No. 21618. EUROPEAN AGREEMENT ON MAIN INTERNATIONAL TRAFFIC ARTERIES (AGR). CONCLUDED AT GENEVA ON 15 NOVEMBER 1975[1]

ENTRY INTO FORCE of amendments to annexes II and III to the above-mentioned Agreement

The amendments were proposed by various Parties and circulated by the Secretary-General to the Contracting Parties on 23 September 1988. They came into force on 24 June 1989, in accordance with article 8 (5) of the Agreement.

The revised text of annexes II and III reads as follows:

REVISED TEXT OF ANNEXES II AND III OF THE EUROPEAN AGREEMENT ON MAIN INTERNATIONAL TRAFFIC ARTERIES (AGR)

ANNEX II. CONDITIONS TO WHICH THE MAIN INTERNATIONAL TRAFFIC ARTERIES SHOULD CONFORM

CONTENTS

[1] United Nations, *Treaty Series*, vol. 1302, p. 91, and annex A in volumes 1303, 1306, 1364, 1365, 1380, 1388, 1394, 1402, 1412, 1436, 1439, 1442, 1485, 1511, 1515 and 1537.

Conditions to which the main international traffic arteries should conform

I. *General*

The fundamental characteristics of the construction, improvement, equipment and maintenance of the main international traffic arteries, hereafter designated "international roads", are dealt with in the following provisions, which are based on modern concepts of road construction technology. They do not apply in built-up areas. The latter shall be by-passed if they constitute a hindrance or a danger.

The provisions of this annex take into account various criteria including traffic safety, environmental protection, fluidity of traffic flow and comfort of road users, applied on the basis of economic evaluation.

Countries shall make every possible effort to conform to these provisions both in the construction of new roads and in modernizing existing ones.

II. *Classification of international roads*

International roads are classed as follows:

1. *Motorways*

"Motorway" means a road specially designed and built for motor traffic, which does not serve properties bordering on it, and which:

(i) Is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other by a dividing strip not intended for traffic or, exceptionally, by other means,

(ii) Does not cross at level with any road, railway or tramway track, or footpath; and

(iii) Is specially sign-posted as a motorway.

2. *Express roads*

An express road is a road reserved for motor traffic accessible only from interchanges or controlled junctions and on which, in particular, stopping and parking are prohibited on the running carriageway(s).

3. *Ordinary roads*

An ordinary road is one open to all categories of users and vehicles. It may have a single carriageway or separate carriageways.

International roads should preferably be motorways or express roads.

III. *Geometric characteristics*

III.1. *General considerations*

The choice of geometric characteristics shall be such as to afford to all users proper safety and traffic flow conditions, bearing in mind the function of the road and the general behaviour of drivers.

The general rules of design apply to both the construction of new roads and the modernization of the existing network. In the latter case, however, account shall be taken of special constraints and situations and the basic rules shall be applied flexibly so as to conserve the general consistency of the route. Less importance may therefore be attached to some basic parameters while upgrading the quality of the alignment and its perception by the driver (''readability'' of the road) so as to improve safety.

The progressive improvements to a road shall be effected with particular care so as, at each stage, to respect the general consistency of the route (importance of transitions).

When a motorway or a road with separate carriageways is constructed in stages, involving the initial inauguration of a single two-way carriageway, care shall be taken in designing this first phase so that its two-way nature is clearly recognizable by users and so that it can function as such; this will involve the need to ensure overtaking visibility for traffic in each direction along most of the alignment and, as far as possible, to conceal such installations as must be constructed in their final form from the outset.

The parameters of the design and dimensions depend on the choice of category of road, which is conditioned by its functions, its location (topography, land use, etc.) and the general technical and economic context. The choice of category shall take account of:

— Internal consistency (homogeneity) of construction characteristics;

— Consistency of the road with the user's perception of it.

It will then be possible to define a consistent overall approach to the development of the route (or section) under consideration, and to decide accordingly on all the components of the project (geometry, signs and equipment, and junctions).

