Economic and Social Council

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

Working Party on General Safety Provisions

112th session
Geneva, 24-28 April 2017
Item 16 of the provisional agenda
New regulation on Advanced Driver Assistance Systems (ADAS)

Proposal for a new Regulation on uniform provisions concerning the approval of motor vehicles with regard to the Blind Spot Information System

Submitted by the expert from Germany*

The text reproduced below was prepared by the expert from Germany to introduce requirements for Blind Spot Information Systems (BSIS) intend to be fitted to heavy goods vehicles to protect vulnerable road users.

Please recycle

I.   Proposal

Regulation No. XXX

Uniform provisions concerning the approval of motor vehicles with regard to the Blind Spot Information System

1.   Scope

1.1.   This Regulation applies to the blind spot information system of vehicles of categories N_2 (> 87.5 t permissible maximum mass) and N_3; [other vehicles may be approved at the request of the manufacturer].

1.2.   The requirements of this Regulation are so worded as to apply vehicles which are developed for right-hand traffic. In vehicles that are developed for left-hand traffic these requirements shall be applied by inverting the criteria, when appropriate.

Opmerking [s1]: IWG to check: Agreed on VRU-PROXI 07-03. IWG/GRSG to check if this should still be in (might lead to problems?).

2.   Definitions

For the purposes of this Regulation:

2.1.   *"Approval of a vehicle type"* means the full procedure whereby a Contracting Party to the Agreement certifies that a vehicle type meets the technical requirements of this Regulation;

2.2.   *"Vehicle type with regard to its Blind Spot Information System"* means a category of vehicles which do not differ in such essential respects as:

(a)   The manufacturer's trade name or mark;

(b)   Vehicle features which significantly influence the performances of the Blind Spot Information System;

(c)   The type and design of the Blind Spot Information System.

2.3.   *"Blind Spot Information System (BSIS)"* means a system to inform the driver of a possible collision with a bicycle near side, travelling in a trajectory parallel to the vehicle, if the driver would initiate a turn manoeuvre.

2.4.   *"Reaction time"* means the time between the information signal is given and a driver reaction has occurred.

2.5.   *"Driver Brake deceleration"* means the deceleration that typical drivers apply after receiving the information signal.

2.6.   *"Stopping distance"* means the distance required by the vehicle to come to a full stop after the Blind Spot Information Signal has been given, taking into account reaction time and brake deceleration.

2.7.   *"Collision point"* means the position where the trajectory of any vehicle point would intersect with any bicycle points if a turn by the vehicle would be initiated.

2.8.   *"Last Point of Information (LPI)"* means the point at which the information signal shall have been given. It is the collision point minus the stopping distance on the vehicle trajectory.

2.9.   *"Near side"* means the side of the vehicle near the bicycle. The near side of the vehicle is the right side for right-hand traffic and the left side for left-hand traffic.

2.10.   *"Information signal"* means ~~at least one means out of~~an optical~~, [acoustical and haptical]~~ signal with the purpose of informing the vehicle driver about a nearby moving bicycle.

2.11.   *"Vehicle Trajectory"* means the connection of all positions where the front right corner of the vehicle has been or will be during the course of a test run, projected towards the ground plane.

2.12.   Bicycle means a combination of a bicycle and bicyclist. This is simulated in test cases as specified in section 6.5 with a test device according to annex III.

2.13.   "Common space" means an area on which two or more information functions (e.g. symbols) may be displayed, but not simultaneously.

3.   Application for approval

3.1.   The application for approval of a vehicle type with regard to the BSIS shall be submitted by the vehicle manufacturer or by his authorized representative.

3.2.   It shall be accompanied by the documents mentioned below in triplicate and include the following particular:

3.2.1.   A description of the vehicle type with regard to the items mentioned in paragraph 5. below, together with dimensional drawings and the documentation as referred to in paragraph 6.1. below. The numbers and/or symbols identifying the vehicle type shall be specified.

3.3.   A vehicle representative of the vehicle type to be approved shall be submitted to the Technical Service conducting the approval tests.

4.   Approval

4.1.   If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraph 5. below, approval of that vehicle type shall be granted.

4.2.   The conformity of the requirements in paragraph 5. below shall be verified with the test procedure as defined in paragraph 6. below, however its operation shall not be limited to these test conditions.

4.3.   An approval number shall be assigned to each vehicle type approved; its first two digits (00 for the Regulation in its initial form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to the same vehicle type equipped with another type of Blind Spot Information System, or to another vehicle type.

4.4.   Notice of approval or of refusal or withdrawal of approval pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in Annex 1 and photographs and/or plans supplied by the applicant being in a format not

exceeding A4 (210 x 297 mm), or folded to that format, and on an appropriate scale.

4.5. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark conforming to the model described in Annex 2, consisting of either:

4.5.1.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;[1]

4.5.1.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 4.5.1. above; or:

4.5.2. An oval surrounding the letters "UI" followed by the Unique Identifier.

4.6. If the vehicle conforms to a vehicle type approved under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.5. above need not be repeated; in such a case, the Regulation and approval numbers and the additional symbols shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.5. above.

4.7. The approval mark shall be clearly legible and be indelible.

4.8. The approval mark shall be placed close to or on the vehicle data plate.

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[1] The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.6 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

5. Specifications

5.1.   Any vehicle fitted with a BSIS complying with the definition of paragraph 2.3. above shall meet the requirements contained in paragraphs 5.2. to 5.5. of this Regulation.

5.2.   General requirements

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

5.3.   Performance requirements

5.3.1.   Whenever the system is operative, as specified in paragraph 5.3.1.3. below, the BSIS, working according to paragraph 2.3, shall inform the driver so that the vehicle can be stopped before crossing the bicycle trajectory, taking into account a reaction time of 1.4 seconds and a deceleration of 5 m/s².This shall be tested as specified in paragraph 6.5.

