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**REVISION OF THE CONSOLIDATED RESOLUTIONS ON
ROAD TRAFFIC (R.E.1) AND ON ROAD SIGNS
AND SIGNALS (R.E.2)**

**DRAFT RECOMMENDATION ON IMPROVEMENT OF
VISIBILITY AND LEGIBILITY OF ROAD SIGNS**

Transmitted by the International Road Safety Organisation (PRI)

This document was prepared by the experts of the International Road Safety Organisation (PRI) for consideration by the WP.1 Working Party at its thirty-sixth session.

It introduces a draft recommendation to be attached to R.E.2 concerning the improvement of visibility and legibility of road signs, particularly at night, at dawn or at dusk, or during unfavourable weather conditions, by using the photometric retroreflective and fluorescent properties of the products used in road signs.

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Improvement of visibility and legibility of signs

The Vienna Convention of 1968 is no longer up to date as regards the daytime and night-time visibility of road signs and is no longer adapted to present traffic conditions.

Traffic conditions have changed since 1968, not only because the number of vehicles and heavy vehicles in particular has increased, but also because of the ageing of the population, and especially of drivers.

This changing road environment means that traffic signs conforming to the old conditions are no longer adequate today in most situations for today's road users.

This is particularly relevant for night driving. Although, generally speaking, night traffic is a third of day traffic, the number of accidents at night is equivalent to those occurring during the day. This may in part be explained by the fact that 90 per cent of information of use to drivers is visual.

In view of this change in traffic conditions, national regulations concerning traffic signs have been amended over time to accommodate present-day traffic conditions. Particularly as regards the level of visibility required in daytime or at night, these national regulations recommend the use of products whose performance varies according to the conditions encountered.

It is now time to consider amending the Vienna Convention, particularly in aspects relating to the visibility of road signs so that it will be in conformity with national regulations.

The attached draft recommendation therefore deals with two essential issues concerning the effectiveness of road signs.

1. Visibility at night

1.1 If they are to be effective, road signs must furnish a level of luminance corresponding to the needs of users, to ensure not only greater safety but also some degree of driving comfort.

1.2 The degree of luminance required depends on a large number of factors, such as the category of road, the position of the traffic sign, the ambient illumination, the type of vehicle and the driver's age.

1.3 Numerous studies in the existing literature show that in complex environments (e.g. in towns) or on particularly dangerous sections of road, the need for a higher retroreflective level than is required in more ordinary situations is perfectly justified.

1.4 The Vienna Convention should therefore be amended in order to incorporate this notion of different degrees of retroreflection according to different situations.

2. Daytime visibility

2.1 It is assumed that all signs are visible by day. There are conditions, however, in which visibility is considerably reduced (fog or rain, at dawn or dusk).

2.2 Studies have shown conclusively (SINTEF 1997 and TNO 1997) that in these particularly unfavourable conditions, the use of fluorescent colours together with retroreflection at least doubles visibility.

2.3 Similar studies have shown that the use of highly conspicuous colours has a positive impact on road safety, not only at known danger spots (where the use of fluorescent colour as a surround for a prescribed sign reduces speeds) but also in the vicinity of roadworks where the use of fluorescent signs helps to reduce the number of lane-changes and the speed before, during and after the works area.

2.4 The purpose of the proposed recommendation is therefore to take this technological advance into account by recommending the use of such materials where there is a need to alert users to the potential dangers they may encounter or more generally in cases where it must be possible to guarantee the visibility of the sign by day, whatever the weather conditions.

DRAFT RECOMMENDATION ON THE IMPROVEMENT OF VISIBILITY AND LEGIBILITY OF ROAD SIGNS

1. Introduction

1.1 Considering the increase in motorized traffic in the industrialized and developing countries and countries in transition;

1.2 Considering the constantly expanding access to driving, particularly by young people, but also by an ageing population whose visual acuity deteriorates with age;

1.3 Considering the development of the road network and the diversity of technical characteristics and traffic conditions, according to the functions of each road category:

1.3.1 Transit traffic over long distances linking the most important cities, carried by motorways and dual carriageways or first category main roads,

1.3.2 Regional and local transit traffic on main roads categorized as lower category,

1.3.3 Local traffic on local or urban roads where general traffic and environmental conditions introduce visual disturbances of a specific nature and volume;

1.4 Considering the increasing number of heavy vehicles on each of these categories of roads and the potential dangers resulting from mixed traffic;

1.5 Road signs are required to play an increasingly vital role in guiding users and warning them of danger. The visibility and legibility of signs vary considerably depending on the type of road, traffic conditions, the positioning of the signs (on the right shoulder, the left shoulder, or suspended over the traffic lanes).

