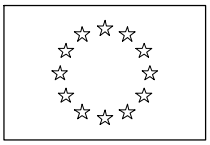

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels,
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COMMISSION STAFF WORKING DOCUMENT

Proposal for a Directive of the European Parliament and of the Council on road infrastructure safety management

Full Impact Assessment

COMMISSION SERVICES WORKING DOCUMENT

Annex to the Proposal for a Directive of the European Parliament and of the Council on road infrastructure safety management

Impact Assessment

Lead DG: DG TREN

Other involved services: Secretariat General

Agenda planning or WP reference: 2006/TREN/68

EXECUTIVE SUMMARY

Today, in the European Union, road infrastructure and design are a contributing factor in one out of three fatal accidents. In order to increase safety of road infrastructures, the proposed Directive introduces a comprehensive system of road infrastructure safety management focussing on the following four procedures:

(1) **Road safety impact assessments** demonstrating, on a strategic level, the implications on road safety of different planning alternatives of a project, whether construction of a new infrastructure or rehabilitation of an existing infrastructure.

(2) **Road safety audits** providing for an independent technical control aiming at identifying unsafe features of a road project, including proposals for remedy.

(3) **Network safety management** targeting remedial measures to parts of the network with high concentrations of accidents (high-risk road sections or black spots) and/or a high potential to avoid them in the future.

(4) **Safety inspections,** as part of regular road maintenance, enabling the detection and hence reduction of accident risk in a preventive way through low cost measures.

These procedures already exist and are applied at varying degrees in some Member States.

Two policy options have been considered in order to extend these procedures to all Member States. The first option would consist in providing Member States with **harmonised legislation** aimed at introducing common infrastructure safety management instruments. The Commission would impose mandatory guidelines on the four procedures. This option would provide common and homogeneous instruments for Member States. However, introducing an extended harmonisation would face the opposition of Member States, as demonstrated by the public consultation. Moreover, already existing and efficiently applied procedures should be

replaced, if not in line with the EU legislation. The large investment needed and the consequential delays in application do not make this a realistic option for more infrastructure safety.

The second policy option would consist in leaving Member States the **freedom to adopt their own legislation** on infrastructure safety management. The Commission would require from the Member States the adoption of guidelines on the above mentioned procedures, without defining technical standards or requirements, but leaving the Member States free to keep already existing procedures or to introduce their own. This solution would involve significantly less cost than the harmonisation option, since Member States could choose the infrastructure safety management instruments best suited to their needs. This will allow them to adopt the measures in a shorter time and would immediately contribute to saving lives on the European roads. Finally, the comparison of the different approaches adopted by the Member States will allow the Commission to identify best practices and to possibly adopt further harmonised guidelines which can be progressively extended to Member States.

Aim of this proposal for a directive is therefore to extend the above-mentioned measures to the whole of the EU, without defining technical standards or requirements, but leaving the Member States free to keep already existing procedures or to introduce their own.

The Directive explicitly limits the requirements to a minimum set of elements necessary to achieve a safety effect and spread procedures that have shown to be effective. The application of the comprehensive package of measures will make sure that road safety is included and considered in the whole life of a road of European importance, from planning to operation.

SECTION 1: PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

Working Group on infrastructure safety

In order to provide for expert input at an early stage and with regard to transparency policy, the Commission established a working group on infrastructure safety in 2002. 11 Member States participated in this Group[1] and gave detailed advice on the situation and practices in their countries on 4 road infrastructure safety procedures, namely Road infrastructure safety management, Road safety audits, Network safety management and Road safety inspections. All procedures proposed by the Commission in this directive have proven their effectiveness in more than one Member State. Several of these countries will have to introduce only minor, changes or additions to their current practice in order to meet the requirements of the present directive. The results of this working group reveal a widespread deficit of feedback concerning the effectiveness of the management systems, which makes any improvement on a purely "best practice" basis improbable.

The following paragraphs summarise how safety procedures required by this Directive are already implemented in the Member States participating in the Working Group.

Road Safety Impact Assessment

[1] Austria, Belgium, Denmark, Germany, Finland, Greece, Italy, Norway, Portugal, Sweden and the United Kingdom

In the UK, Norway and Italy, road safety impact assessment is an initial stage of the road safety audit. Similarly, in Germany and Sweden, the independent road safety impact assessment is taken into account in the road safety audit, although it is not compulsory. This procedure is mandatory in Denmark for all major new projects and schemes.

Road Safety Audit

The longest running programme is in the UK, where road safety audit has been a mandatory requirement for the national road network as well as all new roads and improvements on existing ones since 1990. The audits are the responsibility of local highway authorities and therefore the level of auditing can vary widely. In Belgium too, the audits are done under the authority of regional administrations. The Danish road safety audit is largely based on the UK equivalent though it is not mandatory (except for new roads). The procedure is somewhat different in Sweden, where it is part of the ordinary quality check system of each new road design. In Portugal, Germany, Finland and Italy, road safety audit is only in its early implementation phase and guidelines have been published in 2001 or 2002.

Management of High-Risk Road Sections

The definition of a high-risk road section varies across countries. Portugal, Norway, Germany and Austria have exact definitions of what is a high-risk section, but these definitions vary. Cost/benefit analysis is often an integral part of remedial action for high-risk sections.