It shall also inform the driver about approaching bicycles while the vehicle is stationary before the bicycle reaches the vehicle front, taking into account a reaction time of 1.4 seconds.

The signal shall be maintained for as long as the conditions of paragraph 2.3 are fulfilled and for at least three additional seconds.

5.3.1.1.   [Switching off -placeholder to be discussed next week. Function as described by EC:

Two-stage deactivation process similar to e.g. ESC deactivation. First stage/activation: e.g. sounds, warning functions, etc are turned off. Second stage: System is completely turned off, but is reactivated as soon as driving conditions significantly change].

[GER: Provisions to deactivate any optional functions as specified in 5.4.3 are allowed if the functionionality as described in 5.3.1. maintained.]

5.3.1.12.   The information signal shall meet the requirements of paragraph 5.4. below.

5.3.1.3.   The BSIS shall be operative for all forward vehicle speeds between 0 km/h and [30] km/h.

5.3.1.4.   The BSIS shall be able to give an information signal for a bicycle moving with a speed between 5 km/h and 20 km/h at a lateral clearance between bicycle and vehicle of between [1.15] and [4.5] metres measured between the outermost point of the vehicle and the centre of the bicycle.

5.3.1.5.   [Make sure there are not much false positives - how to write that down? Maybe take intro text from R130. There is currently a FP check with traffic sign and cones specified, but a corresponding requirement is needed.]

5.3.2.   The system shall also provide the driver with the failure warning specified in paragraph 5.4.3. below when tested in accordance with the provisions of paragraph 6.9. below (failure detection test).

5.4.   Information signal

Opmerking [s3]: **France:** In addition we suggest to confirm the immunity ckeck by adding in the UNECE n°10 regulation the following wording :
"§ 2.12. "Immunity related functions" are: [...]
(b) Functions related to driver, passenger and other road user protection:
(i) e.g. airbag and safety restraint systems, **blind spot information system**."

Opmerking [s4]:
Option 1: Reduce to 25 km/h (ok for all accidents, but for severe accidents, 30 ist better).
Option 2:Maintain 30 km/h, but adjust pass criteria to be not as strict as for test cases

Opmerking [s5]: Effectiveness information will be provided from NL and TfL

5.4.1.   The blind spot information referred to in paragraph 5.3.1. above shall be noticeable by the driver and be provided by at least one warning means out of haptic, optic and acoustic.

5.4.2   Where an optical signal is used for the blind spot warning signal, it shall be visible even by daylight; the satisfactory condition of the signals shall be easily verifiable by the driver from the driver's seat.

5.4.3.   Additional signals and/or automatic brake interventions shall be permitted under the discretion of the vehicle manufacturer as long as these do not violate the requirements in paragraph 5.3.1.5. above.

5.4.4.   The failure warning referred to in paragraph 5.3.2. above shall be a yellow optical warning signal.

> **Opmerking [s6]:** OICA to provide an alternative wording until IWG meeting, if necessary.

5.4.4.1.   The BSIS optical failure warning signal shall be activated either when the ignition (start) switch is turned to the "on" (run) position or when the ignition (start) switch is in a position between the "on" (run) and "start" that is designated by the manufacturer as a check position (initial system (power-on)) or when the vehicle is in "active driving possible mode" (whichever is applicable). This requirement does not apply to warning signals shown in a common space.

5.4.5.   The optical warning signal and optical information signal shall be visible even by daylight; the satisfactory condition of the signals shall be easily verifiable by the driver from the driver's seat.

5.4.6.   When the driver is provided with an optical warning signal to indicate that the BSIS is temporarily not available, for example due to inclement weather conditions, the signal shall remain active as long as the BSIS is not available. The failure warning signal specified in paragraph 5.3.2. above may be used for this purpose.

5.5.   Provisions for the periodic technical inspection

> **Opmerking [s7]:** The following two paragraphs come from R130 (copy+paste).
>
> Option 1: Maintain paragraphss to be in line with other regulations
> Option 2: Remove them, if they are not deemed necessary (**Technical Service to check, CPs to check, EC to check**)
> Option 3: Reword them

[5.5.1.   At a periodic technical inspection it shall be possible to confirm the correct operational status of the BSIS by a visible observation of the failure warning signal status, following a "power-ON" (off-system OK, on-system fault present).

In the case of the failure warning signal being in a common space, the common space shall be observed to be functional prior to the failure warning signal status check.]

[5.5.2.   At the time of type-approval, the means to protect against simple unauthorized modification of the operation of the failure warning signal chosen by the manufacturer shall be confidentially outlined.

> **Opmerking [s8]:**
> =cutting wires?
> =covering sensor?

Alternatively, this protection requirement is fulfilled when a secondary means of checking the correct operational status of the BSIS is available.]

> **Opmerking [HF9]:** What is the final aim of this paragraph ? Is it the right place in this regulation ?

6.   Test procedure

~~State of discussion of test procedure at January 30:~~

~~Conduction of tests in principle is possible (confirmed by DAF presentation). There are some technical issues to be solved with regard to the test equipment (e.g. synchronization between vehicle and dummy).~~

~~However, a "straight driving" test procedure eliminats effectively all risks for test driver and test equipment and allows much more efficient testing~~

~~It seems to be possible to implement a test procedure without actually going into the bend. This can be achieved by extending the required warning time (e.g. move the LPI to earlier positions, where the vehicle would not even start to turn) without sacrificing functionality.~~

~~It might occur that the target is lost during swerving to the outside when driving with a long semi trailer. This will NOT lead to a deactiviation of the warning signal if the modification of paragraph 5.3.1 is accepted, because with this paragraph, the information signal can be turned off at the earliest three seconds after target loss. So, with this provision, the problem is solved.~~

~~Next step: Industry to provide (possibly confidential) information to BASt what test cases are too challenging for current technology and to explain why this is the case. Deadline February 23.~~

6.1. The manufacturer shall provide a documentation package which gives access to the basic design of the system and, if applicable, the means by which it is linked to other vehicle systems. The function of the system shall be explained and the documentation shall describe how the operational status of the system is checked, whether there is an influence on other vehicle systems, and the method(s) used in establishing the situations which will result in a failure warning signal being displayed. The documentation package shall give sufficient information for the type-approval authority to identy the type and to aid the decision-making on the selection of the worst-case.

