Proposal for amendments to false reaction avoidance of UN Regulation 152
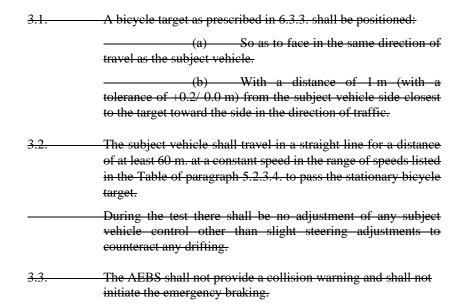
I.   Proposal

Remove existing scenarios of false reaction avoidance:

1.   Vehicle Target

1.1.   Two stationary vehicles. of Category M₁ AA saloon shall be positioned:

(a)   So as to face in the same direction of travel as the subject vehicle;

(b)   With a distance of 4.5m (with a tolerance of +0.2/ 0.0 m) between them;

(c)   With the rear of each vehicle aligned with the other.

1.2.   The subject vehicle shall travel for a distance of at least 60 m. at a constant speed in the range of speeds listed in the Table of paragraph 5.2.1.4. of this Regulation to pass centrally between the two stationary vehicles.

During the test there shall be no adjustment of any subject vehicle control other than slight steering adjustments to counteract any drifting.

1.3.   The AEBS shall not provide a collision warning and shall not initiate the emergency braking.

2.   Pedestrian Target

2.1.   A pedestrian target as prescribed in 6.3.2. shall be positioned:

(a)   So as to face in the same direction of travel as the subject vehicle.

(b)   With a distance of 1 m (with a tolerance of +0.2/-0.0 m) from the subject vehicle side closest to the target toward the side in the direction of traffic.

2.2.   The subject vehicle shall travel in a straight line for a distance of at least 60 m. at a constant speed in the range of speeds listed in the Table of paragraph 5.2.2.4. to pass the stationary pedestrian target.

During the test there shall be no adjustment of any subject vehicle control other than slight steering adjustments to counteract any drifting.

2.3.   The AEBS shall not provide a collision warning and shall not initiate the emergency braking.

*Insert **new** scenarios of false reaction avoidance, to read:*

"**The following scenarios shall be used as the tool in order to share technical information which clarifies behaviour and the safety concept of the system between the Technical Service and the vehicle manufacturer. In each scenario, the vehicle manufacturer shall demonstrate the Technical Service how the system behaves safely. So, these scenarios don't have specific pass / fail criteria.**

Scenario 1: Left turn or Right turn at the intersection

1.1.   In this scenario, the subject vehicle passes by a left turn or right turn in front of an oncoming vehicle that is stopped to make a left turn or right turn at an intersection.

1.2.   The subject vehicle drives at a speed of [30] km/h (with a tolerance of +0/-2 km/h) toward the intersection, and decelerates by braking to a speed of not less than [20] km/h at a point where the subject vehicle begins to steer left / right, and the TTC to the oncoming vehicle is not more than [2.3] seconds. When the subject vehicle turns left or right in the intersection, the speed is reduced to not less than [13] km/h, and then drives at a constant speed. The TTC to the oncoming vehicle is not more than [1.4] seconds at when the wrap ratio between the subject vehicle and the oncoming vehicle becomes 0%.

Scenario 2: Right turn or Left turn of a forward vehicle

2.1.   In this scenario, the subject vehicle follows a forward vehicle. After that, the forward vehicle turns right or left at a corner, and the subject vehicle goes straight.

2.2.   Both the forward vehicle and the subject vehicle drive at a speed of [40] km/h (with a tolerance of +0/-2 km/h) on the straight road. The forward vehicle decelerates by braking to a speed of [10] km/h (with a tolerance of +0/-2 km/h) in order to turn right or left at the corner, and the subject vehicle also decelerates by braking to keep appropriate distance with the forward vehicle. At when the forward vehicle begins

to turn right or left, the speed of the subject vehicle is not less than [30] km/h and the TTC to the frontal vehicle is not more than [3.5] seconds. After that, the subject vehicle decelerates to a speed of not less than [21] km/h, and then drives at a constant speed. The TTC to the forward vehicle is not more than [1.6] seconds at when the wrap ratio between the subject vehicle and the oncoming vehicle becomes 0%.

Scenario 3: Passing each other at a curved road

3.1.   In this scenario, the subject vehicle and another vehicle pass each other at a small radius curved road.

3.2.   The subject vehicle and another vehicle ([M1] category) approaches a curve from opposite directions of which the radius is not more than [20] m at the centre of the road. Speed of the two vehicles is [20] km/h (with a tolerance of +0/-2 km/h) constant. In the curve, the subject vehicle drives inner lane than the centre of the road, and another vehicle drives outer lane than the centre of the road. The subject vehicle and another vehicle pass each other at approximately [middle] of the curve.

Scenario 4: Curved road with guard pipes and a stationary object

4.1.   In this scenario, the subject vehicle drives a small radius curved road of which the guard pipes are constructed to the outer side, and a stationary vehicle ([M1] category) or a stationary pedestrian target is positioned just outside of the guard pipes and where on the extension of the centre of the lane.