A design speed is associated with each category of road.

The design speed is that speed which in a scheme for the improvement or construction of a road is chosen to determine geometric characteristics permitting isolated vehicles to travel at this speed in safety.

The range of recommended design speeds in km/h on international roads is as follows:

Motorways	x	80	100	120	140
Express roads	60	80	100	120	x
Ordinary roads	60	80	100	x	x

Design speeds of over 100 km/h should not be selected unless the carriageways are separated and the layout of intersections so permits.

The lowest design speeds (60 km/h for roads or 80 km/h for motorways) may be used on highly restrictive sections.

The design speed may be reduced in exceptional cases on sections of limited length of the road and in difficult topographic and other conditions. Changes from one design speed to another should be applied gradually in such a manner that they can be easily foreseen by the driver.

The concept of ''design speed'' may not be applicable to certain routes with a difficult topography.

International roads shall present homogeneous characteristics over sufficiently long sections. Changes of category shall be made at points where they are quite clear to users (approaching built-up areas, change in topography, interchanges) and particular attention shall be paid to transition zones.

It is also important to verify that minimum conditions of safety are observed at all points on the road, taking into account the actual speeds at which most users travel, in the light of the general configuration of the alignment and the regulations in force.

International roads should provide for traffic of motor vehicles in accordance with national regulations concerning the sizes, total weight and axle load.

III.2. *Horizontal and vertical alignment*

III.2.1. *Basic parameters*

The horizontal and vertical alignment shall be co-ordinated in such a way that the road is perceived by the driver as being without undue discontinuities of alignment, permits him to anticipate his manœuvres and to see clearly the critical points, in particular junctions and entrances and exits of interchanges.

The rules for the dimensions of the horizontal and vertical alignment shall be based on conventional traffic engineering parameters (reaction times, friction coefficients, height of obstacle, etc.) for the majority of users.

The recommended minimum values for the parameters of the horizontal and vertical alignment are given in the following table:

Category (design speed)	60	80	100	120	140
Minimum radii in plane (corresponding to maximum superelevation 7 per cent)	120	240	425	650	1 000
Maximum gradient (percentage not to be exceeded)	8	7	6	5	4
Minimum radii at the highest point of the vertical alignment (in m):					
One-way	1 500	3 000	6 000	10 000	18 000
Two-way	1 600	4 500	10 000	—	—
Minimum radii at the lowest point of the vertical alignment	1 500	2 000	3 000	4 200	6 000

The minimum vertical alignment radii shall be avoided at the approaches to critical points (junctions, interchanges, accesses, entries to built-up areas, etc.).

The gradient resulting from longitudinal slope and superelevation shall not exceed 10 per cent.

Horizontal alignment curves shall, when possible, be introduced by links with a progressive curvature.

III.2.2. *Conditions of visibility*

Visibility distances shall be at least equal to stopping distances for obstacles over the whole length of the road.

Minimum values are given for guidance in the table below:

Design speed (km/h)	60	80	100	120	140
Minimum stopping distance (m)	70	100	150	200	300

On two-way roads, the minimum visibility distances required for overtaking shall be provided on as great a percentage of the length of the road and be as uniformly distributed as possible.

Where visibility is insufficient, the construction, on single carriageway two-way roads, of passing areas or judiciously-sited local widening of the road is recommended.

In areas where visibility distances cannot be ensured (permanently or temporarily), appropriate road markings and signs shall prohibit overtaking in a form clear and perceptible to users.

III.3. *Cross-section between junctions*

The formation of international roads shall comprise, in addition to the carriageway or carriageways, verges and possibly a central reserve and special paths for pedestrians and cyclists. Such special paths shall not be permitted within the formation of motorways and express roads.

The cross-section shall be such as to ensure at all times the smooth flow of current and foreseeable traffic in proper conditions of safety and comfort.