6.2. Test conditions

6.2.1. The test shall be performed on a flat, dry asphalt or concrete surface.

6.2.2. The ambient temperature shall be between 0° C and 45° C.

6.2.3. The test shall be performed under visibility conditions that allow safe driving at the required test speed.

6.3. Vehicle conditions

6.3.1. Test weight

The vehicle may be tested at any condition of load, the distribution of the mass among the axles being that stated by the vehicle manufacturer without exceeding any of the maximum permissible mass for each axle. No alteration shall be made once the test procedure has begun. The vehicle manufacturer shall demonstrate through the use of documentation that the system works at all conditions of load.

6.3.2. The vehicle shall be tested at the tyre pressures for normal running conditions.

6.3.3. In the case where the BSIS is equipped with a user-adjustable information timing, the test as specified in paragraph 6.5. below shall be performed with the information threshold set at its latest setting. No alteration shall be made once the test procedure has begun.

6.4. Optical failure warning signal verification test

With the vehicle stationary check that the optical warning signal(s) comply with the requirements of paragraph 5.4.3. above.

> **Opmerking [s10]:** 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.
>
> **OF to explain, IWG to decide on this paragraph.**

6.5.   Blind Spot Information dynamic test

6.5.1.   Using cones and the bicycle dummy, form a corridor according to Figure 1, Appendix 1 of this document and the additional dimensions as specified in Table 1, Appendix 1 of this Regulation.

6.5.2.   Position the bicycle target (as detailed in Annex 3 of this Regulation) at the appropriate starting position as shown in Figure 1, Appendix 1 of this Regulation.

6.5.3.   Position a local traffic sign corresponding to sign C14 as defined in the Vienna convention on road signs and signals (speed limit 50 km/h) or the local sign closest to this sign in meaning on a pole at the entry of the corridor as shown in Figure 1, Appendix 1 of this Regulation.

6.5.4.   Drive the vehicle at a speed as shown in Table 1, Appendix 1 of this document with a tolerance of +/- 2 km/h through the corridor.

6.5.5.   Do not operate the turn lights when initiating the turn towards the bicycle trajectory.

6.5.6.   Move the bicycle dummy on a straight line as shown in Figure 1, Appendix 1 of this document in a way that the dummy position crosses line A (Figure 1, Appendix 1) with a tolerance of +/- 0.5 m at the same time when the vehicle crosses line B (Figure 1, Appendix 1) with a tolerance of +/- 0.5 m.

The lateral deviation of the dummy with respect to a straight line connecting initial starting position and theoretical impact point shall be maximum ± 0.2 m..

Move the dummy in a way that the dummy moves in a steady state for at least 8 seconds, with the speed as shown in Table 1, Appendix 1 of this document (with a speed tolerance of ± 0.5 km/h), before reaching the collision point.

6.5.7.   Verify that the Blind Spot Information signal has been activated before the vehicle crosses line C, Figure 1, Appendix 1 of this document.

6.5.8.   Verify that the Blind Spot Information signal has not been activated when passing the traffic sign and any cones as long as the bicycle dummy is still stationary.

6.5.9.   Repeat paragraphs 6.5.1. to 6.5.8. for all a minimum of [5] test cases shown in Table 1, Appendix 1 of this Regulation. However, the technical service conducting the tests shall perform as many tests as necessary to guarantee the compliance of the vehicle with the Blind Spot Information Signal activation. [Where this is deemed justified, the technical service may select test cases different than shown in Table 1, Appendix 1, within the range of vehicle speed, bicycle speed and lateral clearance as indicated in paragraphs 5.3.1.3. and 5.3.1.4.]

6.5.10.   The test is passed when the Blind Spot Information signal has been activated in all test cases as shown in Table 1, Appendix 1 of this Regulation before the vehicle has crossed line C (see paragraph 6.5.7. above) and the Blind Spot Information signal has not been activated in any test run when the vehicle passes the randomly positioned traffic sign (see paragraph 6.5.8. above).

Opmerking [s11]: added to be in line with static test at 6.6.

Opmerking [s12]: Paragraph reworded. All to check if it is OK now.

Opmerking [w13]: Do all tests if turning is deleted (only 7 dynamic + 2 static tests left)

Opmerking [w14]: To be discussed based on general GSR approach.
Options see comment to 5.3.1.3. (required speeds).
Proposal: P/F criteria is LPI at 15 m line for all cases.

6.6.   Blind Spot Information Static Tests

6.6.1.   Static Test Type 1

Leave the vehicle under test stationary. Then maneuver the bicycle dummy perpendicular to the vehicle's center axis with an impact position of the most forward point fo the vehicle, with the minimum bicycle speed of 5 km/h, as shown in Figure 2 in appendix 1.

The test is passed if the Blind Spot information signal is activated at the latest when the distance between bicycle and vehicle is [2] m.

6.6.2.   Static Test Type 2

Leave the vehicle under test stationary. Then maneuver the bicycle dummy parallel to the vehicle's center axis, with a lateral separation of [3] ± 0.2 m between bicycle line of movenent and the vehicle's moust outer point not counting mirrors, with a bicycle speed of 20 ± 0.5 km/h, as shown in Figure 2 in appendix 1. The bicycle should be at constant speed at least 44 m before passing the most forward vehicle point.

The test is passed if the Blind Spot information signal is activated when the vehicle is 7.77 m away from the projection of the vehicle's most forward point to the bicycle line of movement.

6.67.   The manufacturer shall demonstrate, to the satisfaction of the type-approval authority, through the use of documentation, simulation or any other means, that the Blind Spot Information signal is activated, as described in paragraph 6.5.10., also for smaller bicycles and smaller bike target postures, differing by not more than 20% from the values than detailed in Annex 3 of this Regulation.