4.2.   The subject vehicle drives at a speed of [30] (with a tolerance of +0/-2 km/h) km/h toward the curve of which the radius is not more than [25] m at the outer side of the road, and decelerates by braking to a speed of not less than [24] km/h at a point where the subject vehicle enters the curve. The TTC to the stationary vehicle or a stationary pedestrian target is not more than [1.5] seconds at when the subject vehicle begins to turn in the curve. In the curve, the subject vehicle drives outer lane than the centre of the road. After that, the subject vehicle continue to turn in the curve at a constant speed of not less than [24] km/h. The TTC to the stationary vehicle or a stationary pedestrian target is not more than [1.0] second at when the wrap ratio between the subject vehicle and the stationary vehicle becomes 0%, or at when the offset ratio[*] between the subject vehicle and the centre of the pedestrian target becomes -100%.

[*]offset ratio between the subject vehicle and the stationary object is calculated by the following formula.

$$R_{offset} = L_{offset} / (0.5 * W_{vehicle}) * 100$$

R_{offset} : Offset ratio [%]

L_{offset} : Amount of offset between the centre of the subject vehicle and the centre of the stationary object, and the direction of offset to the driver's seat side is defined as plus (+) [m]

$W_{vehicle}$: Width of the subject vehicle [m]

Scenario 5: Straight road on which a pedestrian is walking

5.1.   **In this scenario, the subject vehicle drives a straight road on which a pedestrian is walking on the roadside in the same direction to the subject vehicle or walking on the roadside in oncoming direction to the subject vehicle.**

5.2.   **The subject vehicle drives a straight road at a speed of [30] km/h (with a tolerance of +0/-2 km/h), and a pedestrian is walking at a speed of about [5] km/h (with a tolerance of $\pm$ 0.2 km/h). The directions of a walking pedestrian:**

        (a) Same as the subject vehicle

        (b) Oncoming to the subject vehicle.

        The closest distance between outer side of the subject vehicle and the pedestrian is not more than [1] m, and guard pipes:

        (a) Positioned between the subject vehicle and the pedestrian

        (b) Not positioned

Scenario 6: Lane change due to road construction

6.1.   **In this scenario, the subject vehicle changes the lane in front of the signboard which is positioned in the centre of the lane and notifies the driver that the lane is reduced.**

6.2.   **The subject vehicle drives a straight road at a speed of [40] km/h (with a tolerance of +0/-2 km/h), and begins to steer in order to change the lane in front of the signboard which notifies reducing the lane. No other vehicles approach the subject vehicle. The TTC to the signboard is not more than [3.7] seconds at when the subject vehicle begins to steer. During changing the lane, the speed of the subject vehicle is constant, and the TTC to the signboard is not more than [3.0] seconds at when the offset ratio between the subject vehicle and the centre of the signboard becomes -100%.**

Scenario 7: Left turn or Right turn of another vehicle on the opposite lane

7.1.   **In this scenario, on a straight road, another vehicle comes into the lane of oncoming side from left side or right side of the road.**

7.2.   **The subject vehicle drives a straight road at a speed of [40] km/h (with a tolerance of +0/-2 km/h). The other vehicle turns right or left from left or right side of the road and comes into the lane of oncoming side at a speed of not more than [3] km/h. During the right turn or left turn of the other vehicle, the outer corner of the vehicle slightly touches the lane marking, but it doesn't cross the lane marking. The TTC to the other vehicle is not more than [1.0] second at when the outer corner of the other vehicle touches the lane marking.**

Scenario 8: Lane change on a straight road with guard pipes and a stationary pedestrian target

8.1. **In this scenario, the subject vehicle changes the lane, and guard pipes are positioned at the road side of the target lane.**

8.2. **The subject vehicle drives a straight road at a speed of [30] km/h (with a tolerance of +0/-2 km/h), and begins to steer in order to change the lane. A stationary pedestrian target is positioned outside of the guard pipes which is positioned at the roadside of the target lane, and the position of a pedestrian target is in front of the centre line of the subject vehicle when the angle between the centre line of the subject vehicle and the lane marking becomes approximately maximum."**

II. Justification

1. The False Reaction scenarios in Annex 3-Appendix 2 were based on R131 (trucks in highways), and it was not verified sufficiently whether they are appropriate for passenger cars. Therefore, Japan proposes some additional or amendment scenarios in the Appendix.

2. The above scenarios are based on the traffic scenes where it is possible for passenger cars to encounter on public roads.

3. In the above scenarios, the subject vehicle speed and TTC to the related objects are based on the basic research which was carried out by Japan in order to measure data of driving behaviour of normal drivers.

4. The False Reaction scenarios shall be used as the tool in order to share technical information which clarifies behaviour and the safety concept of the system between the Technical Service and the manufacturer. The safety concept to the False Reaction is different in each vehicle manufacturer, therefore, simple and appropriate pass / fail criteria cannot be defined according to new technologies in the future.