III.3.1. *Number and width of traffic lanes*

The choice of the number of lanes shall be based on current and foreseeable flows of traffic. It must ensure that the necessary standard of service is provided, taking into account the economic function of the road.

The volume of traffic flow for calculation purposes varies according to the general characteristics of the route, the structure of the traffic and types of use (function of the road).

Various methods of calculation linked to traffic flow may be used, depending on actual traffic conditions and the data available.

Operational measures may also ensure a steady flow of traffic under certain special conditions.

Particular care shall be taken in regard to the construction of three-lane roads and the use of the central lane.

Separate one-way carriageways are strongly recommended for four-lane roads so as to maintain proper safety standards.

Additional lanes should be considered, especially on gradients when the proportion and speed of slow vehicles lead to unacceptable reduction in service level.

Traffic lanes on a straight alignment should have a minimum width of 3.50 m. Extra width shall be provided in small radius curves so as to make room for the largest authorized vehicles.

The width of supplementary lanes on gradients can be reduced to 3 m.

III.3.2. *Shoulders*

The shoulder can be taken to comprise a stabilized or paved section and a grass or gravel verge.

The recommended minimum width of shoulders should range from 2.50 m for ordinary roads to 3.25 m for motorways. On difficult sections of mountainous terrain and on sections crossing intensively urbanized areas, and also on sections equipped with acceleration or deceleration lanes the width of shoulder can be reduced to 1.50 m.

On motorways, the shoulders should normally include a continuous stopping strip (emergency stopping strip) of at least 2.50 m (3 m if heavy vehicle traffic so justifies), stabilized and paved so as to permit stopping.

On ordinary roads, the provision of stabilized lateral strips of at least 0.7 m width, clearly differentiated from the carriageway, is recommended.

For safety reasons, an obstacle-free area of at least 3 m beyond the edge of the running carriageway should be provided, if possible, and obstacles which are too close to the edge of the carriageway shall be isolated by appropriate means.

In the absence of a stopping-strip, parking areas (stopping points) shall be provided at intervals. Where necessary, draw-ins for buses shall also be provided.

When two-wheeled traffic so justifies, special facilities (cycle paths or strips) shall be envisaged. Special facilities for pedestrians shall also be envisaged when their presence makes it necessary.

The verge shall be sufficiently wide to permit clear visibility and provide room for highway equipment (signs, barriers; see chapter IV) where necessary.

III.3.3. *Central reserve*

The recommended minimum width of the central reserve on motorways and roads with separate carriageways is about 3 m. This minimum width may be reduced in highly restrictive areas, although an adequate width must be maintained for the installation of a safety fence. Adequate safety fences shall be provided in such cases (see chapter IV).

The central reserve shall normally be equipped with safety fences (crash barriers or safety barriers) unless it is wide enough to result in little risk of vehicle cross-over accidents.

III.3.4. *Crossfall*

On straight or nearly straight alignments the carriageway crossfall as a rule should be from 2 per cent to 3 per cent to facilitate water runoff. The slope should be from a central crown on two-way roads and slope outwards from the central reserve where there are separate carriageways.

Areas of varied superelevation should be treated with special care to ensure adequate water runoff.

III.4. *Overhead clearance*

Overhead clearance shall be not less than 4.5 m.

III.5. *Intersections*(*)

III.5.1. *Choice of type of junction*

The whole of the interchange system shall be treated consistently over the whole route, both in terms of the location and distances between interchange points, and in the choice of facilities which must be clear to all users and so designed as to minimize risks of conflict (particularly in traffic cuts).

The number of interchange points may also be reduced by re-routing some traffic flows to better constructed neighbouring junctions.

International roads shall normally have priority, except at specific points (intersection with another international road, transition zones, roundabouts) where loss of priority may be allowed.

On two-way roads, intersections can either be grade separated or level junctions. Grade-separated junctions may be envisaged for important interchange points if economic conditions so permit, as well as grade separation without interchange for re-establishing certain communications (agricultural traffic, for example).