6.78.   The manufacturer shall demonstrate, to the satisfaction of the type-approval authority, through the use of documentation, simulation or any other means, that the Blind Spot Information signal is not activated, as described in paragraph 6.5.10., when the vehicle passes any other usual stationary object than the randomly positioned traffic sign. In particularly parked cars shall be addressed.

6.69.   Failure detection test

6.69.1.   Simulate a BSIS failure, for example by disconnecting the power source to any BSIS component or disconnecting any electrical connection between BSIS components. The electrical connections for the failure warning signal of paragraph 5.4.3. above shall not be disconnected when simulating a BSIS failure.

6.69.2.   The failure warning signal mentioned in paragraph 5.4.3.above shall be activated and remain activated while the vehicle is being driven and be reactivated after a subsequent ignition "off" ignition "on" cycle as long as the simulated failure exists.

7. Modification of vehicle type and extension of approval

7.1. Every modification of the vehicle type as defined in paragraph 2.2. of this Regulation shall be notified to the Type Approval Authority which approved the vehicle type. The Type Approval Authority may then either:

7.1.1. Consider that the modifications made do not have an adverse effect on the conditions of the granting of the approval and grant an extension of approval;

7.1.2. Consider that the modifications made affect the conditions of the granting of the approval and require further tests or additional checks before granting an extension of approval.

7.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 4.4. above to the Contracting Parties to the Agreement applying this Regulation.

7.3. The Type Approval Authority shall inform the other Contracting Parties of the extension by means of the communication form which appears in Annex 1 to this Regulation. It shall assign a serial number to each extension, to be known as the extension number.

8. Conformity of production

8.1. Procedures concerning conformity of production shall conform to the general provisions defined in Article 2 and Schedule 1 to the Agreement (E/ECE/TRANS/505/Rev.3) and meet the following requirements:

8.2. A vehicle approved pursuant to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements of paragraph 5. above;

8.3. The Type Approval Authority which has granted the approval may at any time verify the conformity of control methods applicable to each production unit. The normal frequency of such inspections shall be once every two years.

9. Penalties for non-conformity of production

9.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 8. above are not complied with.

9.2. If a Contracting Party withdraws an approval it had previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by sending them a communication form conforming to the model in Annex 1 to this Regulation.

10. Production definitively discontinued

If the holder of the approval completely ceases to manufacture a type of vehicle approved in accordance with this Regulation, they shall so inform the Type Approval Authority which granted the approval, which in turn shall forthwith inform the other Contracting Parties to the Agreement applying this

Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

## 11.	Names and addresses of the Technical Services responsible for conducting approval tests and of Type Approval Authorities

The Contracting Parties to the Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests and of the Type Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval are to be sent.
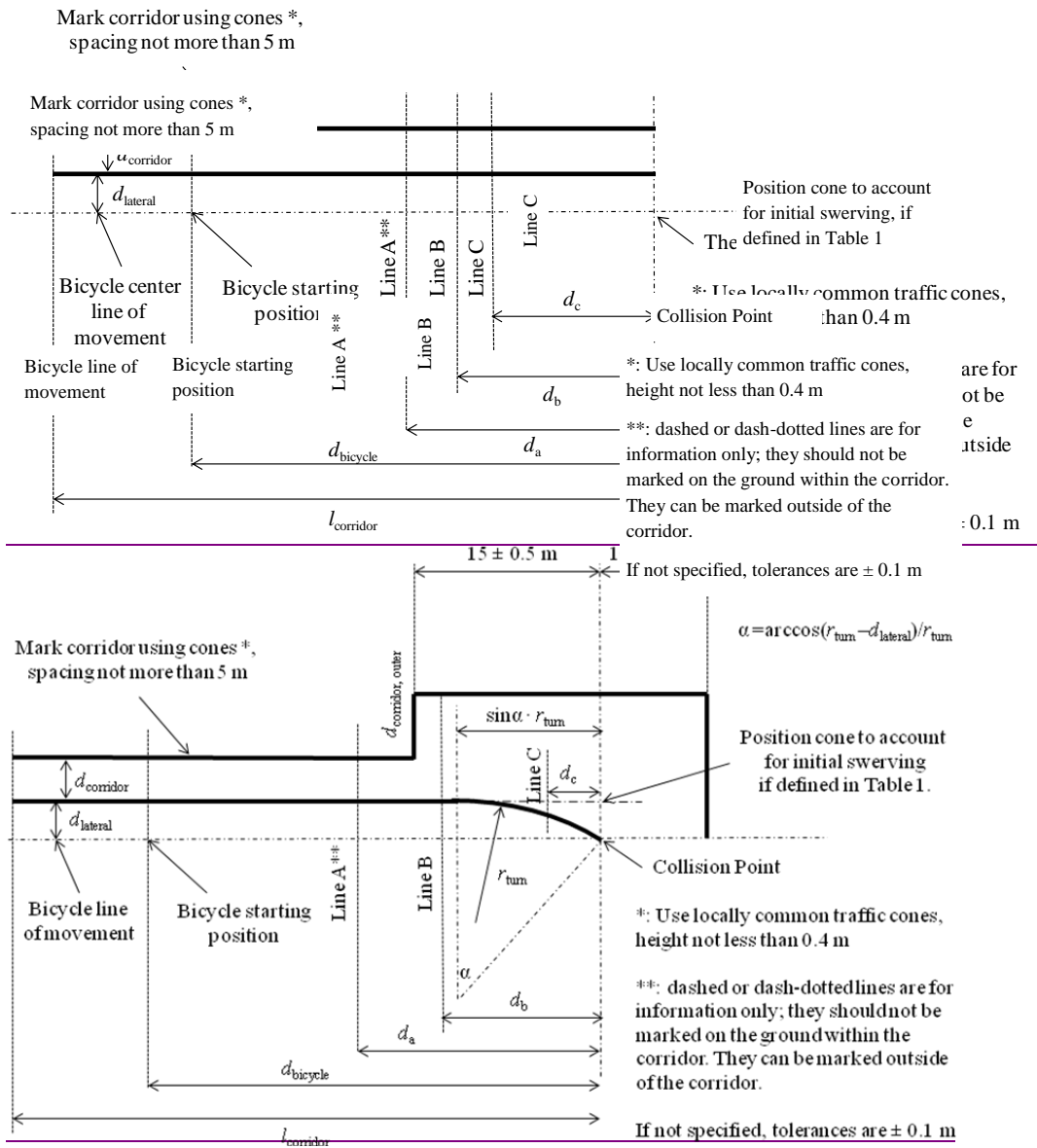
Appendix 1