In Portugal, a high-risk section is a stretch of road with a maximum length of 200 m, where at least five accidents with a *seriousness indicator* above 20 have occurred in the last year. This seriousness indicator is in turn defined as:
(100 x people killed) + (10 x people seriously injured) + (3 x people slightly injured).
Cost/benefit analysis is used to determine appropriate measures, which are compiled into guidelines for the treatment of high-risk sections.

A similar approach is used in Belgium where high-risk zones (rather than high-risk spots) exist and where in one region the *priority coefficient* is defined as:
(5 x people killed) + (3 x people seriously injured) + (1 x people slightly injured)
and where a coefficient higher than 15 is deemed a priority. Other regions use a combination between qualitative and quantitative analysis over certain periods of time to determine high-risk zones

Germany defines high-risk spots according to accident types over different periods of time. The analysis distinguishes between spots, lines and areas. Cost/benefit analysis is essential.

In the UK, accident data monitoring, detailed analysis of accident sites and maps are used together with cost/benefit analysis to define remedial treatments. Similarly, in Sweden, the practice was initiated in the 1960s and many critical high-risk spots have been already successfully treated.

Different layouts of high-risk spot warning signs have been put in a few respondent countries. Positive experience was made in Austria. In the city of Graz, a special sign was put at 11 different inner city high-risk crossings. Relative to the two previous years, the total number of injury accidents in the first two year period after the signs were put dropped by 28 %. Except for one site, all sites saw reduced or at least stable numbers of injured.

Some 100 high-risk spot signs were put on Polish national roads after 1998. The sign included the numbers of fatalities and injured people during previous years. Before/after analysis reveal a 23 % drop in the number of killed and 28 % less injury accidents.

Network Safety Management

Network safety management is a relatively new practice.

In Germany, improvements in the road network safety are carried out in areas considered to have a high frequency of serious accidents. The basis for this work is the German guideline for safety analysis of road networks. The accidents per kilometre of road are converted into annual economical loss to get an indication of cost savings had the road been built according to national highway design standards.

In Finland, network safety management consists in the monitoring of longer road sections (usually 20-50km), which are classified according to their fatal accident density (defined as fatalities/100km/year). Investments are made to improve roads according to this factor.

In the UK, the Highways Agency has introduced a road safety strategy with supporting documents for the safety management of the trunk road network, such as an operational guide. Network safety management relies on availability of relevant accident data, understanding of network effect (not just high-risk road sections) and the use of a systematic approach to planning. Priorities are to encourage traffic onto appropriate roads with appropriate speed limits.

Road Safety Inspections

Germany has an established road safety inspection programme with regular and cause-oriented inspections focusing on intersections and roadsides. Regular checks are performed every two years on all urban and rural roads and motorways, and every four years on municipal roads.

In Portugal, Italy, Greece and Austria, inspections are done mostly out of a maintenance point of view and are the responsibility of regional or local bodies in charge of the upkeep of roads.

Road Safety Action Programme impact assessment

In 2005, the whole Road Safety Action Programme[2] of 2003 (RSAP) was subject to an impact assessment, and a wide range of stakeholders were consulted on the policies put in place and executed[3].

Stakeholders in general welcome the Road Safety Action Programme, but asked that long-term, concrete and technical solutions should receive more attention from the Commission – as opposed to short term and immediate actions without lasting structural effect.

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2 Commission Communication: "Saving 20 000 lives on our roads – A shared responsibility", COM(2003) 311

3 ECORYS Transport, SWOV (2005), Impact Assessment Road Safety Action Programme - Assessment for mid term review - Final Report, Rotterdam, The Netherlands

The present proposal is thus also geared to such valid comments of stakeholders. The procedures introduced by this Directive will require that road safety is actively taken into consideration and safety features and solutions are identified into detail. The implementation of the proposal is intended to lead to lasting structural effect with high added value concerning the improvement of safety of road infrastructures. Furthermore, this Directive covers the following recommendations, which are additional to the current RSAP, mentioned by the stakeholders:

- more active role of the European Commission in outlining and adapting directives for the harmonisation of rules and their application;
- more attention to the possible gains from an integrated approach (especially for the combination of measures such as enforcement); the proposal addresses the issue of infrastructure safety, hitherto not yet covered by Community measures;
- increased focus on road design (adopting the road infrastructure package); the proposal gives a direct answer to this concern.

Public consultation

Road safety activities were put very high on the agenda of the Austrian EU Presidency in the first semester of 2006. To deal with infrastructure safety related subjects a High Level Expert Meeting on "Infrastructure Safety" was organised in Vienna on 24-25 January 2006. In preparation of this meeting a questionnaire on road safety related issues and instruments for infrastructure safety management was sent out to the invited countries. 26 European countries answered the questionnaire. The results of this survey were collected in a report[4] showing the level of diffusion of the proposed instruments in the different European countries. The following table summarises in which of the 25 Member States the instruments are used.

