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Working Party on Lighting and Light-Signalling (GRE)

Fifty-seventh session
2-6 October 2006
Item 4.1. of the provisional agenda

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 48

(Installation of lighting and light-signalling devices)

Submitted by the expert from Japan

Note: The text reproduced below was prepared by the expert from Japan proposing additional provisions for automatic activation of the hazard warning signal under certain circumstances. The proposal supersedes ECE/TRANS/WP.29/GRE/2006/23 and takes into account amendments, based on ECE/TRANS/WP.29/GRE/2006/30, adopted at the fifty-sixth GRE session (ECE/TRANS/WP.29/GRE/56, para. 15). The modifications to the current text of the Regulation or ECE/TRANS/WP.29/GRE/2006/30 are marked in **bold** characters.

Note: This document is distributed to the Experts on Lighting and Light-Signalling only.

A. PROPOSAL

Insert new paragraphs 6.6.7.3. to 6.6.7.3.2., to read:

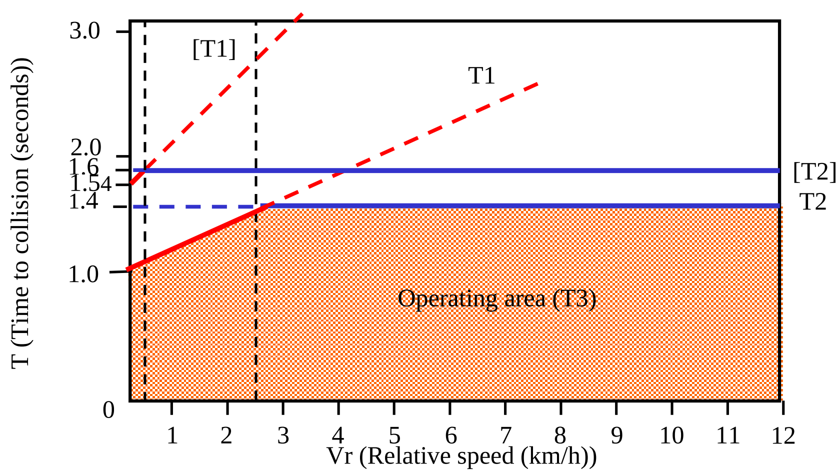
"**6.6.7.3. The signal may be activated automatically in case the collision seems to happen. This shall be deemed to be satisfied if the following conditions are met:**

6.6.7.3.1. where the estimated time to collision (T) which is the time obtained by dividing distance by relative speed between following vehicle and leading vehicle, is not more than T1 (braking avoidance timing) and T2 (steering avoidance timing) (see figure below);

T1 = 0.0167 Vr + 1.00 (if 0 < Vr < 24.0) or

[T1 = 0.0317 Vr + 1.54 (if 0 < Vr < 1.9)]

and T2 = 1.4 (if Vr ≥ 24.0) or [T2 = 1.6 (if Vr ≥ 1.9)]



6.6.7.3.2. this signal shall not be activated during the ESS and/or the direction-indicator lamp operation."

Paragraph 6.6.7.3. (former), renumber as paragraph 6.6.7.4.

Paragraph 6.6.9., amend to read:

"6.6.9. Other requirements

6.6.9.1. As specified in paragraph 6.5.9. If a power-driven vehicle is equipped to draw a trailer the hazard warning signal control shall also be capable of bringing the direction-indicator lamps on the trailer into action. The hazard warning signal shall be able to function even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.

[6.6.9.2. If the vehicle complies with paragraph 6.6.7.3., the stop lamp may be flashing as hazard warning signal at the choice of the manufacture.]"

B. JUSTIFICATION

During the fifty-sixth GRE session, Japan submitted ECE/TRANS/WP.29/GRE/2006/23 proposing conditions for automatic activation of hazard warning signal. However, it was necessary to clarify the operating area. Therefore, Japan volunteered to prepare this proposal.

General

Japan believes that it is important to update UNECE Regulations in order to reflect new vehicle safety technologies available.

In Japan, there are a large number of accidents when the driver of the following vehicle is preoccupied or looking sideways and thus fails to check the timely status of the leading vehicle (including when the leading vehicle is stopped at an intersection) resulting in a rear-end collision with the leading vehicle. There are many similar accidents in Europe, too.

If the following vehicle is detected and the hazard-warning signal automatically activated in advance, then the driver of the following vehicle will be less likely to fail to recognize the leading vehicle and thus the number of rear-end collisions or the degree of injury may be reduced.