Figure 1: Dynamic Tests

Mark corridor using cones *,
spacing not more than 5 m

Mark corridor using cones *,
spacing not more than 5 m

$d_{corridor}$

$d_{lateral}$

Line A**

Line B

Line C

Line C

Bicycle center
line of
movement

Bicycle starting
position

Bicycle line of
movement

Bicycle starting
position

Line A**

Line B

Line C

d_c

Collision Point

Position cone to account
for initial swerving, if
The defined in Table 1

*: Use locally common traffic cones,
height not less than 0.4 m

*: Use locally common traffic cones,
height not less than 0.4 m

d_b

d_a

**: dashed or dash-dotted lines are for
information only; they should not be
marked on the ground within the corridor.
They can be marked outside of the
corridor.

$d_{bicycle}$

$l_{corridor}$

If not specified, tolerances are ± 0.1 m

15 ± 0.5 m

If not specified, tolerances are ± 0.1 m

$\alpha = \arccos(r_{turn} - d_{lateral})/r_{turn}$

Mark corridor using cones *,
spacing not more than 5 m

$d_{corridor, outer}$

$\sin\alpha \cdot r_{turn}$

Line C

d_c

Position cone to account
for initial swerving
if defined in Table 1.

$d_{corridor}$

$d_{lateral}$

Line A**

Line B

r_{turn}

Collision Point

Bicycle line
of movement

Bicycle starting
position

α

d_b

d_a

*: Use locally common traffic cones,
height not less than 0.4 m

**: dashed or dash-dotted lines are for
information only; they should not be
marked on the ground within the
corridor. They can be marked outside
of the corridor.

$d_{bicycle}$

$l_{corridor}$

If not specified, tolerances are ± 0.1 m

Figure 2: Static Tests

Table 1

New Test Case	$v_{vehicle}$ [km/h]	$v_{Bicycle}$ [km/h]	$d_{lateral}$ [m]	d_a [m]	d_b [m]	d_c [m]	$d_{bicycle}$ [m]	$l_{corridor}$ [m]	$d_{corridor}$ [m]
1	10	20	1.5	44.4	15.8	~~4.3~~[15]	< 55	> 70	vehicle width + 1m
2	10	20			22	~~4.4~~[15]			
3	20	20			38.3	~~10.7~~[15]			
4	20	10	4.5	22.2	43.5	~~10~~[15]			
5	10	10			19.8	~~2.4~~[15]			
6	10	20		44.4	14.7	~~3.4~~[15]			
7					17.7				

Annex 1

Communication

(Maximum format: A4 (210 x 297 mm)

issued by :   (Name of administration)

....

....

....

Concerning: [2]   Approval granted

Approval extended

Approval refused

Approval withdrawn

Production definitively discontinued

of a type of vehicle with regard to the Blind Spot Information System (BSIS) pursuant to Regulation No. XXX

Approval No.:.......................................~~Extension No.:~~.....................................

> **Opmerking [T.M.H.26]:** Extension number is part of the spproval number since the Revised 1958 Agreement.

1.   Trademark:...

2.   Type and trade name(s):...

3.   Name and address of manufacturer:..

4.   If applicable, name and address of manufacturer's representative: ....

5.   Brief description of vehicle:..

6.   Date of submission of vehicle for approval: ....

7.   Technical Service performing the approval tests: ....

8.   Date of report issued by that Service: ....

9.   Number of report issued by that Service:..

10.   Reason(s) for extension (if applicable) : ....

10.   Approval with regard to the BSIS is granted/refused/extended/withdrawn:[2]

11.   Place:..

12.   Date:...

13.   Signature: ....

14.   Annexed to this communication are the following documents, bearing the approval number indicated above: ....
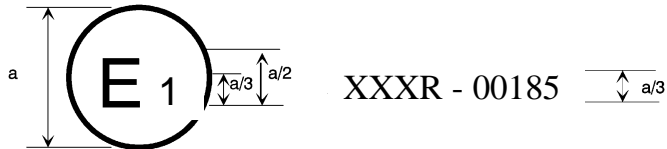
15.   Any remarks:..

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[1] Distinguishing number of the country which has granted/extended/refused/withdrawn an approval (see approval provisions in the Regulation).

[2] Strike out what does not apply.

Annex 2

Arrangements of approval marks

(see paragraphs 4.45. to 4.45.2. of this Regulation)

$$a \quad \bigcirc \text{E} \, 1 \quad \uparrow a/3 \, \downarrow a/2 \qquad \text{XXXR - 00185} \quad \updownarrow a/3$$

a = 8 mm min

The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in Germany (E1) with regard to the BSIS pursuant to Regulation No. XXX. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No. XXX in its original form.

$$2a/3 \quad a/2 \quad \boxed{\text{UI}} \quad 270650 \quad \updownarrow a/3$$

a ≥ 8 mm   a
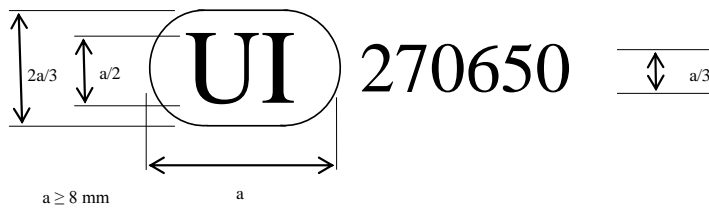
The above Unique Identifier shows that the type concerned has been approved and that the relevant information on that type-approval can be accessed on the UN secure internet database by using 270650 as Unique Identifier. Any leading zeros in the Unique Identifier may be omitted in the approval marking.