1.6 There is therefore a growing need for optimum visibility and legibility of signs. In order to provide a proper response to this need, the effectiveness of signs must be adapted to the diversity of situations in order to meet user needs. The visibility and legibility of road signs need to be enhanced.

1.7 Effective signs (performance, criteria) ensure security in driver behaviour in modern traffic.

2. Proposal

2.1 The visibility and legibility of signs and the immediate comprehension of the message are essential for the free flow of traffic. Each sign must be equally visible by day or by night (dimensions, forms and colours) whatever the weather conditions.

2.1.1 By day, this requirement is ensured, as the Vienna Convention recommends, by:

2.1.1.1 The harmonization of signs and symbols and a forms and colours code allowing immediate identification of the sign and its meaning by any driver in international traffic,

2.1.1.2 Sufficient contrast between the background and the letters and symbols to allow easy reading of the message,

2.1.1.3 The use of a range of dimensions in accordance with the type of road on which the signs are placed, in relation to driving speed and consequently the time needed to read the message.

2.1.2 Daytime visibility and legibility of signs can be greatly enhanced by the use of fluorescent colours.

2.1.3 By night, the visibility and legibility of signs are ensured by lighting, or by the use of retroreflective signs. Since retroreflective signs guarantee complete visibility of the information under any weather conditions, even when a lighting device is defective, this is the solution that is most frequently used generally, both in built-up areas and on country roads.

3. Use of retroreflection

3.1 Retroreflection should become the general rule at night, so that the driver will receive the same message as by day, whether signs are illuminated or not.

3.2 In this case the retroreflective level of road signs must be adapted to the characteristics of the road network, the position of the signs, to traffic conditions and to the environment.

3.3 The retroreflective level should therefore be highest:

3.3.1 On motorways and important main roads carrying heavy high-speed traffic, particularly for direction and informative signs,

3.3.2 For signs in sensitive areas (motorway junctions and exits, roundabouts, intersections ...),

3.3.3 For signs in a complex lighted environment or above the road,

3.3.4 For some categories of signs, particularly danger signs or signs indicating a traffic regulation with a strong impact on road safety, such as priority signs.

4. Use of fluorescence

4.1 Fluorescence results from a physical phenomenon which enables the visibility of signs to be increased, especially at dawn and dusk, and when weather conditions during the day are particularly bad, for example, during fog.

4.2 Recent technological developments have made it possible to create products combining retroreflective colours with fluorescence, the quality and durability of which are very close to the best high performance products currently used for the requirements of modern traffic.

4.3 It is therefore highly recommended that this property should be used to improve the visibility of signs in particularly dangerous situations.

4.4 The use of this phenomenon should be reserved for certain colours (yellow, red and orange) in the following forms:

4.4.1 As a background for yellow and orange signs, generally temporary and roadworks signs,

4.4.2 To enhance the visual impact of signs which use other background colours, especially white, by putting a regulatory sign in a frame (rectangular or following the original form) covered with the retroreflective fluorescent product. In this case, the use of products of a very light yellow tending towards green, known as lime green, is recommended,

4.4.3 In order to ensure homogeneity in the message to users, this method, in one of the two forms described above, should be reserved for signs for situations recognized as being among the most dangerous and in specific situations, such as, for example:

4.4.3.1 Large roadworks or specific work sites located in places which may create a surprise effect on users and involve the use of counterflow lanes in the event of lane diversion on motorways or dual carriageways,

4.4.3.2 Diversions, particularly when the alternative routes use local roads with geometrical features and equipment of a lower category than the road network closed to traffic,

4.4.3.3 Warning of a pedestrian crossing used by children in the vicinity of schools (A 13),

4.4.3.4 Warning of level crossings (A 25, A 26) and barriers,

4.4.3.5 Warning of an intersection of a road and a cycle path (A 14) or an intersection between a road and a lane reserved for public transport vehicles,

4.4.3.6 Warning signs for zones with a particularly high risk of accidents or accident "black spots".
