

## Proposal for amendments regarding GRVA-12-52

In creating the draft informal document UNR157-15-03 certain elements of text that were in document UNR157-14-03 were mistakenly not carried across. These were proposals to modify text around the assessment of the target lane to change back to the assessment being based on the visibility of the ALKS vehicle rather than the detectability of the approaching vehicle.

Modifications to the existing text of UN-Regulation No. 157 are in **bold** for new or ~~striketrough~~ for deleted characters.

Modifications to GRVA-12-52 are in **green bold** for new or ~~green striketrough~~ for deleted characters and were included in UNR157-14-03 but were included in UNR157-15-03.

Modifications to GRVA-12-52 are in **blue bold** for new or ~~blue striketrough~~ for deleted characters and were included in UNR157-14-03 but were **not** included in UNR157-15-03.

Further proposed amendments are in **red bold**.

### I. Proposal

*Paragraph 5.2.6.7.2.1., amended to read:*

#### 5.2.6.7.2.1. When there is an approaching vehicle

~~An approaching vehicle in the target lane should not have to~~  
**The ALKS vehicle shall not make an approaching vehicle in the target lane** decelerate, particularly in the case where the lane change is not urgent (e.g. for the purpose of overtaking a slower moving vehicle). But where this is necessary due to the traffic situation, in the absence of more specific traffic rules, the ~~approaching vehicle shall not have to~~ **ALKS vehicle shall not make an approaching vehicle in the target lane** decelerate at a higher level than A m/s<sup>2</sup>, B seconds after the ALKS vehicle starts, to ensure the distance between the two vehicles is never less than that which the ALKS vehicle travels in C seconds.

With:

- (a) A equal to 3.0 m/s<sup>2</sup>
- (b) B equal to:
  - (i) 0.4 seconds after the start of the LCM, provided that ~~the full width of the approaching vehicle was detected by the ALKS vehicle during its lateral movement for at least 1.0 second~~ there was at least 1.0 s lateral movement of the ALKS vehicle within the starting lane **that was visible to the approaching vehicle from the rear and was without any obstruction of the ALKS vehicle** before the LCM starts; or
  - (ii) 1.4 seconds after the start of the LCM.
- (c) C equal to 1.0 second.

*Paragraph 5.2.6.7.2.3. (first), renumbered to 5.2.6.7.2.2.*

#### 5.2.6.7.2.3.2. When there is no vehicle detected

**If no approaching vehicle is detected by the system in the target lane, the assessment shall be calculated as per 5.2.6.7.2.1. with the assumption that:**

- (a) the approaching vehicle in the target lane is at a distance from the ALKS vehicle equal to the actual rearward detection range;
- (b) the approaching vehicle in the target lane is travelling with the allowed maximum speed + 30km/h or 160km/h, whichever is lower; and
- (c) ~~the full width of the approaching vehicle is detected by the ALKS vehicle during its lateral movement for~~ there was at least 1 second lateral movement of the ALKS vehicle within the starting lane **that was visible to a potential approaching vehicle from the rear and was** without any obstruction of the ALKS vehicle.

Paragraph 5.2.6.7.3.1., amended to read:

**5.2.6.7.3.1. When there is an approaching vehicle**

In the absence of more specific traffic rules, ~~an approaching vehicle in the target lane should not have to~~ the ALKS vehicle shall not make an approaching vehicle in the target lane decelerate at a higher level than A m/s<sup>2</sup>, B seconds after the ALKS vehicle starts the lane change manoeuvre, to ensure the distance between the two vehicles is never less than that which the ALKS vehicle travels in C seconds.

With:

- (a) A equal to 3.7 m/s<sup>2</sup>
- (b) B equal to:
  - (i) 0.0 second, if the lateral movement of the ALKS vehicle continued for at least 1 second while the vehicle had not yet crossed the lane marking and the direction indicator had been active for at least 3.0 seconds prior to crossing of the lane markings while ~~the full width of the vehicle approaching from the rear was detected by the sensing system~~ ALKS vehicle was visible to the approaching vehicle from the rear **and was** without any obstruction of the ALKS vehicle;
  - (ii) 0.4 seconds after the start of the LCM, provided that ~~the full width of the approaching vehicle was detected by the ALKS vehicle during its lateral movement for at least 1.0 second~~ there was at least 1.0 s lateral movement of the ALKS vehicle within the starting lane **that was visible to the approaching vehicle from the rear and was** without any obstruction of the ALKS vehicle before the LCM starts; or
  - (iii) 1.4 seconds after the start of the LCM.
- (c) C equal to:
  - (i) 0.5 second, if the lane change is performed towards a lane intended for slower traffic or towards the hard shoulder; or
  - (ii) 1.0 second, for all other conditions.

Paragraph 5.2.6.7.3.1., amend to read:

**5.2.6.7.3.2. When there is no vehicle detected**

If no approaching vehicle is detected by the system in the target lane, the assessment shall be calculated as per 5.2.6.7.3.1. with the assumption that:

- (a) the approaching vehicle in the target lane is at a distance from the ALKS vehicle equal to the actual rearward detection range;
- (b) the approaching vehicle in the target lane is travelling with the allowed maximum speed +30 km/h or 160km/h, whichever is lower, or if the target lane is a hard shoulder, the approaching vehicle is travelling at a speed of 80 km/h or has a speed difference to the ALKS vehicle at the start of the LCM of 40 km/h, whichever is the lower speed; and
- (c) ~~the full width of the approaching vehicle is detected by the ALKS vehicle during its lateral movement for there was at least 1 second lateral movement of the ALKS vehicle within the starting lane~~ that was visible to a potential approaching vehicle from the rear and was without any obstruction of the ALKS vehicle.

## II. Justification

1. If a sensor is placed in an outer mirror or in the outer edge of the rear bumper it can easily happen that another vehicle driving in the same lane behind obstructs the ALKS vehicle nearly totally from the perspective of the driver coming from behind in the adjacent lane at a certain distance. He may see only a part of the side of the ALKS vehicle or the one rear corner. But to decide, whether the ALKS vehicle is really drifting towards the lane and is starting a lane change where the driver may have to react, the driver of the other vehicle should see the whole rear part of the ALKS vehicle (i.e. both corners of the vehicle where the direction indicators are located). This is for two reasons:
    - a. Only with seeing both vehicle corners where the direction indicators are located can the driver see and decide whether the other vehicle has the hazard warning lights on or the direction indicator to only one side to indicate a lane change.
    - b. To see and reliably recognise a lateral drift of the ALKS vehicle (it should be reliable because it may require a braking action of the other driver in free flow traffic) you need to see the ALKS vehicle with a certain lateral dimension/width to determine the direction of the movement.
  2. On the other hand, for the sensor in the ALKS vehicle it is a very easy task to always see the whole vehicle width of the other vehicle because the sensor looks on the other lane to the side and will be hardly affected by any obstruction (vehicle directly behind the ALKS vehicle) in this direction of view.
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