AEBS/LDWS-19-06). Some debate took place about the wording of the footnote:

- The date of 1 November is unclear as it could be interpreted as the time as from which the vehicles must be equipped with AEBS complying with the new values, or the time as from which the informal group will be revived
- The wording “review” can mean the study of the data or the decision about new values.

Industry was keen that 3 years be given to design the vehicles in accordance with the new values.

NL found appropriate to have such a footnote for guaranteeing the revision of the values in the future.

D, J and ROK could support the wording as revised by the group.

- 5.6. Interpretation to be given to the last sentence in row 2 of the table in Annex 3, which states that "until such values are adopted (i.e. the values for row 2), CPs shall refrain from issuing type-approvals for these vehicles in accordance with the 01 series of amendments to the AEBS Regulation"

The Chair questioned the necessity to amend the text of the regulation, and mentioned the need to also discuss the format of the document to be submitted to GRRF. The question is whether the manufacturers can request approval to row 2, according to footnote 1, for vehicles equipped with hydraulic braking system. Does the informal group agree to let the possibility for vehicles of row 2 to get approval to the 01 series before 2016?

The experts did not feel comfortable with an amendment to the transitional provisions.

The group had a debate about whether the document could be submitted as a Supplement vs. a new series of amendments.

OICA pointed out the guidelines, which specify that a change in the technical provisions would imply a new series of amendments.

The Chair recalled the very special case the group is facing, and the group took a look into the guidelines (document WP29/1044/Rev.1). It was also clarified that the ultimate decision with this issue would fall into the hands of GRRF.

The Chair subsequently stated that the question would be less relevant should the informal group be able to table a complete document at GRRF (see item 5.2. above, 2<sup>nd</sup> day of the discussions). This question was in addition considered academic.

## 6. Other business

### Nature and format of document to be tabled to GRRF

The group decided to start the consideration of a draft informal document during this 19<sup>th</sup> session.

The group further discussed the time and procedure for adoption by WP29 in November 2013. It was agreed that GRRF should prepare an official document for the WP29 session of November 2013, with the possibility for GRRF-75 in September 2013 to review it.

**7. List of action items**

Working documents in Annex 1 to be consolidated on 12 February, then sent to UN Secretariat for tabling at GRRF-74

**8. Date and place of next meetings.**

GRRF-74	19-22 February 2013	Thursday pm	Geneva (Palais des Nations)
[AEBS/LDWS-20	April/May 2013		TBD] - depends on J position on optical warning.

## ANNEX 1

### Proposal for a Supplement 01 to the 01 Series of amendments to UN Regulation No. [130] (Advanced Emergency Braking Systems)

The modifications to the existing text of the UN Regulation are marked in bold for new or strikethrough for deleted characters.

#### I. Proposal

*Paragraphs 6.4.2.1. and 6.4.2.2., amend to read:*

“6.4.2.1. At least one ~~haptic or acoustic~~ warning mode shall be provided no later than ~~the value~~ specified in Table I Column B of Annex 3, ~~before the start of the emergency braking phase.~~

**In the case of the vehicles referred to in Table I, row 1 of Annex 3, the warning shall be haptic or acoustic.**

**In the case of the vehicles referred to in Table I, row 2 of Annex 3, the warning shall be haptic, acoustic or optical**

6.4.2.2. At least two warning modes shall be provided no later than ~~the value~~ specified in Table I Column C of Annex 3, before the start of the emergency braking phase.”

*Paragraphs 6.5.2.1 and 6.5.2.2., amend to read:*

“6.5.2.1. At least one haptic or acoustic warning mode shall be provided no later than ~~the value~~ specified in Table I Column E of Annex 3, ~~before the start of the emergency braking phase.~~

6.5.2.2. At least two warning modes shall be provided no later than ~~the value~~ specified in Table I Column F of Annex 3, before the start of the emergency braking phase.”



Annex 3, Table I, amend to read:

A	B	C	D	E	F	G	H	Row	
	Stationary target			Moving target					
	Timing of warning modes		Speed reduction (ref. paragraph 6.4.4.)	Timing of warning modes		Speed reduction (ref. paragraph 6.5.3.)	Target speed (ref. paragraph 6.5.1.)		
	At least 1 haptic or acoustic (ref. paragraph 6.4.2.1.)	At least 2 (ref. paragraph 6.4.2.2.)		At least 1 haptic or acoustic (ref. paragraph 6.5.2.1.)	At least 2 (ref. paragraph 6.5.2.2.)				
$M_3^1$ , $N_2 > 8t$ and $N_3$	Not later than 1.4 s. before the start of emergency braking phase	Not later than 0.8 s. before the start of emergency braking phase	Not less than 20 km/h	Not later than 1.4 s. before the start of emergency braking phase	Not later than 0.8 s. before the start of emergency braking phase	No impact	$12 \pm 2$ km/h	1	
$N_2 \leq 8t^{2,4}$ and $M_2^{2,4}$	<b>Not later than 0,8 s before the start of the emergency braking phase</b>	<b>Before the start of the emergency braking phase<sup>3</sup></b>	<b>Not less than 10 km/h</b>	<b>Not later than 0,8 s before the start of the emergency braking phase</b>	<b>Before the start of the emergency braking phase<sup>3</sup></b>	No impact	<b><math>67 \pm 2</math> km/h<sup>5</sup></b>	2	

- 1/ Vehicles of category M3 with hydraulic braking system are subject to the requirements of row 2
- 2/ Vehicles with pneumatic braking systems are subject to the requirements of row 1
- 3/ **Values shall be specified by the vehicle manufacturer at the time of Type Approval (Annex 1, paragraph 15).**
- 4/ **Manufacturers of vehicles covered by row 2 may elect to gain vehicle Type Approval to the values specified in row 1; in this instance compliance shall be demonstrated with all the values contained in row 1."**
- 5/ **The values for the target speed in cell H2 shall be reviewed before 1st November 2021"**

## II. Justifications

Paragraphs 6.4.2.1, 6.4.2.2, 6.5.2.1. and 6.5.2.2:

Changes to these paragraphs will be necessary to clarify the distinction to be made between row 1 and row 2 vehicles in Table 1 in Annex 3, with regard to the choice the manufacturer has for the selection of the warning mode for this first warning signal.

In addition, as there are for row 2 vehicles no values specified for the warning time of the second warning, it would be no longer coherent to refer in these 4 paragraphs to "the value" specified in the columns C and F of Table 1 in Annex 3.

Table I of Annex 3

Heading for column B and column E: the changes of these headings are necessary to ensure coherence with the changes introduced in paragraph 6.4.2.1 to make the distinction between the number of warning modes the manufacturer may chose from for the 1<sup>st</sup> warning, depending on whether it concerns row 1 vehicles (acoustic or haptic) or row 2 vehicles (acoustic, haptic or optical).

*Footnote 3*

When a warning time has not been specified, footnote 3 requires the applicant for approval to declare his warning time.

*Footnote 4*

Provides clarification in case where the applicant requests type approval for a Row 2 vehicle pursuant the pass/fail values specified in Row 1.

*Footnote 5*

The current state of the knowledge of AEBS for vehicles having hydraulic braking system justifies the speed of the target.

When experience with this AEBS system will be gained, it could be possible to envisage a lower target speed. The UN Regulation should be adapted to a lower target speed as soon as possible with the aim to further improve safety.

The addition of the footnote ensures that the target speed will be reviewed in the light of experience gained.

The date proposed is based on the minimum time necessary to gain experience with AEBS systems on these types of vehicle, plus one year to review the UN Regulation.

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