Roundabouts are a solution under certain conditions (transition areas, outskirts of a built-up area, large-scale interchange movements).

On roads where the carriageways are separated, intersections shall generally be constructed on separate levels (grade-separation of flows), since level junctions with interchanges can be envisaged only under certain specific conditions in which safety criteria can be respected.

Intermediate solutions (grade separation without interchange, no-left-turn half-junction) may be envisaged under certain conditions.

On motorways, grade-separated intersections shall be obligatory.

The use of junctions with traffic signals (three colour lights) outside built-up areas may be envisaged provided that their visibility and successful operation can be ensured without risk to users.

(*) NOTE. This text is based on the assumption that traffic keeps to the right.

III.5.2. *Layout of level junctions*

Level junctions shall be constructed in accordance with the rules in force on the basis of the following general principles:

The best possible conditions of visibility and perception of the junction shall be ensured on approaches from main or secondary roads.

Complex layouts shall be avoided and the geometry made as simple as possible consistent with the functions of the junction, so as to render it readable and comprehensible to users. Junctions comprising more than four branches shall therefore be simplified by grouping certain traffic streams, or shall be treated as roundabouts.

Geometry and traffic-signals shall be used to warn and slow down non-priority users. The junction should include on the non-priority carriageways directional islands, bordered, for example, by a slightly raised kerb to channel secondary flows (diversion of lanes).

Intersecting lanes shall intersect one another as nearly at right angles as possible.

Left-turn deceleration lanes shall be provided on the road as soon as the corresponding traffic reaches a substantial level.

Priority-road users shall be forewarned and excessively wide lanes avoided, since they encourage speeding, reduce vigilance and make crossing more difficult (for example, avoid increasing the number of through lanes, and provide deceleration lanes to the right and merging lanes only if the traffic so justifies).

In the case of substantial interchange traffic and in the presence of left-turn(*) deceleration lanes, the central storage area and special lanes shall be indicated clearly (islands, and appropriate markings and surfacing).

Where necessary, direct and clearly marked paths for pedestrians and cyclists shall be provided.

III.5.3. *Interchanges*

III.5.3.1. *General provisions*

Interchanges are grade-separated junctions with slip roads permitting traffic to pass from one road to the other.

The choice of the form of interchanges shall be based on the objectives of simplicity and uniformity.

Uniformity shall be taken to be "operational", i.e., linked to the fact that motorway-users "expect" to have to make similar manœuvres, even in interchanges of different types.

The form of an interchange shall depend on the topography, the relative importance of traffic flows, the type of intersecting road and the possible presence of toll booths.

III.5.3.2. *Geometric characteristics*

Slip roads. It is desirable for slip roads, including lateral markings and shoulders, to have the following minimal widths:

— One-way carriageway: 6 m, including horizontal markings and shoulders;

— Two-way carriageway: 9 m including horizontal markings and shoulders;

The characteristics of the alignment of slip roads should be as follows (but in exceptional cases the standards below may be reduced):

— Internal minimum radius on the level: 50 m,

— Maximum ascending gradient: 7%,

— Maximum descending gradient: 8%,

(*) NOTE. This text is based on the assumption that traffic keeps to the right.

— Minimum radius in convex vertical curve: 800 m.

— Minimum radius in concave vertical curve: 400 m.

Horizontal curves shall always be joined by progressively curved links of a suitable length. For this purpose it is also necessary to apply appropriate signs and/or markings.

Weaving sections. It is recommended that weaving sections should be long enough to allow movements to be effected in complete safety.

Divergence of traffic streams. Where a carriageway divides into two other carriageways, the separation of the two traffic streams shall be so effected as to be clearly perceptible.

To this end, the user shall have time to move into the lane most appropriate for the direction he wishes to take, and shall have a sufficiently clear view of the point of divergence. It is therefore also necessary to apply appropriate signs and/or markings.

The less important traffic stream shall be required to leave by the right-hand carriageway.