Ad paragraph 6.6.7.3.

Japan believes that the current text of Regulation No. 48 is not clear enough. Although, GRE adopted at its fifty-sixth session ECE/TRANS/WP.29/GRE/2006/30, introducing certain conditions for activation of automatic hazard warning signal, the adopted amendments do not cover the system proposed by Japanese experts. Therefore, Japan introduces its clarified proposal.

The concept of the emergency stop signal (ESS) is to provide a high frequency rear-flashing signal in order to inform the following vehicle(s) that the driver is applying emergency braking. ESS is activated regardless of the presence of a following vehicle.

The concept of Japanese system is to temporarily notify the driver of a following vehicle that there is a potential hazard due to a very short vehicle-to-vehicle distance as a result of a lack of forward recognition, such as careless driving. The Japanese system is activated only if there is a following vehicle. Therefore, the purpose of the ESS differs from the Japanese system.

The purpose of the Japanese system is in agreement with the definition of "Hazard warning signal" as laid down in Regulation No. 48:

"2.7.18. "Hazard warning signal" means the simultaneous operation of all of a vehicle's direction-indicator lamps to show that the vehicle temporarily constitutes a special danger to other road-users;"

Therefore, the Japanese experts believe that the hazard warning signal is the most appropriate for introduction of their system.

Even if the driver of a following vehicle is driving carelessly, he can recognize the danger ahead by the flashing rear lamps of the forward vehicle. The colour of the signal would not make great difference in its effect with regard to improving the recognition of the presence of a leading vehicle by the driver of the following vehicle. Therefore, it is possible to discuss using a red flashing signal for that purpose.

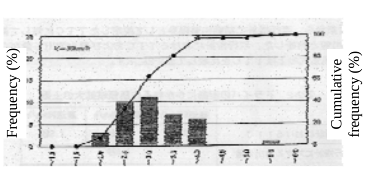
<u>Ad paragraph 6.6.7.3.1.</u>

The operating area (T3) has been determined taking into consideration the normal braking avoidance lower limit (T1) and normal steering avoidance start lower limit (T2) when the driver of a following vehicle performs a normal driving. These values were determined on the basis of the Japanese study: "Technical Guidelines for Frontal Obstacle Collision Reduction Brake System".

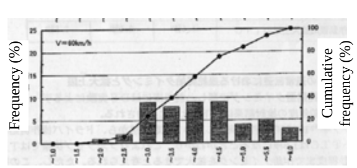
It is difficult for the sensor to detect whether the following vehicle is a small-sized motor vehicle or a large-sized motor vehicle. Therefore, in order to reduce unnecessary operations, the value of a small-sized motor vehicle, which has a higher avoidance capability, has been used. However, it is possible to use the value of large-sized motor vehicles in order to reduce accidents regardless of unnecessary operations. Therefore, the values for large-sized motor vehicles are given in square brackets for further discussion.

T1 Refers to the time from the moment when the test subject recognizes that the distance to a forward stationary obstacle is getting shorter and, thus, judges that there is a danger (the vehicle should not get closer any more under normal conditions) of collision if the driver takes no avoidance operation, while the vehicle is running toward the stationary obstacle at a constant speed. In other words, it refers to the minimum value of the braking avoidance timing at the time when the driver takes a normal avoidance operation (the vehicle should not get closer any more under a normal condition).
This has been obtained through the actual vehicle tests, carried out by the Japan Automobile Research Institute (JARI), in which the test subject takes a braking avoidance for each designated speed in relation to a stationary obstacle.

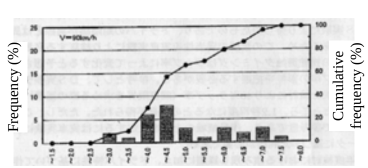
Distribution of brake start timing in normal avoidance:
(Example of small-sized motor vehicles)



Brake start timing (seconds)



Brake start timing (seconds)



Brake start timing (seconds)

Minimum values (in seconds):