Opmerking [T.M.H.27]: Updated according to the Revised 1958 Agreement.

[Annex 3

- ### Draft Bicycle Target[1]

  1. The Bicycle Target (BT) described in this paper represent an average human adult bicyclist on an average standard adult utility bike (Figure 1) in relation to the vulnerable road users detection sensors used in vehicles. The requirements relate, unless not specified otherwise, to the BT including a platform. The BT is designed to work with the following types of automotive sensors technologies: RADAR, Video, Laser and Near-IR-based system similar to the definition of the Articulated Pedestrian Target Specifications.[2] The BT shall be a full 3D-dimensional representation of a real bicyclist and bike, shall have rotating wheels (synchronized to speed), pedalling legs are not mandatory.

Figure 1
Bicycle Target

  2. The bike target is based on a standard utility bike, male size 28 inch. Other typical dimensions are shown below in Figure 2 and Table 1.

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[1] [This section contains the draft specification for the ACEA and Euro NCAP Bicycle Target to be used from 2018 on. A final specification is expected in February 2017, and it is foreseen that there are not much changes.]

[2] ACEA: Articulated Pedestrian Target Specifications Version 1.0.

Opmerking [HF28]: Is it possible to be less design restrictive for bycicle target keeping a defined detectability level regarding detection technology used ?

Opmerking [s29]: Keep this chapter as a placeholder. Use ISO definition **(Patrick to check for ISO progress!)**

**Opmerking [s30]:** Discuss about typeof bicycle; whether this bike is appropriate.

Opmerking [s31]: To be discussed **after January 19**.

Opmerking [s32]: Proposal: Make reference to upcoming ISO standard, so at least different products are fine.

Opmerking [HF33]: Need to open technology to ultra sonic systems too.

Opmerking [s34]: Either that, or delete all other technologies here (and probably rely on ISO reference only).

Figure 2
**Bike target dimensions and dummy posture**
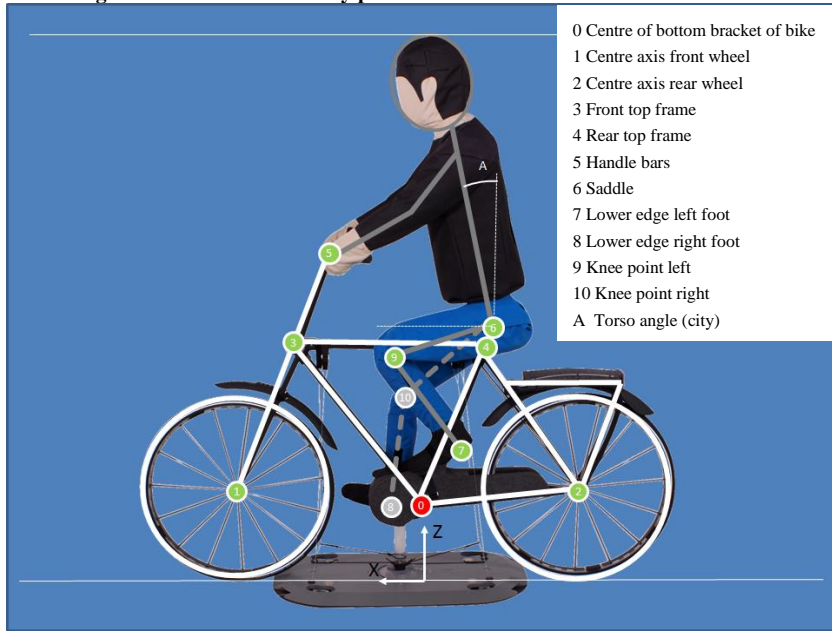
0 Centre of bottom bracket of bike
1 Centre axis front wheel
2 Centre axis rear wheel
3 Front top frame
4 Rear top frame
5 Handle bars
6 Saddle
7 Lower edge left foot
8 Lower edge right foot
9 Knee point left
10 Knee point right
A Torso angle (city)

Table 1
Bike target dimensions

Segment	X [mm]	Z [mm]	Tolerance [mm]
0 Centre of bottom bracket of bike	0	280	± 10
1 Centre axis front wheel	670	340	± 10
2 Centre axis rear wheel	-540	340	± 10
3 Front top frame	430	855	± 10
4 Rear top frame	-215	860	± 10
5 Handle bars	310	1180	± 10
6 Saddle	-235	935	± 10
7 Lower edge left foot[3]	105	495	± 20
8 Lower edge right foot	80	200	± 20
9 Knee point, left[4]	150	860	± 20
10 Knee point, right	85	700	± 20
Total height	1865		± 20
Total length	1890		± 20
A Torso angle [°]	10° (optional 30°)		± 2°

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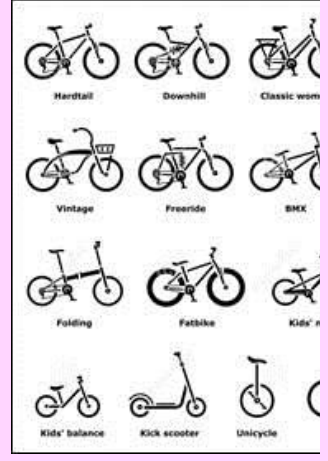
[3]   Lowest point of shoe – centre line tibia.
[4]   Knee point: rotation point of knee.