Convergence of traffic streams. Where two carriageways converge to form one single carriageway, the integration of the two traffic streams shall be effected in safe conditions and shall not entail any significant reduction in the speeds of vehicles.

To this end:

(*a*) The drivers in the less important traffic stream shall preferably merge from the right into the more important traffic stream;

(*b*) The driver who has to merge shall have a good view of the other carriageway before and beyond the point of convergence. The merging manœuvre, where appropriate via an acceleration lane, shall not entail any appreciable reduction in the speed of the principal stream.

III.6. *Deceleration and acceleration lanes*

It is recommended that acceleration and deceleration lanes should be provided for access to or exit from the main carriageway at interchanges or related areas. These lanes shall be of constant width and either followed or preceded by a taper.

The length of the acceleration and deceleration lanes shall be calculated in accordance with the design speed or the traffic flow.

III.7. *Railway intersections*

It is desirable for the railway intersections with international roads to be at different levels.

IV. *Equipment*

IV.1. *General Considerations*

The types of road equipment described below constitute an essential element in the functioning of the road network and have an important impact on fluidity and safety of the traffic as well as on the comfort of road users.

Regular checking of the functioning of all such equipment and appropriate maintenance will enable it to ensure maximum efficiency.

IV.2. *Vertical signs and road markings*

IV.2.1. *General characteristics of vertical signs and road markings*

Vertical signs and road markings, in accordance with the principles set out in international conventions and agreements, contribute to the comprehensibility of the road and shall be designed and executed in such a way as to be consistent with each other and with the components of the project in general.

The basic prerequisite for signs shall be homogeneity; they are intended for users moving rapidly and shall therefore be visible from an adequate distance by day or by night, and be immediately comprehensible.

Illuminated panels or panels using retro-reflective materials shall be used for signs on roads which are not lit and may also be used on roads which are equipped with permanent lighting. It is recommended that markings on roads without permanent lighting should be executed using retro-reflective materials.

It is also important to avoid having too many signs.

IV.2.2. *Road Markings*

Road markings shall be harmonized with vertical signs and the materials used shall have a high skid resistance.

IV.2.3. *Vertical signs*

In view of the international nature of the roads under consideration, particular care shall be taken in the use of indicator panels and the use of the "E" sign.

The effectiveness, and particularly the comprehensibility and readability of the signs depends on a number of conditions, their dimensions and correct siting, predominance of international symbols over words, brevity of the message conveyed, use of the same alphabet over the entire international network (other alphabets should be used only in conjunction with Latin characters) appropriate sizes for symbols and characters and the suitable proportions in relation to their background and the maximum speed of traffic.

IV.2.4. *Roadworks and emergency signs*

For roadworks, emergencies (accidents) or ongoing operations entailing the closure of carriageways or lanes to traffic, adequate temporary signs shall be installed so as to ensure the safety of users and the personnel involved in such operations. These signs shall be removed once they are no longer required.

Within an area of road lighting the signs shall be retro-reflective. Where there is no road lighting the signs shall be retro-reflective and, as far as possible, combined with special illuminating guiding devices.

Permanent signs which are in contradiction with the temporary signs shall be removed or concealed.

IV.3. *Equipment and user services*

IV.3.1. *Safety fences and barriers*

Safety fences and barriers are designed to prevent a vehicle accidentally leaving the carriageway or to limit the consequences of its doing so.

The choice of device (guard-rails, crash barriers, safety barriers and fences) and the conditions for their use shall depend on the type of vehicle to be arrested, the cross-section, the possible consequences of vehicles leaving the carriageway, specific problems of visibility and difficulty of maintenance.

Since such devices themselves constitute obstacles, they shall not be installed unless the risk attendant on not doing so justifies them.

Such safety devices shall normally be provided on structures.

The use of safety devices on the central reserve depends on a number of factors, the most important of which are the volume of traffic and the width of the central reserve itself.