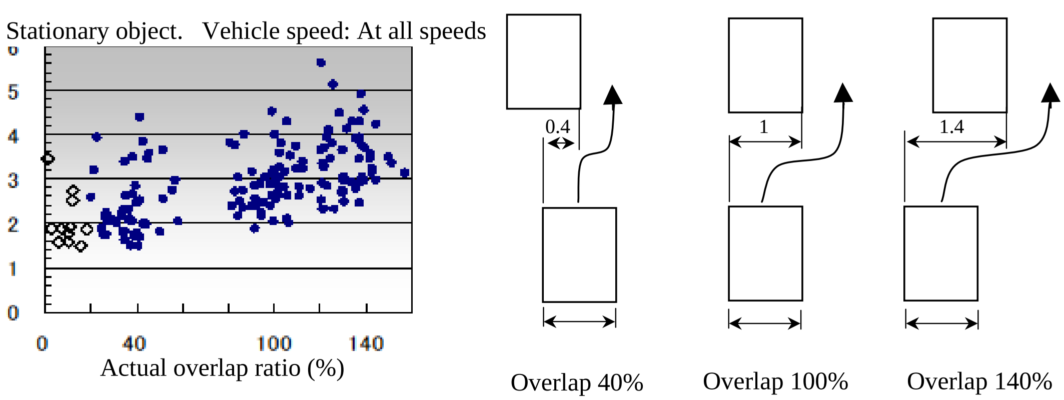
Small-sized motor vehicles */	Large-sized motor vehicles **/
Vehicle speed 30 km/h=1.73	Vehicle speed 30 km/h=2.46
Vehicle speed 60 km/h=2.00	Vehicle speed 60 km/h=4.00
Vehicle speed 90 km/h=2.74	Vehicle speed 80 km/h=4.05 sec

*/ Motor vehicles with a passenger capacity of 10 persons or less.
**/ Motor vehicles with a passenger capacity of 11 persons or more, and trucks with a gross vehicle weight of 8 tons or more and with a maximum loading capacity of 5 tons or more.

These values can be expressed by a linear formula "T1=0.0167Vr + 1.00" in the case of small-sized motor vehicles; and "T1=0.0317Vr + 1.54" in the case of large-sized motor vehicles.
Moreover, this means that, as an example, when a motor vehicle running at a speed of 30 km/h is getting closer to another stationary motor vehicle, the driver starts braking avoidance at a deceleration equivalent to 0.6 G + a marginal vehicle-to-vehicle distance of approximately 6.6 m in the case of small-sized motor vehicles; and at a deceleration equivalent to 0.6 G + a marginal vehicle-to-vehicle distance of 15.0 m in the case of large-sized motor vehicles.
(The use of different operating areas can be discussed).

T2 Refers to the time from the moment when the test subject recognizes that the distance to a forward stationary object is getting shorter and, thus, judges that there is a danger (the vehicle should not get closer any more under normal conditions) of collision if the driver takes no avoidance operation, while the vehicle is running toward the stationary obstacle at a constant speed. In other words, it refers to the minimum value of the steering avoidance timing at the time when the driver takes a normal avoidance operation (the vehicle should not get closer any more under a normal condition).
This has been obtained through the actual vehicle tests, carried out by JARI, in which the driver avoids an obstacle to the right by a steering operation.

(Example of small-sized motor vehicles)



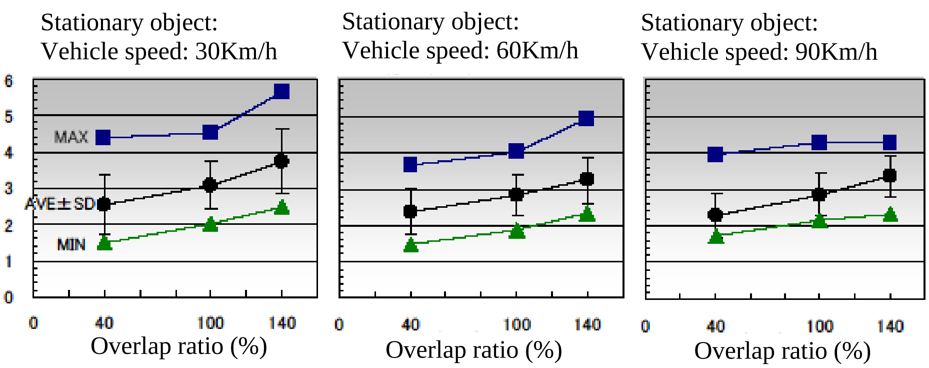
Minimum values:

Small-sized motor vehicles: 1.47 (seconds);

Large-sized motor vehicles: 1.64 (seconds).

<u>Note</u>: These values do not vary greatly depending of the vehicle speed.

(Example of small-sized motor vehicles)



The minimum value of these values (the minimum value of the steering start timing) is regarded as the threshold value.

(The use of different operating areas can be discussed).

T3 The system will not operate at the time of overtaking, for the system will operate at a timing when it will not interfere with the avoidance operation of the driver.

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