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3. In order to ensure a realistic scenario, special requirements concerning radar reflection shall be fulfilled. Thus, the diameter of the frame, seat stay and chain stay shall be as followed:

Frame: 25 mm – 35 mm
Seat stay: 15 mm – 25 mm
Chain stay: 15 mm – 25 mm

4. The material of the frame, stays, spokes, steering and rim consists of a black coloured metallic outer surface to ensure that their reflection represent the one of a real bicycle.

5. Dimensions of the bicycle target are based on an adult pedestrian target, described by Articulated Pedestrian Target Specifications 5, representing average (50th percentile) male. The shape of the bicycle target has to comply in its contours with the 50 percent RAMSIS Bodybuilder based on the RAMSIS version 3.8.30 to a permitted tolerance of ± 20 mm. The stature body height of the adult BT is, according to EN ISO 7250-1: 2016-05 is 1800 mm.

Figure 3
Bicycle target dimensions in standing posture
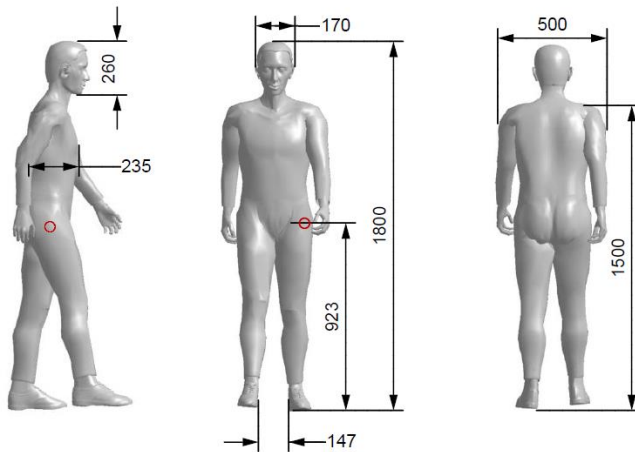
Table 2
Bicycle target dimensions in standing posture

Segment	Dimension [mm]	Tolerance [mm]
Body height (incl. shoes)	1800	± 20
H-Point height	920	± 20
Shoulder width	500	± 20
Shoulder height	1500	± 20
Head width	170	± 10
Head height	260	± 10
Torso depth	240	± 10

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[5] ACEA: Articulated Pedestrian Target Specifications Version 1.0.

6.   The posture of the bicycle target represents a natural driving position, facing forward, both hands on the steering wheel, with right foot down and left foot up (see Figure Figure 4). The same dummy posture is used for all driving directions. The posture definition includes: lower edge of left and right foot, knee point left and right (see Figure and Table 2).

Figure 4
Posture of bicycle target

7.   There shall be a possibility to check and correct the body posture and angle of legs and arms in an easy and practical way corresponding to the defined tolerances, e.g. with the help of a tool with a reference shape.]

Annex 4

Function of test parameters

1. The appropriate Table 1 in Appendix 1 as a function of test parameters can be generated by the following MATLAB (usable with any other compatible software like e.g. open source packages SCILAB or Octave).

```
% Input variables for test cases, ID refers to original test ID

r_turn = [5 10 10 10 5 25 25]; % [m]

d_lat = [1.5 4.5 4.5 1.5 4.5 4.5 1.5]; % [m]

speed_dummy = [20 20 20 20 10 10 20]; % [km/h]

speed_vehicle = [10 10 10 10 10 20 20]; % [km/h]

impact_pos = [6 6 3 0 0 0 6];

decel = 5; % [m/s²]

t_react = 1.4;  %[s]



% Do not plot the available vehicle data

plot_vehicle_data = 0;



% This sorts the test cases for better testing (e.g. not much changes

% in between).
```

```
sort_indices = [1 4 7 6 5 2 3];

r_turn=r_turn(sort_indices);

d_lat=d_lat(sort_indices);

speed_dummy=speed_dummy(sort_indices);

speed_vehicle=speed_vehicle(sort_indices);

impact_pos=impact_pos(sort_indices);


% Add the second set of test cases with tighter corridor


r_turn = [r_turn 5 10 5 10 10];

d_lat = [d_lat 1.5 1.5 4.5 4.5 4.5];

speed_dummy = [speed_dummy 20 20 10 20 20];

speed_vehicle = [speed_vehicle 10 10 10 10 10];

impact_pos = [impact_pos 6 0 0 6 3];


% Position a cone to prevent following exact curvature?

cone = [1 1 0 0 1 1 1 0 0 0 0 0];


% Require speeds stationary at this ttc
```

```
ttc_start = 8;



% Calculate angle of bend until arriving at bicycle trajectory

alpha = acos((r_turn-d_lat)./r_turn)*180/pi;



% Calculate distance travelled in turn

d_turn = alpha*pi/180.*r_turn;



% Calculate distance projected to bicycle trajectory

d_turn_projected = sin(alpha*pi/180).*r_turn;



% Calculate stopping distance including reaction time

d_stop = ones(1,length(speed_vehicle)).*t_react.*speed_vehicle/3.6 + (speed_vehicle/3.6).^2/2/decel;



% Calculalte position for bicycle steady-state

d_a = ttc_start.*speed_dummy/3.6;



% Calculate position for vehicle steady_statea

d_b = ttc_start.*speed_vehicle/3.6 - d_turn + d_turn_projected - impact_pos;

% Make sure this is larger than 15 m in all cases. 15 m is the position
```

```
% where the corridor opens up, and we want to have everything steady state

% by then.


% Calculate LPI (d_c). This calculation requires a distinguishment between

% the cases where the last point of information is in the turn and

%cases where it is before the turn.


% Initialise d_c

d_c = zeros(1,length(d_stop));


% Perform a loop for all test cases

for i = 1:length(d_stop)

    if d_stop(i)>d_turn(i) % this is the case where the LPI is outside of the bent

        d_c(i)=d_stop(i)- d_turn(i)+d_turn_projected(i);

    else

        beta = alpha(i)*((d_turn(i)-d_stop(i))/d_turn(i));

        d_c(i) = d_turn_projected(i)-r_turn(i)*sin(beta*pi/180);

        beta = [];

    end

end
```

```
% Output table

table = [r_turn' speed_vehicle' speed_dummy' d_lat' d_a' d_b' d_c'];

disp(table)


% Generate diagrams


% This is relevant for plotting

X = [5 3 2 2 6 1 1]; % m

X=X(sort_indices);

X = [X 1 1 1 1];

w_vehicle = 2.5; % m

d_bicycle = 55; % m

l_corridor = 70; % m


if plot_vehicle_data

    load data;

end


close all
```

```
for i = 1:length(speed_vehicle)

    figure(i);


    if plot_vehicle_data

        rel = find(strcmp({meta.Type},['Case' int2str(sort_indices(i))]));

        for j = rel

            hold on;

            plot(bla(j).x_vut(bla(j).rel),bla(j).y_vut(bla(j).rel),' r');

        end

    end


    ha(1) = line([-r_turn(i)*sin(alpha(i)*pi/180)-l_corridor],[d_lat(i) d_lat(i)]);

    ha(2) = line([-15-l_corridor],[d_lat(i)+w_vehicle+1 d_lat(i)+w_vehicle+1]);

    ha(3) = line([-15-15],[d_lat(i)+w_vehicle+1 d_lat(i)+w_vehicle+1+X(i)]);

    ha(4) = line([-15 10],[d_lat(i)+w_vehicle+1+X(i) d_lat(i)+w_vehicle+1+X(i)]);

    ha(5) = line([10 10],[d_lat(i)+w_vehicle+1+X(i) 0]);

    ha(6) = line([r_turn(i).*sin(0:0.01:alpha(i)*pi/180)]-
d_turn_projected(i),[r_turn(i).*cos(0:0.01:alpha(i)*pi/180)] r_turn(i)+d_lat(i));

    set(ha,'LineWidth',2,'Color','k');
```

```
hb = line([-d_bicycle 0],[0 0]);

set(hb,'LineWidth',2,'LineStyle',':','Color','k');



hc(1) = line([-d_c(i) d_c(i)],[-10 X(i)+10]);

hd(1) = text(0.5-d_c(i), -10,'Line C');

hc(2) = line([-d_b(i) d_b(i)],[-10 X(i)+10]);

hd(2) = text(0.5-d_b(i), -10,'Line B');

hc(3) = line([-d_a(i) d_a(i)],[-10 X(i)+10]);

hd(3) = text(0.5-d_a(i), -10,'Line A');

hc(4) = line([-d_bicycle d_bicycle],[-10 X(i)+10]);

hd(4) = text(0.5-d_bicycle, -10,'Bicycle Start');

set(hc,'LineWidth',1,'Color','k','LineStyle','-');

set(hd,'Rotation',90)



if cone(i)

    hold on

    plot(0,d_lat(i),'kx');

end



grid on
```