Safety devices shall be provided on shoulders where protruding non-brittle obstructions are situated too near the carriageway, where the height of embankments or the slope of banks constitutes an obvious hazard, or on sections bordered or crossed by a watercourse, a heavily used road, a railway, etc.

IV.3.2. *Delineators*

The installation of delineators (i.e., road studs and hazard marker posts) furnished with retro-reflective devices may considerably improve perception of the alignment.

IV.3.3. *Anti-glare devices*

Outside lighted sections, it might be advisable to install an artificial screen or a hedge on the central reserve of motorways and expressways, or on the shoulder when another road runs along the "E" road. It is advisable to make sure that such arrangements do not obstruct the visibility for road users and do not reduce the efficiency of traffic safety devices installed nearby.

IV.3.4. *Arrester beds*

To ensure the safety of lorries on very long, steep gradients, it may be useful to provide judiciously-placed arrester beds alongside the downhill lane. This facility should, however, be the exception, and be reserved for instances when no other solution can be envisaged.

IV.4. *Traffic control*

IV.4.1. *Traffic light signals*

Traffic light signals shall be used in accordance with the international conventions and agreements in force. Flashing amber lights may be used to indicate a particular hazard (roadworks, toll gates, pedestrian crossings, etc.) thus encouraging users to pay more attention and reduce their speed.

Temporary traffic light signals may be provided in some exceptional cases (e.g., alternating traffic as a result of roadworks or accidents).

IV.4.2. *Variable traffic signs*

Variable traffic signs shall be as comprehensible as static road signs, and be legible by day and night to drivers.

IV.4.3. *Emergency communication systems*

The provision of emergency telephone or other communication posts, indicated by specific signs, linked to a centre operating 24 hours a day is recommended on all types of international roads. Such call points would be installed along the road on the outer verge away from structures, regularly spaced and at reasonably frequent intervals.

Where a special road emergency communication system does not exist on express roads and ordinary roads the general telephone system can be utilized and signs indicating the position of the nearest public telephone would be helpful.

Special allowance can be made for long bridges and tunnels.

The operation of call-points shall be simple, easy for users to understand and preferably explained by symbols or ideograms.

IV.5. *Road lighting*

Lighting is desirable in some special areas such as frontier posts, long tunnels, adjoining areas, interchanges with other "E" roads, etc. When the volume of traffic justifies its installation and operation, homogeneous and adequate road lighting may also be advisable if the road crosses or borders an area in which the lighting may inconvenience traffic on the international road (airports, industrial or heavily built-up areas, etc.).

IV.6. *Auxiliary facilities installation*

IV.6.1. *Safety of pedestrians and cyclists*

On ordinary roads, special paths for pedestrians and cyclists may improve the safety.

The utmost attention shall be paid to crossings for two-wheeled vehicles and pedestrians, especially at junctions.

IV.6.2. *Protection of disabled persons*

Users, whether passengers or drivers, for whom travel is difficult or who are not able to provide for their own immediate needs unaided, shall also be able to use the road with ease.

The design of the road and its equipment must thus be such as to minimize the critical situations in which such users may find themselves.

It is necessary in any case to ensure that the constraints imposed on users, particularly in rest and service areas, are compatible with their capabilities.

IV.6.3. *Protection from animals*

In order to protect users from animals adequate fencing shall be provided wherever the topography indicates a risk of animals crossing.

Protective measures must also be taken for the animals themselves, such as over- or under-passes of suitable size and shape.

IV.7. *Service facilities*

Depending on the characteristics of their operation, separate rest areas, service areas, frontier posts, etc. shall be provided along international roads.

IV.7.1. *Rest areas*

Rest areas away from interchanges enable users to stop in an environment which provides a break from the monotony of traffic; in such cases landscaping is of great importance.

Water points, tables, shelters and toilets are desirable.

IV.7.2. *Service areas*

Service areas adapted both to the site and to its users (tourists, road haulers, etc.) and away from interchanges shall provide a minimum of services such as parking, telephone, fuel and toilets.

