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Working Party on Road Transport
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ROAD TRANSPORT INFRASTRUCTURE

Amendments to the AGR (annex II)

Proposals transmitted by France

Note by the secretariat

At the ninety-eighth session of the Working Party on Road Transport (SC.1), the Director of the Transport Division, referring to the work done in Verona on road safety, requested the Working Party to consider the possibility of creating a new Convention or a new annex to the AGR on the evaluation of the impact of road safety with regard to roads, similar to the one that already existed for the environment. He invited the countries to provide the secretariat with all useful information on the subject. He also asked the Working Party to reflect on the possibility of preparing a methodology for road safety inspection.

Following this invitation, the French delegation undertook to submit proposals on the two topics: the evaluation of the impact of road safety with regard to roads and a methodology for road safety inspection. These proposals, partially amended by the secretariat in agreement with the expert from the French delegation, are set out below.

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ROAD AND SAFETY

Preamble

In-depth analyses of incidents occurring on the road network show that most of the time an accident results from the conjunction of a multiplicity of adverse factors:

- conduct of the driver, alcohol, fatigue, failure to respect the rules, etc.,
- state of the infrastructure, slippery roadway, form of a bend, camber of road, etc.,
- state of the vehicle, brakes, tyres, lighting, etc.

Whatever the final diagnosis and the improvements proposed, it should be borne in mind that:

- a very great majority of fatal accidents have their origin in human error, while the infrastructure, the vehicle and secondary factors (alert/assistance/treatment) are successively implicated in the remainder;
- increased speed leads to more and increasingly severe accidents (conversely, reducing speed leads to reduced numbers of less serious accidents).

The technical expert needs to understand the accident whatever the circumstances and draw from it lessons concerning the infrastructure. In this regard and where road safety is concerned, the aim of a road network designer or manager should be as far as possible to circumvent the processes leading to accidents by upgrading the infrastructure and to ensure that the mistakes that a driver is, despite everything, liable to make do not have serious consequences.

Upgrading the infrastructure should therefore ensure the best possible conditions for environment/user interaction so that the consequences of off-road mistakes by drivers can, if necessary, be reduced. The requirements that will make the infrastructure safe will take into account aspects of the functioning or malfunctioning of the man/vehicle/environment system. The machine (vehicle)-infrastructure-environment must be adapted to the human operator and his possible lapses.

If this infrastructure objective is to be achieved, a systematic inspection must be made **of all new roads** in order to check that safety criteria have been complied with and that improvements to the roads are in keeping with that objective.

A systematic inspection **of existing roads**, however, cannot really be envisaged on the basis of safety criteria. It would entail vast programmes of roadworks and, moreover, no guarantee that they would be effective. An approach based on the analysis of accidents to persons over a period of several years could mobilize attention on eliminating or reducing the dysfunctional factors which have caused accidents. Actions can be given an order of precedence in terms of their commitment to greater efficiency.

1. Criteria for assessing infrastructure safety qualities

A list of safety qualities to be taken into consideration in guidelines for considering a project or an existing road network is given below. They are assessed in the form of questions.

1.1 Visibility

Does the visual information reach the user and reach him in time (bearing in mind speed behaviour and the speed of other users) to adjust his behaviour or to manoeuvre as events require?

Can another user (or a pedestrian) about to take or cross a road/traffic lane see sufficiently far ahead to have the time to take in the information, decide on the manoeuvre and perform it efficiently and smoothly?

1.2 Readability

Can the infrastructure and the environment be easily deciphered so that the user can rapidly ascertain where he is and the course he should take and comfortably anticipate events (movement of traffic, pedestrians, modification of the infrastructure, etc.) that may arise and adapt his behaviour accordingly?

1.3 Matching the infrastructure to dynamic stresses

If the behaviour of the vehicle and its speed in particular (in part as caused by the road network and the environment) is taken into account, is it possible for the infrastructure to prevent dynamic disruptions (skidding, overturning, etc.)?

1.4 Possibilities of evasive action and recovery

Can a user in a critical situation hope to avoid a collision (by braking, swerving, etc.) or regain control of a vehicle in difficulties? Does the infrastructure provide areas for evasive action or recovery enabling certain emergency manoeuvres to be performed?

1.5 Limiting the gravity of collisions

Are obstacles along roads (trees, lamp-posts, etc.) sufficiently few and far between and set back from the road so as not to aggravate the consequences of accidents?

Are the inclines in the vicinity of the road sufficiently gentle not to give rise to wheel-locking or overturning?

Is collision speed sufficiently low, particularly in the case of a collision with a pedestrian or a two-wheeled vehicle?

1.6 Consistency of all aspects of the road network and its environment

Are the main aspects of the road (cross-section, type and frequency of junctions, etc.) consistent with its use and functions and its environment?

Has a school entrance been located on the best street for pedestrian safety, with the least rapid and most moderate traffic, given the large numbers of young pedestrians involved?