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— axis equal

— pos = axis;

— axis([pos(1) pos(2) -12 18]);

— xlabel('x [m]');

— ylabel('y [m]');

— annot(['Test Case ' int2str(i) ' as defined in Table 1, Appendix 1'],1);

end

2. The following Figures 1 to 12 show the test cases as scaled diagrams.

Figure 1

Test Case 1, as defined in Table 1, Appendix 1

Figure 2

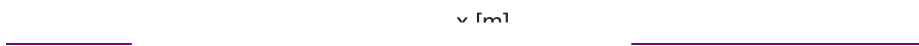**Test Case 2, as defined in Table 1, Appendix 1**

Figure 3

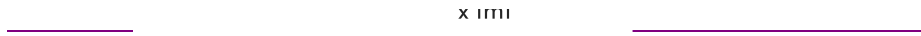**Test Case 3, as defined in Table 1, Appendix 1**

x [m]

Figure 4

Test Case 4, as defined in Table 1, Appendix 1

x [m]

Figure 5

Test Case 5, as defined in Table 1, Appendix 1

Figure 6

Test Case 6, as defined in Table 1, Appendix 1

x [m]

Figure 7

Test Case 7, as defined in Table 1, Appendix 1

x [m]

Figure 8

Test Case 8, as defined in Table 1, Appendix 1

[m]

Figure 9

Test Case 9, as defined in Table 1, Appendix 1

Figure 10

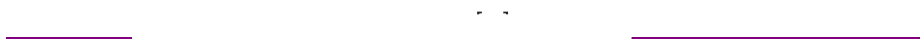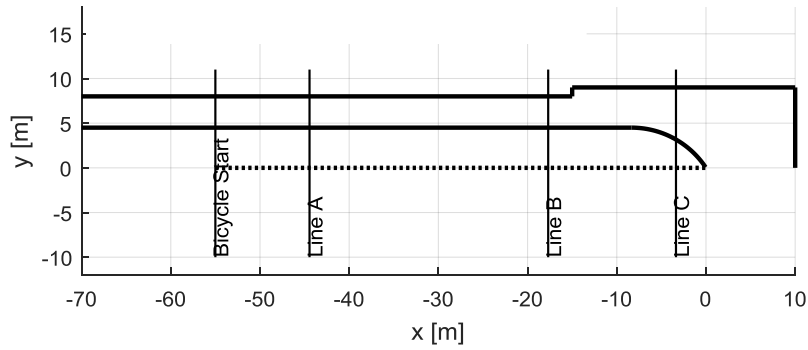**Test Case 10, as defined in Table 1, Appendix 1**

Figure 11

Test Case 11, as defined in Table 1, Appendix 1

Figure 12

Test Case 12, as defined in Table 1, Appendix 1

II. Justification

The justification and information about the test procedure was provided in informal document GRSG-109-19 and in presentations GRSG-110-18-Rev.1 and GRSG-111-24. The draft Regulation will be further explained during the 112th session of the Working Party on General Saftey Provisions (GRSG) on the basis of another informal document.