[4] Austrian Ministry for Transport, Innovation and Technology – Road Directorate: "High Level Expert Meeting on "Infrastructure Safety" – Infrastructure Safety in Europe – Evaluation of the results of the questionnaire", Vienna (Austria), 2006

Road Safety Impact Assessment	AT	BE	CY	CZ	**DE**
	DK	EE	EL	ES	**FI**
	FR	HU	IE	IT	**LT**
	LU	LV	MT	**NL**	PL
	PT	SE	**SI**	**SK**	UK
Road Safety Audits	**AT**	BE	CY	**CZ**	**DE**
	DK	**EE**	**EL**	ES	**FI**
	FR	**HU**	**IE**	**IT**	**LT**
	LU	**LV**	**MT**	**NL**	**PL**
	PT	SE	**SI**	SK	**UK**
Network Safety + High-Risk Road Section Management	**AT**	BE	**CY**	**CZ**	**DE**
	DK	**EE**	**EL**	**ES**	**FI**
	FR	**HU**	**IE**	**IT**	**LT**
	LU	**LV**	**MT**	**NL**	**PL**
	PT	SE	**SI**	**SK**	**UK**
Road Safety Inspections	**AT**	BE	CY	**CZ**	**DE**
	DK	**EE**	**EL**	ES	**FI**
	FR	**HU**	**IE**	**IT**	**LT**
	LU	**LV**	**MT**	**NL**	PL
	PT	SE	SI	**SK**	UK

Diffusion of the proposed instruments in the EU Member States.
Codes of the Member States where the instruments are in use are bold and shaded.

In April and May 2006, the services of the inland transport directorate of the Directorate General for Energy and Transport of the European Commission launched a public consultation on their approach to road infrastructure safety management. The normal period of 2 months was reduced to 6 weeks since numerous stakeholders had already been consulted. 51 comments were received:

- 15 from national governments;
- 11 from research institutes and experts in the field of road safety;
- 10 from health, transport and road safety organisations;
- 9 from users associations;
- 6 from road operators associations.

All comments are published on the Commission Website[5].

Road safety research institutes and experts, health, transport and road safety organisations, users and road operators associations unanimously welcome the proposal.

Some stakeholders consider the introduction of harmonising legislation (Option 3, *see* below) as more effective. However, they recognise such an option may be more difficult to implement on Community level, and are also satisfied with the flexible framework described in Option 2.

[5] http://ec.europa.eu/transport/road/index_en.htm

For reasons of subsidiarity, the Directive proposal features the extension of the provisions of the Directive to roads not being part of the Trans-European Road Network (TERN) as a recommendation only. Several comments propose to extend the provisions of the Directive also to roads not being part of the trans-European road network.. However, the previous experience with Directive 2004/54/EC on minimum safety requirements for tunnels in the trans-European road network shows that Member States are in general ready to extend provisions beyond the scope of the Directive. The final date of transposition for Directive 2004/54/EC was 1 May 2006. Transposition documents show that many Member States have extended the validity of their legislation also to tunnels not being part of the trans-European Road Network. The same behaviour is expected in the case of this Directive on road infrastructure safety management, whose validity is largely recognised.

The comments from the **national governments** are mixed. Eleven out of fifteen support the objective and welcome the approach envisaged by the Commission, to leave Member States free to adopt own legislation on a set of mandatory procedures (Option 2). On the other hand, 4 Member States would prefer approaches further minimising the level of prescription and encouraging an intensive exchange of best practices.

However, the Commission finds that the intensive exchange of best practices as a solution to improve road infrastructure safety is not, in itself, sufficient, and the Member States proposing this solution do not provide evidence for their claims. Indeed, exchange of best practices through research projects, working groups, conferences and workshops has been going on now for several years in the European Union and in the international arena. In spite of this, a strong demand arises for an initiative at European level, as shown by the comments to the public consultation. Road infrastructure deficiencies turn out to be a major contributing factor in one out of three fatal accidents involving one or more vehicles. 27% of the accidents are the result of an impact against unfenced road side objects, such as trees, sign posts or poles, while impacts against safety barriers represent about 24% of all impacts. The thematic network EURORAP II[6] has shown that, even in a country with good safety records, deaths could be slashed by around 20% by a suitable and comprehensive road safety programme, such as the proposed one.

The four Member States proposing a best practice solution in the stakeholder consultation are amongst the best performing in road safety in Europe; they are therefore more likely to be at the "giving end" of best practices than other countries in Europe. Member States commenting, who still need to improve their road safety record - thus at the "receiving end" of best practices -, are asking for a more structured approach to road safety management, in line with option 2. This is a further indication that the exchange of best practices as such is not optimal in the field of road infrastructure safety.

The following "collective statement of support" is especially noteworthy: on 22 May 2006, a collective statement of support of the initiative of the European Commission to propose this Directive on road infrastructure safety management has been co-signed and publicly released by nine European stakeholder organisations. They represent interests of different categories of involved parties, such as road users, road operators, vehicles producers, transport operators, pavements producers and transport enforcement organisations.

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[6] EuroRAP II is the acronym for European Road Assessment Programme http://www.eurorap.org

Signatories of the statement of support, representing important interests of road users, infrastructure managers, construction companies and public policy organisations, are the following:

FIA – Fédération Internationale de l'Automobile, representing the automobile clubs

ERF – European Union Road Federation, a public policy federation

ASECAP – European professional Association of operators of toll road infrastructures

ACEM – Association des Constructeurs Européens de Motocycles

IRU – International Road Transport Union, the international association of road freight operators

FEMA – Federation of European Motorcyclists Associations

EAPA – European Asphalt Pavement Association

EUROBITUME – European Bitumen Association

CORTE – Confederation of Organisations in Road Transport Enforcement

The organisations, whose interests are often opposite and contradictory, unanimously welcome the initiative and look forward to have the directive adopted soon. They consider the European Commission's proposal to offer Member States a toolkit of safety management procedures as the right way to ensure Europe overcomes today's unacceptable patchwork of national standards.

