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Working Party on Road Traffic Safety

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**REPORT OF THE WORKING PARTY ON ROAD TRAFFIC SAFETY
ON ITS FIFTY-FIRST SESSION**

Addendum

Revision of the Consolidated Resolution on Road Traffic (R.E.1)

Speed

Members of WP.1 will find below the text on speed (basis ECE/TRANS/WP.1/2005/19/Rev.2) as adopted by the Working Party at its fifty-first session (see ECE/TRANS/WP.1/108, paragraphs 29-30).

The contents of this text will be incorporated into chapter 1 of the Consolidated Resolution R.E.1 according to the draft structure of R.E.1 contained in document ECE/TRANS/WP.1/2005/15/Rev.4.

R.E.1**Section concerning speed**

Amendments made to document ECE/TRANS/WP.1/2005/19/Rev.2 appear in bold

Chapter 1 - General rules relating to behaviour in traffic

...

1.1 Speed

Statistics in all countries show that speeds over the permitted limits or speeds inappropriate to the state of the road or traffic conditions affect both the risks of accidents and the consequences of accidents. Put another way, speed causes accidents insofar as it reduces the possibility of manoeuvring in time to avoid the danger and exacerbates them, since the greater the speed the more violent the impact and the severer - not to say more dramatic - the consequences.

1.1.1 *Some figures on the effects of speed*

(a) Depending on the country, excessive or inappropriate speed is the origin of between 30 and 50% of fatal accidents;

(b) Excessive or inappropriate speed has dramatic consequences for pedestrians. The probability of a pedestrian being killed is multiplied by eight with an increase in impact speed from 30 km/h to 50 km/h;

(c) A variation in average speed causes in general, according to certain studies, a **greater variation in the same direction** (increase or decrease) in the number **and severity** of accidents;

(d) Speed increases stopping distance, which is equivalent to the reaction distance plus the braking distance. It is recalled that a driver's reaction time to an unexpected event varies between 1 and 2 seconds.

The tables below give, by way of example, the stopping distance for a driver's reaction time of 1 second:

Table 1. For a vehicle containing only the driver

Speed in km/h	Stopping distance on dry road (in metres) with a grip coefficient of 0.7	Stopping distance on wet road (in metres) with a grip coefficient of 0.4
30	17	18
50	34	38
90	82	95
100	106	118
130	147	179

Table 2. For a fully loaded vehicle

Speed in km/h	Stopping distance on dry road (in metres) with a grip coefficient of 0.7	Stopping distance on wet road (in metres) with a grip coefficient of 0.4
30	18	20
50	38	44
90	95	122
100	113	145
130	176	215

(e) **High** speeds contribute to the increase of polluting emissions and noise **and therefore affect the quality of life of the population, particularly in urban areas. Moreover**, the operating costs of the vehicle (increased fuel and oil consumption, more wear on tyres) **are higher**;

(f) The time gained by driving faster is minimal and overestimated; on a journey of 100 km, only 6 minutes are gained by driving at 150 km/h instead of 130 km/h;

(g) Speed increases the risk of mistakes and fatigue sets in more quickly;

(h) Speed requires still greater attention at night; since the passing beam only lights the road up to 30 m ahead, above 70 km/h an obstacle emerging into the lighted zone cannot be avoided;

(i) The faster the driving speed, the more visual perception is reduced; the field of vision is 100° at 40 km/h, but becomes 30° at 130 km/h;

(j) The higher the speed, the less the tyres adhere to the road.

1.1.2 Factors influencing choice of speed:

Although numerous factors, such as those described below, can influence the choice of speed, a driver must, in all circumstances, have control of his vehicle, as required by Article 13 of the Vienna Convention on Road Traffic, so as to be able to exercise due and proper care and to be at all times in a position to perform all manoeuvres required of him.

1.1.2.1 External factors

- (a) Aspects of the road affecting the driver:
- Type (motorway, dual carriageway, country road, urban street, etc.)
 - Function (transit, local traffic, etc.)
 - Cross-section (notably, width and number of lanes)
 - Horizontal and vertical alignment
 - Framework (tunnel, bridge)

- Lay-out of intersections
 - Road markings
 - State of surface, etc.
- (b) Aspects of the vehicle affecting the driver:
- Type
 - Mass/power ratio
 - Comfort
 - Sound-proofing, etc.
- (c) Aspects of traffic affecting the driver:
- Density
 - General speed
 - Composition
- (d) Aspects of the environment affecting the driver:
- Climate conditions
 - Time of day (day/night)
 - Landscape (plain, mountains, tourist spots, etc.)
 - Road lighting
 - Signs
 - Speed limits
 - Radars, etc.