Do the features of the infrastructure and the environment induce users to drive more carefully?

1.7 Taking heavy vehicles into account

Over equivalent distances travelled in kilometres, heavy vehicles are less often involved in accidents than light vehicles with the exception of motorways, but when they are involved the accidents are noticeably more serious whatever the other user groups concerned. Is the specific nature of this category of vehicles, in terms of their dimensions, their weight and their manoeuvres, taken into account in certain adaptations of the road network?

Certain situations in particular are to be avoided in project design, for example:

- Steep inclines;
- Numerous or sharp bends;
- Existence of an average short hill between two steep inclines with an adverse effect on problems of perception and strategy since it may lead to an acceleration intended to cool the brakes;
- Presence of difficulties in the lower part of a downhill section (tight bend, intersection, entrance to a built-up area);
- Narrow exit angle at interchanges;
- Limited use on motorways of ad hoc restraint devices to protect other users;
- No horizontal markings for the shoulder;
- Soft verges, etc.

Each manager must assess whether, given the stakes (accidents, etc.) a specific treatment or upgrading is required to prevent situations of this type.

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METHODOLOGY FOR ROAD-MONITORING MISSIONS

Preamble

A road-monitoring mission has two objectives:

- to ascertain that the project fulfils the order and complies with the technical instructions, standards and the rule book,

- to ensure final quality control of road safety and that the measures taken are in keeping with the protection of the environment.

1. Main aspects subject to inspection

Monitoring should take place in two phases, the first once the project has been drawn up and the second on completion of the work, before the road is brought into service.

A. First phase

During the first phase, monitoring should involve all the aspects of the project listed below:

1.1 Geometrical characteristics relating to:

- longitudinal sections,

- cross-sections,

- type sections,

- special sections for specific equipment such as noise walls, screening mounds, crash barriers, etc.

1.2 Exchanges and re-establishment of communications:

- merging lanes,

- deceleration lanes,

- weaving lanes,

- distances between entrances and exits situated close to each other (including those of related lay-bys, where necessary),

- single-level intersections.

1.3 Special facilities provided for the movement of:

- pedestrians,
- two-wheeled vehicles,
- public transport,
- works vehicles and animals.

The same applies to facilities for:

- vehicle parking,
- entry to the site of the engineering work,
- protection of local residents and specific engineering works in passages through sensitive areas.

1.4 Taking into account of the conclusions of geological, geotechnical, hydrological and hydrogeological studies (water tables, water networks, catchment areas, etc.) which affect areas traversed or engineering works requiring special protection.

1.5 Earthmoving:

- specification of sub-grades (materials and their origin),
- slope of cutting and embankment inclines.

Drainage:

- natural flow,
- points of discharge in the environment.

Carriageway:

- class of traffic,
- class of bearing capacity of the road level,
- freezing index,
- structural types,
- surfaces, etc.

1.6 Engineering works:

- bridges,
- walls exceeding a certain length,
- tunnels,
- covered or semi-covered cuttings exceeding a certain length.

1.7 User services equipment:

- vertical and/or horizontal signs and marking,
- services areas or lay-bys.

1.8 Maintenance centres for:

- specific equipment (lighting, ventilation, pumping station, etc.),
- special technical devices (equipment for engineering works, anti-pollution devices, etc.),
- landscaping amenities (banks, central reservation with plants, services areas and lay-bys, etc.),
- periodic events (stocks of sand, salt, etc.).

1.9 Centres of operations justified by the issues at stake:

- status and type of road network,
- level of traffic evaluated or forecast,
- account taken of expected major upheavals or constraints (climate variations, seasonal migrations, heavy commuter traffic, etc.).

B. Second phase

During the second phase, prior to bringing the road into service, **compliance with the implementation of the project** should be monitored and **a check made in situ that**:

- the conditions for the protection of the environment for which the project provides have been met,
- the project implemented does not present problems for the safety of users. This check is carried out with the assistance of independent experts with competence in road safety.

2. Distribution of responsibilities

Four levels are involved.

2.1 The State

In a concern for transparency and independence, each region or administrative area should establish an ad hoc service (road inspection mission) for which the State should identify the standard terms of reference, even where sponsorship and management of road networks are or are likely to be entrusted to a decentralized service or a concessionaire.

2.2 The developer and/or manager:

- approves the project,
- takes financial responsibility for the studies and the work,
- draws up the timetable and places an order with the contractor for the studies and the work requested,
- after checking the inspection mission, gives his approval on the basis of the file delivered by the contractor for each stage of the work,
- approves the acceptance of the work on the basis of the final report submitted by the contractor,
- decides on entry into service, following prior inspection by the inspection mission.

2.3 The inspection mission:

- advises the developer and the contractor,
- on behalf of the developer ensures the external quality control defined above,
- performs the inspection prior to entry into service with the assistance of experts.

2.4 The contractor, enterprises and subcontractors have the conventional responsibilities of their professions.