According to the collective statement, numerous deaths and serious injuries on roads will be prevented if the European Union ensures that safety is integrated in all phases of road planning, design, construction, operation and maintenance through the cost-effective road management practices:

- Road safety impact assessments, providing comparative safety scenarios at the planning stage,
- Road safety audits, as a systematic process for checking new road schemes prior to their opening,
- Road safety inspections, offering a periodical review of road networks in operation,
- Network safety management, to ensure high-risk road sections are inventoried and eradicated.

The organisations call for the swift release of a Directive on road infrastructure safety management as a part of a new "safety deal" linking in a realistic way all the actors of the safety chain, the drivers, the vehicles, the roads, the policy makers and the citizens in their common effort to save thousands of needless casualties and billions of Euros every year.

In addition, the FIA, representing more than 100 million motorists worldwide and more than 40 million citizens in the European Union, called on the European Commission for

"legislation to lead to a rapid improvement of road infrastructure", stressing that "guidelines alone will not be enough to halve road deaths by 2010"[7]. This very clear statement from major road user organisations shows that there is growing impatience from the road user community at the lack of progress concerning safety of roads.

The main conclusions of the consultation can thus be summarised as follows:

- The stakeholder consultation has provided useful information from all involved groups in society; some helpful suggestions and clarifications are taken into account in the current proposal;
- All comments agree on the definition of the problem and on the necessity of an action at European level, with differing degrees of intensity;
- The proposed measures and instruments are widely recognised as effective;
- A significant number of comments suggest to extend the provisions of the Directive also to roads not part of the trans-European road network;
- The Commission is expected to assist less experienced Member States in the implementation of the Directive, providing them with framework to develop methodology and know-how;
- The overwhelming majority of the comments welcome the approach envisaged by the Commission, to leave Member States free to adopt own legislation on a set of mandatory procedures;
- The stakeholder consultation did not generate any compelling argument to change the overall approach.

SECTION 2: PROBLEM DEFINITION

In 2001 the European Union set itself the ambitious objective of halving the number of fatalities on European roads by 2010 (from 50 000 to 25 000). While progress is being made (see Mid Term Review of the 2003 Road Safety Action Plan[8]), road accidents have still caused 41 500 victims on EU roads in 2005[9].

This large number of accident related deaths causes high costs to society. The direct measurable costs of road accidents were estimated in the RSAP to be 45 billion € per year. The indirect costs, which include physical and psychological damage suffered by victims and

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7 EuroTest Press Release, 14 June 2006: «Vice President Barrot called to halve deaths on the road».

8 Commission Communication of 22 February 2006: "Mid Term Review of the 2003 Road Safety Action Plan", COM(2006) 74

9 Focusing on the prevention of accidents and injuries by public health actions, the European Commission adopted in 2006 a Communication *[Communication from the Commission to the European Parliament and the Council on Actions for a Safer Europe, COM(2006) 328]* and proposed a Council Recommendation *[Proposal for a Council Recommendation on the prevention of injury and the promotion of safety, COM(2006) 329]*.

their relatives, are estimated to be up to four times higher. These figures show that road safety is a large societal problem.

The following specific problems are considered by the Directive:

(1) While the general trend is to decrease budgets for road infrastructure, road users pay more attention to the quality and level of safety of roads. Road authorities have to provide an infrastructure corresponding to the latest state of safety under budgetary constraints. Moreover, road authorities run the risk of being sued by citizens who have suffered injuries in road accidents.

(2) Present road designs result from many decades of construction and maintenance, in a time when safety issues were not always considered to the same extent. Today, several road features no longer meet the latest safety requirements. Moreover, traffic conditions may have changed since the road was designed and built.

(3) Existing road infrastructure is often not managed according to the best available know-how of safety engineering. This has shown to contribute to unacceptably high numbers of fatal accidents on specific stretches of road. Therefore, action needs to be taken on the selection of high-risk road sections on the basis of local accident records. The thematic network EURORAP II has shown how affordable and well-designed engineering and enforcement measures applied in the right place can reduce the risk that a particular type of crash might lead to death or severe injury of the occupants of the vehicle. For instance, appropriate new signals at junctions can reduce the risk of fatal side impacts by up to 75%; pedestrian crossings at dangerous junctions can lead to a potential reduction of the risk of collisions with vulnerable users by up to 85%.

The thematic network IMPROVER[10] is currently undertaking research on road traffic signing. In a study aimed at identifying potential signing harmonisation areas, experts from 17 EU Member States were asked about official traffic signs in their countries. Preliminary results show that some signs were not recognised by more than 50 % of the experts as part of their official traffic sign collection, though those signs were prescribed by the "Convention on road signs and signals" of 8 November 1968 (the Vienna Convention)[11].

(4) While roads are usually designed according to criteria concerning urban or regional planning, travel time, user comfort and convenience, fuel consumption, construction cost and environmental impact, safety is often implicitly assumed to be achieved by simply adhering to prescribed standards of alignment and layout. Experience shows that abiding by those standards is not sufficient to avoid hazardous features.

(5) Some 60% of accident fatalities occur on roads outside built-up areas. Dual carriageway roads with median barriers are twice to four times less dangerous than single carriageway roads, which accounted for around one third of TEN roads in the EU 15 and 90% in new Member States (2001). The need to build new roads or upgrade existing trunk roads is imminent, especially in Central and Eastern Europe

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10 IMPROVER is the acronym for Impact Assessment of Road Safety Measures for Vehicles and Road Equipment. Among the IMPROVER partners are road research institutes from 9 different Member States as well as from Israel

11 Convention on Road Signs and Signals, Economic Commission for Europe, 8 November 1968

where best use of the EU-15 experience should be made.