All traffic and parking areas shall be separated from the carriageway(s) of the E-road.

IV.7.3. *Toll areas*

Toll areas comprise a progressive widening of the carriageway or interchange loops up to and beyond the control lanes.

The number of control lanes shall be determined in terms of the volume of traffic anticipated.

Toll booths should be situated in open areas; it is not advisable to situate them at the bottom of a descent.

Adequate spaces shall be provided outside the control lanes for the buildings and installations required for collecting tolls, for surveillance and the personnel involved.

IV.7.4. *Frontier posts*

The location, dimensions and form of separate, or better still, adjoining frontier posts, as well as the type and layout of the installations, buildings, parking areas, etc., shall be selected on the basis of the checks anticipated and the traffic passing through such posts.

The structure and form of a frontier complex and the internal communications network should, with effective signposting, make it possible to preselect and separate passenger and goods traffic before they arrive at the buildings and installations.

V. *Environment and landscaping*

V.1. *General Remarks*

The pace of changes in the economic, social and cultural fields has had as a consequence in recent decades, a considerable increase in road traffic. At the same time

this phenomenon has produced various nuisances (noise, pollution, vibrations, severance) both in and outside urban areas.

The concern to preserve the quality (visual and ecological) of the environment means that roads must be designed to harmonize with landscapes.

It is therefore desirable, when new projects are prepared and existing roads improved, to assess and compare the advantages and disadvantages for the environment of the various solutions which may be envisaged, in parallel with technical and economic studies.

The general aim is to maximize the positive effects on the environment and to correct the negative ones.

V.2. *Integration of roads into the environment*

When the project is set up, consideration should be given to the direct and indirect effects of roads and traffic on:

— People, fauna, flora;

— Ground conditions, water, air, microclimate;

— Landscape, physical property and the cultural heritage.

In this regard the following elements should ideally be taken into account:

Good co-ordination of the alignment and the longitudinal profile, in relation to the elements of the landscape, should ensure not only harmonious integration of the alignment with local topography and land use but also prevent unfavourable impact on the safety of road users.

Acoustic nuisance, vibration and air and water pollution deriving from traffic, the maintenance and the exploitation of roads should be limited as far as possible by appropriate means, in accordance with the rules and regulations of the countries concerned.

Whenever a new road and the works involved have a great influence on the landscape, it would be better to take care of their quality by creating a new landscape rather than trying to mask it.

V.3. *Effects of the environment on the road user*

Such elements of the landscape and the environment as are visible from the road will contribute to traffic safety and to the comfort of road-users. They should supplement and reinforce visual guidance and add to the interest of the journey.

The sight of towns, rivers, hills, etc. gives users an opportunity to take their bearings and should be conserved as far as possible. Plantations (in alignment or other forms) may contribute to improving visual guidance and to breaking the monotony of the road alignment, provided that the conditions of their implementation do not create additional risks. Landscaping may also contribute to protection against dazzle and against adverse weather conditions (wind, snow, etc.).

The installation of noise barriers along roads means that the user loses a great deal of his information about the environment and has the impression of being "shut in"; such installations should therefore be constructed so as to ensure that they are integrated to the maximum into the landscape and so as to compensate users for the information lost. For aesthetic and safety reasons, commercial advertising near international highways should be avoided.

VI. *Maintenance*

VI.1. *General considerations*

Roads and auxiliary facilities should be maintained as close as possible to their original condition, to preserve their investment value and to ensure constant levels of safety and comfort.

It is advisable that from the initial design and construction stages, account be taken of future maintenance activities, in order to reduce the costs and negative effects on traffic flow.

Maintenance concerns all the elements which make up the road: pavements, structures, embankments and cuts, drainage signs and markings, traffic control systems, landscaping, building, etc.

Landscaping should be designed with regard to future maintenance aspects. Growth of trees and bushes should be monitored and action taken if necessary to avoid obscuring signs and the obstructions of safety equipment.