1.1.2.2 *Factors linked to the driver*

- (e) And, naturally, the following criteria affect the driver himself:
- Age
 - Sex
 - Reaction time
 - **Driver education**
 - **Fatigue**
 - Attitudes (perception of dangers, sensation-seeking, etc.)
 - **Driving under the influence of alcohol and/or drugs and medicines**
 - **Presence of passengers**
 - Circumstances of the journey

The choice of an appropriate speed, however, basically depends on the driver's perception, leaving aside any psychological or subjective factors that may intrude (personal concerns, fear of arriving late, etc.); in order to select an appropriate speed, he must be in a position to estimate it.

Studies have shown that estimation of speed is essentially based on:

- Auditory information:- absence of this information leads to underestimation of speed;
- Peripheral vision - wide roads with no reference points also lead to underestimation of speed.

Moreover, the sensation of speed decreases in the course of driving and drivers always change their speed less than is necessary when they need to reduce [...] it. **This is particularly the case at points of transition, namely when there are changes either at the level of the road environment or when the rules of the road require it;**

Finally, the perception of speed **may be affected**:

- (a) **when the same speed** is maintained unchanged for a long period; and
- (b) **when** peripheral vision is reduced, particularly because of the lack of reference points.

In order to achieve the best possible results where speed is concerned, measures should be taken to ensure that:

- (a) driver errors become less likely;
- (b) it is less tempting [...] to break the speed limit;
- (c) errors and infringement of speed limits do not necessarily lead to an accident;
- (d) the **infrastructure** installations on the roadside do not worsen the situation when an accident happens and on the contrary that they can absorb driver errors or limit their consequences.

1.1.4 Recommendations

In view of the above, competent authorities are recommended to consider the following measures:

1.1.4.1 With regard to regulations:

- (a) Establish general speed limits in terms of the type of road in question and its equipment (**urban roads**, motorways, dual carriageways, **other** roads,), categories of vehicles (light vehicles, heavy vehicles, etc.), drivers (e.g. novice drivers) and weather conditions (rain, snow, fog, **etc.**);
- (b) Establish local speed limits where the dangerous nature of the section or the regulation of the traffic requires, making sure that the limits are justified and are applied by drivers. Additional recommendations on this subject can be found in chapter 16, items 16.1 and 16.2 of the present Resolution.

- (c) Clearly indicate local speed limits by means of appropriate signs respecting the principles of uniformity and consistency by applying the same criteria as for similar traffic conditions;
- (d) **Recommend on heavy vehicles the installation of speed limiters** which are already obligatory in certain countries. **Moreover, it should be taken into account that some countries already recommend the use on light vehicles of devices which help drivers to better to observe speed limits such as cruise control and/or speed limiters that can be adjusted by the driver.**

1.1.4.2 With regard to infrastructure design:

- (a) Introduce a road network hierarchy in terms of the functions of each road (transit, local traffic, **etc.**);
- (b) Ensure the homogeneity of traffic as far as possible in order to avoid speed discrepancies between different categories of vehicles (prohibition of slow vehicles in high-speed sectors);
- (c) Ensure that infrastructure installations and the design of the road remove all uncertainty where drivers are concerned, i.e. by giving them means of easily identifying the type of road they are on and the type of users they are likely to meet;
- (d) Implement measures obliging drivers to use a lower speed. For example, in an urban context, the measures most frequently introduced are:
 - residential zones and zones where the speed is limited to 30 km/h, known as “30 km/h zones”
 - roundabouts;
 - speed-control **humps**, etc.
- (e) Ensure a safety-enhancing design for the edge of the road in order to reduce the possible consequences of some driver errors in the case of the vehicle leaving the road.

1.1.4.3 With regard to checks and penalties:

Make speed checks an essential element of observing speed limits by giving drivers the impression that they may be checked at any time (see also [...] chapter 2, item 2.3 of the present Resolution which is devoted exclusively to checks and penalties). [...]