In 2004, the thematic network RISER[12] undertook a research on single vehicle crashes. According to this study, road turns out to be a major contributing factor in one out of three fatal accidents. 27% of the accidents are the result of an impact against unfenced road side objects, such as trees, sign posts or poles, while impacts against safety barriers represent about 24% of all impacts.

Accident records and available expertise can play a crucial role in improving road infrastructure. Unfortunately, safety data take too long to reach the authorities in charge of maintaining the road network and taking remedial action. This information is not available to all stakeholders to allow the selection and ranking of effective remedial measures.

Action at EU level will ensure a common high level of safety of roads in all Member States. All Member States, but especially new Member States, which are in the process of upgrading and extending their road networks, will be given the opportunity to develop their road networks in full consideration of safety.

Exchange of best practices as a solution to improve road infrastructure safety is not, in itself, sufficient. Indeed, exchange of best practices through research projects, working groups, conferences and workshops has been going on now for several years in the European Union and in the international arena. Nevertheless, a strong demand arises for an initiative at European level, as shown by the comments to the public consultation. Furthermore, Member States needing to upgrade their road safety record are positive about regulatory measures. This is a strong indication that they find best practices insufficient to improve their safety performance.

Moreover, road infrastructures are still a contributing factor in one out of three fatal accidents. The thematic network EURORAP II has shown that, even in a country with a good safety record, deaths could be slashed by around 20% by a suitable and comprehensive road safety programme, such as the proposed one.

The Trans-European Road Network needs common and high safety standards throughout the European Union, as acknowledged by the Community legislator itself. Wherever a road user travels on the network, he or she is entitled to the same high level of safety, in line with Article 2, par. 2, lit. a of Council and Parliament Decision 1692/1996[13] Without abinding methodology and legal commitment throughout the European Union, Member States alone are not in a position to safeguard this common high level of safety, as the very disparate safety records of the single Member States show.

The EU directive will improve the effectiveness of the exchange of best practice by introducing a common basic set of procedural requirements and by promoting and enabling its codification through comitology.

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[12] RISER is the acronym for Roadside Infrastructure for Safer European Roads. Among the RISER partners are road research institutes from 9 different Member States
http://www.riser-project.com

[13] This section reads: «The network must (a) ensure the sustainable mobility of persons and goods within an area without internal frontiers *under the best possible* social and *safety conditions*, …»

The directive will create the basis for establishing safety procedures that will help Europe achieve its ambitious objective to drastically reduce the number of road fatalities. It will allow road infrastructure safety management to become a comprehensive system based on a thorough analysis of accidents, the identification of risky designs, revised guidelines and training curricula, as well as the implementation of effective remedial measures. It will also mitigate the risk of judicial action against road managers.

The present directive explicitly limits the requirements to a minimum set of elements necessary to achieve a safety effect and spread procedures that have shown to be effective. Aim of this proposal for a directive is therefore to extend these measures to the whole of the EU, without defining technical standards or requirements, but leaving the Member States free to keep already existing procedures or to introduce their own. The application of the comprehensive package of measures will make sure that road safety is included and considered in the whole life of a road of European importance, from planning to operation.

Cost increases will be marginal and often be offset within a short while due to reduced number and cost of accidents as well as reduced costly correction being avoided once roads are in operation. No additional delays in the approval procedure and the design process of roads can be expected, as safety impact assessment and audits will be undertaken in parallel with them (*see* below, Section 5).

SECTION 3: OBJECTIVES

The European Commission announced its decision to take concrete action on road infrastructure safety in its White Paper on European Transport Policy for 2010[14] and in its Communication on a European Road Safety Action Programme of 2 June 2003. The European Parliament invited the Commission to provide guidelines for high-risk spot management and road safety audits[15].

Besides action on the driver and the vehicle, infrastructure should be the third pillar of any comprehensive road safety programme based on the principle of the integrated approach. In fact, much progress has been made in terms of passive vehicle safety. Car occupants run a much lower risk of death or injury in case of crash than ten years ago. Test and training requirements have been gradually increased to ensure that European drivers can cope with the dangers of road traffic.

However, for road safety infrastructure, no such joint effort has yet been carried out at European level, although Member States called for a high level of safety on roads in the Trans-European Network Guidelines of 1996[16].

The objective of this Directive is to ensure that safety is integrated in all phases of planning, design and operation of road infrastructure. It will ensure that safety is regarded in its own right and separately from economic and environmental analysis.

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14 Commission White Paper of 12 September 2001: "European transport policy for 2010: time to decide", COM (2001) 370

15 European Parliament Resolution A5-0381/2000 of 18 January 2001

16 European Parliament and Council Decision 1692/96/EC of 23 July 1996 on Community guidelines for the development of the Trans-European network, O.J. L 228 of 9 September 1996, Art. 10, Par. 5

Main objectives will be:

(1) To provide road authorities and road managers with the instruments necessary to strengthen safety to maximize the benefit to road users and the public at large, to make safety implications of decisions more transparent and to optimise use of limited funds for more efficient construction and maintenance roads;

(2) To increase the safety of new roads through continuous adaptation to the latest safety requirements;

(3) To bring about a common high level of safety of roads in all EU Member States;

(4) To create safety awareness in order to achieve informed decisions on planning and design;

(5) To establish a constant exchange of best practice in terms of infrastructure safety management; to allow the collection and the distribution of the available expertise in order to exploit research results; to allow for a better collection, treatment and dissemination of safety-related information.