Any special equipment needed for maintenance should not impair the safety of road users and excessively hinder the normal traffic flow and operations.

A systematic and rational approach to maintenance activities can reduce substantially the direct costs of road administration as well as the indirect costs incurred by road users on the given road network. The distinction between preventive maintenance and rehabilitation operations is necessary to optimize the cost-benefit effects of a maintenance programme during the decision-making process of an authority.

VI.2. *Maintenance management*

Maintenance management closely related to traffic management should be supported by procedural and technical inspection plans, systematic data collection and analysis, instructions, etc. These facilities should be implemented by the road administration as an expedient to road maintenance efficiency and to account for compromise solutions in certain cases.

The operational organization set up to survey the level of maintenance of the actual road facilities and equipment, should have at its disposal an up-dated and complete inventory of all the elements of the road under consideration. This is an essential part of the operation allowing rapid decisions and action in case of incidents which reduce the traffic flow or in case of accidents.

The planning and budgeting operations, providing priorities for the technical interventions, should be based on results of systematic measurements and observations of pavement conditions, the aspect and visibility of vertical road signing and of horizontal markings (both by day and by night), etc. in the light of international standards' requirements. This technical inspection and verification is recommended as essential information for the elaboration of preventive or rehabilitation maintenance in the context of the local transport economy.

The executive organization, responsible for the supervision of maintenance work, should also regulate all temporary measures needed during the maintenance activities, ensuring safety requirements, efficient working and applied technology. Restrictions, traffic speeds, design characteristics, etc. need a consequent scheduled plan of provisions and regulations.

VI.3. *Specific maintenance aspects*

Maintenance of road elements directly linked to traffic safety should be given maximum priority. These include:

— Pavements, regarding their skid resistance and drainage of surface water;

— Structures, especially expansion joints, supports, parapets, etc. of bridges and viaducts; tunnel installations;

— Lighting; safety devices;

— Road signs and markings;

— Total viability throughout the year: provision for snow and ice removal, and for other particularly unfavourable environmental weather situations;

— Works involving merging the road into its environment, such as anti-noise barriers, landscaping, etc.

It is essential to ensure the quality of carriageways and road structures at high level through a coherent maintenance policy and to guarantee transport reliability during maintenance operations. Maintenance activities should be executed in good time in order to avoid the mechanism of progressive pavement failure.

The safety of road workers as well as that of road users is to be ensured through adequate protective measures which must be both foreseen in the planning of activities and regularly checked throughout the work.

The provision of road safety equipment, signs and markings is essential on work sites to avoid accidents, traffic delays, etc. and installations must be clearly visible both by day and by night. Systematic inspections should ensure that they are visible and understood according to the requirements of the international conventions in force. Temporary equipment and road signing should also be in conformity with these conventions.

Under winter conditions, through appropriate measures, traffic safety and operation shall be secured to the maximum extent possible. Special attention should be given to maintaining adequate skidding resistant surfaces and to the clearance of snow and ice from road signs. This operation should be considered as an additional maintenance activity for winter conditions.

ANNEX III. IDENTIFICATION AND SIGNING OF E-ROADS

1. The sign to be used for identifying and signing E-roads is rectangular in shape.

2. This sign consists of the letter E, generally followed by the number in Arabic numerals attributed to the route.

3. It has a green ground with white inscription; it may be affixed to or combined with other signs.

4. Its size should be such that it can be easily identified and understood by drivers of vehicles travelling at speed.

5. The sign to be used for identifying and signing E-roads does not preclude the use of a sign for identifying roads on a national basis.

6. In principle, E-road numbers will be integrated into (or combined) with the system of direction signs of the member country in question. The numbering can be inserted before as well as after each access road or interchange.

In case the E-road changes over to another road or crosses another E-road it is recommended to indicate the relative E-road numbers before the access or the interchange.

Authentic texts of the amendments: English, French and Russian.

Registered ex officio *on 24 June 1989.*