SECTION 4: POLICY OPTIONS

The policy options considered in this assessment can be summarised as follows:

Option 1: No policy change.

Maintaining the status quo would not involve any direct cost or effort from the Community budget for improving the road infrastructure safety. In this case, a possible improvement of the road infrastructure safety could only rely on exchange of best practice. However, exchange of best practice alone has shown to not offer any guarantee that road safety will be further enhanced by Member States.

Option 2: To provide Member States with legislation requiring the adoption of guidelines on infrastructure safety management from them and leaving the details of their implementation to Member States.

In order to ensure that the adopted approaches will be comprehensive, the Directive would require the application of guidelines on different aspects covering all stages from the draft design to the full operation of a road. Aim of this option would be to extend road safety measures to the whole of the Trans-European Road Network, without defining technical standards or requirements, but leaving the Member States free to keep already existing procedures or to introduce their own. The application of the comprehensive package of measures would make sure that road safety is included and considered in the whole life of a road of European importance, from planning to operation.

Option 3: To provide Member States with harmonised legislation aimed at introducing common infrastructure safety management instruments.

The harmonisation of Member States legislation on road safety assessment, audits, management and inspections, would provide common instruments to strengthen safety to maximise the benefit to road users and the public at large. These instruments would be coherent and homogeneous and would guarantee that common minimum safety requirements are reached on the Trans European Network roads.

Both option 2 and 3 would require the implementation of 4 road infrastructure safety management procedures, namely road safety impact assessment, road safety audits, network safety management and safety inspections. They are briefly described in the following paragraphs.

Road safety impact assessment

Approval procedures of new roads or rehabilitation works take into account economic data, environmental effects and traffic impacts, but they frequently fall short of understanding the safety implications of a project. The road safety impact assessments will demonstrate, on a strategic level, the implications on road safety (also on surrounding networks and other transports) of different planning alternatives of a project before it is approved. Therefore, road safety impact assessments will take place at an early planning stage to allow the results of the assessment to influence the further planning process, as in the case of environmental impact assessment. Moreover, they will be carried out on all transport policy measures having an influence on road safety, including e.g. infrastructure investments, standardisation, pricing etc.

Road safety audits

Once a road design has been chosen, possible unsafe features of a road project will be identified and remedies will be proposed, to ensure that no safety requirement has been underestimated. Road safety audits provide the tools and the technical know-how to identify possible mistakes before the road is cast in concrete. Introducing early improvements and corrections at the planning and design stages will allow the social and economic costs of accidents to be reduced.

Network safety management

Network safety management will analyse networks to find measures that have the highest accident reduction potential, i.e. it will consider the parts of the network where most can be gained in relation to the cost. Identification of high-risk road sections is necessary to target action on stretches of road where high numbers of fatal and severe accidents happen or can be expected. Safety gains expected will be a maximum during the first years of a high-risk site management programme. This is why infrastructure providers should mobilise the critical resources in staff, know-how and finance to substantially and quickly reduce the number of serious and fatal road accidents. Once high-risk road sections or black spots have been dealt with, the safety quality of the whole network will have to be improved. Assessments will range from identifying and treating accident patterns at single high-risk sites or black spots to understanding and managing safety over whole routes.

Safety inspections

It will be also necessary to inspect and remedy safety deficits in locations without a past record of high accident numbers. Such safety inspections will be carried out periodically. They will be undertaken in the context of a safety programme and target sensitive points like road works, level crossings, signing, tree lines and night visibility. Regular inspections will also be required to identify transient changes affecting the condition and visibility of the signs and markings for example.

The inspections will enable a risk analysis to indicate both where accidents are likely to happen and which action is appropriate. The risk analysis approach will establish links between certain design elements and accident occurrence in order to compare route sections with desired safety principles. Accident reports can play a crucial role in improving road infrastructure. They must identify relevant accident types. This information will be made available to allow the identification of high-risk sites or black spots, as well as the selection and ranking of effective remedial measures.

SECTION 5: ANALYSIS OF IMPACT

Both option 2 and 3 would require the implementation of the package of four road infrastructure safety management procedures. The social, economic, administrative and environmental impacts of these two options are therefore similar and are described in the following paragraphs.

Social impact

In 2003, the thematic network ROSEBUD[17] undertook an impact analysis for the proposed package of procedures. It found it realistic to estimate the reduction potential for the implementation of the four procedures to the TEN roads to more than 600 fatalities and about 7000 injury accidents per year. This corresponds to 12%-16% of fatalities and 7%-12% of injury accidents.

ROSEBUD also estimated that 400 lives per year could be saved if the safety management was applied to motorways, and additional 900 lives could be saved every year if it was applied to the main road network, i.e. interurban roads or national roads (without motorways)[18]. As a result, the application of package of procedures to all motorways and main roads of the EU is estimated to reduce the number of fatalities by 1.300 every year, or 12 % of the fatalities occurring in this part of the network.

The Directive will pave the way for the explicit consideration of safety in road infrastructure projects, creating awareness for safety at all stages of decision-making. A similar approach has already been successfully carried out at European level in the field of environment.

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17 ROSEBUD is the acronym for Road safety and Environmental Benefit-Cost and Cost-Effectiveness Analysis for Use in Decision-Making. Among the ROSEBUD partners are road research institutes from 11 different Member States or New Member States as well as from Israel and Norway http://partnet.vtt.fi/rosebud/

18 Calculation for EU25 plus Bulgaria, Romania and Switzerland

According to the Environmental Impact Assessment Directive[19] and its further amendments, an Environmental Impact Assessment procedure ensures that environmental consequences of projects are identified and assessed before authorisation is given. The implementation of this Directive by the Member States has significantly raised awareness of the environment in order to protect human health, to contribute to the quality of life and to ensure maintenance of the diversity of species.

Similarly, the infrastructure safety management procedures will create the basis for establishing safety procedures that will help Europe achieve its ambitious objective to drastically reduce the number of road fatalities. They will allow road infrastructure safety management to become a comprehensive system based on a thorough analysis of accidents, identification of risky designs, revised guidelines and training curricula, as well as implementation of effective remedial measures.

The European Parliament and the Council intended the Trans-European road network to assume a front-runner role when they called for a high, uniform and continuous level of safety on the European road network. The 4 road infrastructure safety management procedures represent concrete measures to achieve this objective. Safe design and engineering of roads are decisive contributors to the safety of road users. Existing best practice on a small set of procedures will be extended to all Member States of the Union and establish safety management for roads similar to quality management systems that have been successfully established in many other sectors.

All Member States, but especially new Member States, which are in the process of upgrading and extending their road networks, will be given the opportunity to develop their road networks in full consideration of safety.

Economic impact

As said above, the Directive is estimated to reduce the number of EU citizens dying on the TERN by more than 600 fatalities per year and the injury accidents by about 7000 per year. According to the monetary estimations of the White Paper, the welfare benefit of these reductions corresponds to more than 2,4 billions € per year. If the Directive will be applied on motorways and main roads, the reduction of fatalities is estimated around 1.300 every year; this corresponds to more than 5 billions € per year.

For the existing network, only a small part of the budget is directly allocated to safety measures. Measures derived from management of high-risk road sections or black spots and inspections will, in many cases, not need additional funds, but will rather indicate solutions to refocus existing funds to obtain better safety benefits. The systematic application of a security controlling system and of cost/benefit analysis will make the cases in which additional funding is necessary justified and evident for policy makers.

Administrative impact

The administrative impact that the production of **road safety impact assessments** will have on Member States is as follows. The road safety impact assessment consists of a document

[19] Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment

produced in parallel with the approval procedure and the design process of the road. Therefore, no additional delays in the approval procedures can be expected. A rough estimation of the costs for the production of road safety impact assessments can be made considering the costs of the analogous environmental impact assessments (EIA). In general, EIA costs amount to less than 0,5% of the overall capital cost of a construction project. Costs in excess of 1% are the exception. For projects with capital costs in excess of 100 millions of €, EIA costs may be as low as 0,2%.

Also **safety audits** are performed in parallel with the design and construction process of the road, and are therefore not expected to cause any delay. The thematic network RIPCORD-ISEREST[20] made a survey on audits costs estimations in the countries, where audits are already performed. The results of this study show that in the European countries audit costs range between 600 and 6.000 € per stage. In general, the estimations in the different countries indicate that audit costs, related to the time spent to complete it, are far less than 1% of the construction cost of the whole project. A recent Australian evaluation of safety audits[21] in several countries found that benefit-cost ratios of audits reviewed ranged between 2.4:1 and 84:1. About half of all audits had benefit-cost ratios higher than 5 and about half had a cost of less than AUS $ 5,000 (• 3.000 €).

Road safety inspection costs in the European countries were also surveyed by RIPCORD-ISEREST. Where inspections are carried out on a regular basis, costs range between 600 and 1.000 € per km of motorway. Considering the roads where the Directive will be mandatory (the EU25 trans-European road network, having an overall length of approximately 85.000 km in 2005), one can estimate that the overall cost of the inspection of the whole network will range between 50 and 85 millions of €. For a large sized country, having about 5.000 km of TERN on its territory, this means costs for inspections ranging between 3 and 5 millions of €.

Network safety management is performed on the basis of accident records and inspections of the road sections with a large number of fatal and severe accidents. Its organisational costs can be therefore assumed comparable to costs of routine road safety inspections. As results of the inspections, remedial measures for realisation shall be ranked based on their benefit/cost ratios for prioritisation for implementation. Therefore, only safety measures showing the highest benefit-cost ratios shall then be implemented. This guarantees that costs increases due to the measures selected for implementation will be offset within a short while due to reduced number and cost of accidents.

Environmental and other impacts

Under the assumption that the reduction in accidents due to the implementation of the Directive is achieved via reduced congestion on European roads, it will also lead to a decrease of the impacts of transport on environment. Emissions of air pollutants by vehicles stopped in the queue and the level of noise due to congestion will then be reduced. Fuels and energy consumption will then also be decreased thanks to a more efficient transport system.

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[20] RIPCORD-ISEREST is an acronym for Road Infrastructure Safety Protection – Core-Research and Development for Road Safety in Europe. Among the ROSEBUD partners are road research institutes from 11 different Member States as well as from Norway, Switzerland and Turkey http://www.ripcord-iserest.com/

[21] Austroads (2002), Evaluation of the proposed actions emanating from road safety audits, Report AP-R209, Austroads, Sydney, Australia

Reducing the emissions of air pollutants, such as CO_2, the level of noise and the quantity of fuel needed for transport represent important contributions to the improvement of the sustainability of the EU transport policy and to meet the EU target under the Kyoto protocol.

The assumed reduced congestion on the European roads will have other indirect positive impacts. It will improve the mobility of the people and the competitiveness of the European market, but also reduce operating costs of transports and mobility.

It has not been possible to quantify to what extent these beneficial impacts on congestion and environmental impacts will be achieved as a result of the measures put forward in this proposal.

Furthermore, guidelines provided by Member States will mitigate the risk of judicial action undertaken by road users against road managers. In fact, the respect of the guidelines by road managers will clarify their legal responsibilities. Moreover, it will represent the legal proof of their commitment to road safety management.

SECTION 6: COMPARING THE OPTIONS

The policy options considered in this assessment can be summarised as follows:

Option 1: No policy change.

The advantage of maintaining the status quo would be that it does not involve any direct cost or effort for the management of infrastructure safety from the Community budget. On the other hand, this option does not offer any guarantee that road safety will be further enhanced by Member States. Experience has shown that relying on exchange of best practice alone does not advance the objective of higher road infrastructure safety.

Option 2: To provide Member States with legislation requiring the adoption of guidelines on infrastructure safety management from them and leaving the details of their implementation to Member States.

Leaving Member States the freedom to adopt their own legislation on infrastructure safety management would have several positive impacts:

- it would involve significantly less costs than the harmonisation option, since unsuitable and expensive solutions would be avoided by Member States;
- the knowledge of their already adopted road safety management approaches will enable Member States to adopt the appropriate guidelines to implement the minimum requirements prescribed by the Directive;
- more efficient and effective infrastructure safety management instruments would be adopted all over the European Union in a shorter time and would immediately contribute to saving lives on the European roads;

- the comparison of the different approaches adopted by the Member States and their effects will allow the Commission to identify best practices and to possibly adopt further harmonised guidelines which can be progressively extended to Member States.

On the other hand, the presence of different guidelines in the different Member States would also have as effect:

- more uncertainty on the quality of the adopted approaches. To ensure the adoption of effective procedures, the Commission will therefore be expected to assist Member States in the implementation of the Directive, providing them with framework to develop methodology and know-how.

Option 3: To provide Member States with harmonised legislation aimed at introducing common infrastructure safety management instruments.

The harmonisation of Member States legislation on road safety assessment, audits, management and inspections would have some positive impacts:

- common instruments to strengthen safety to maximise the benefit to road users and the public at large would be provided;

- the instruments would be coherent and homogeneous and would guarantee that common minimum safety requirements are reached on the Trans European Network roads.

However, obtaining an extended harmonisation would face the opposition of the Member States, as declared in several comments on the public consultation, creating them many obstacles and difficulties:

- most of the Member States would have to reorganise their road safety practices and legislation, even the already adopted and effective; this would involve huge investments for Member States;

- the large differences between the already existing and effective road safety procedures in the Member States would make it difficult to choose which approach should be extended to all EU;

- harmonised guidelines would not take into account organisational differences between the Member States. As a consequence, their effectiveness could not be assured;

- the harmonisation process would require time to be finalised; the consequent number of lives saved would only be appreciated years later and would only partially justify the huge efforts and costs for Member States.

As a conclusion, Option 2 represents the best solution, for the following reasons.

Sensibly lower implementation costs for Member States would be necessary to implement their own guidelines on the 4 infrastructure safety procedures. The prescribed measures would be adopted and applied in shorter time and would therefore immediately contribute to reduce victims of accidents on the EU roads. Moreover, the development of different best practices in the Member States would enable the Commission to compare their effectiveness and, in the

future, to possibly adopt further harmonised guidelines, to be progressively extended to all Member States.

SECTION 7: MONITORING AND EVALUATION

The Commission will have several ways to monitor the implementation of this Directive and to evaluate the impact of the measures adopted by Member States:

- Laws, regulations and administrative provisions necessary to comply with this Directive will be brought into force by Member States 18 months after its entry into force. The Commission will be constantly kept informed;

- Guidelines for the implementation of this Directive will be adopted by Member States within three years of its entering into force. Member States will notify the Commission of the guidelines and transmit them within three months of their initial adoption. Every subsequent amendment will also be notified to the Commission. Guidelines will be made available to the public and to the authorities by the Commission;

- Reports on the implementation of the articles of the Directive will be provided by Member States to the Commission three years after its entering into force and then every four years. The reports will be in a format provided by the Commission and will allow the effectiveness and the safety potential of the different procedures to be assessed;

- On the basis of the analysis of the different solutions adopted by Member States, the Commission assisted by a Committee will identify best practices for road infrastructure management and further consider adopting harmonised guidelines which will be extended to all Member States;

- Upon request of the Commission, Member States will name the competent entities to the Commission, so that the Commission will be provided with the information it requires to assess the effectiveness of infrastructure safety management.

Progresses made in the Member States will be assessed on the basis of the reports submitted to the Commission. They shall include information on rates, procedures and cost elements analysed to identify road designs that have shown to be very high risk or that have a high potential to reduce risk. Moreover, they shall show and demonstrate the effectiveness of the safety measures implemented and assess their safety effect.

The assessment of the overall progress in the Member States will further be checked by the Commission on the basis of the data on road accidents provided yearly by the Member States and regularly recorded in the CARE database (Community database on Accidents on the Roads in Europe)[22]. In fact, the CARE database makes it possible to identify and quantify road safety problems, evaluate the efficiency of road safety measures, determine the relevance of Community actions and facilitate the exchange of experience in this field.

[22] Council Decision 93/704/EC, Oj No L329 of 30.12.1993, pp. 63-65)