



BALTRIS

WP3.1.1. Analysis of status quo in road, trends in road safety in the BSR, Analysis of national and EU legal requirements and international practice in addressing safety of road

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# **Road Safety in the BSR and International Practice in Road Infrastructure Safety Management**

## **Final Report**



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## Road Safety in the BSR and International Practice in Road Infrastructure Safety Management

Final Report

### Keywords:

EU Directive; road infrastructure safety management; road safety impact assessments; road safety audits; ranking of high accident concentration sections and network safety ranking; road safety inspections.

### Abstract:

Directive 2008/96/EC on road infrastructure safety management requires the establishment and implementation of procedures relating to:

1. road safety impact assessments,
2. road safety audits,
3. ranking of high accident concentration sections and network safety ranking,
4. road safety inspections [1].

The report is based on the “expert questionnaires” discussed and developed during Safety management of road infrastructure – implementation of Dir. 2008/96/EC (“the directive”) Follow up of the meeting of 7th June - Agenda point 5, Draft questionnaire – rev2 - 2010 06 30 [2].

### Citation:





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## Current situation in EU countries concerning implementation of ES directive on Road infrastructure safety management

There are 3 different statutory regulations (law, decree and guideline) that together will cover the full implementation of the Road Safety Management Directive except for article 9 training curricula for road auditors that are under production and will be implemented before the required deadline 19.12.2011 in Sweden. The activities required by the Directive are, save for small exceptions, already being carried out by highway authorities as part of the proper discharge of their functions, during the same time periods required by the Directive.

### United Kingdom

The current actions referred to in this bullet are set down in a framework of guidance documents, available and accessible publicly, (“the guidance”) which imposes requirements for the appraisal, design and construction of road projects. The Guidance, is applied by strategic highway authorities in the United Kingdom (UK) to their activities and relevant parts are made contractual terms in contracts with third parties for the provision of highway services. This makes compliance with those activities, when made contractual terms, enforceable through the courts. Three local highway authorities in England and Scotland are responsible for a very small proportion of the TERN. Local Highway Authorities nevertheless use the Guidance as a common source of best practice and technical expertise, which is therefore applied to their own highway activities in the same way. Some of the responsibilities, such as publishing information about fatal accidents, for these limited sections of local roads may be undertaken on their behalf by the strategic highway authorities. UK is also considering further measures to ensure those local authorities comply and also whether to offer the option of agreeing to make these stretches of road national trunk roads.

There are a number of legislative provisions already in force which impose duties and powers relating to road safety and which complement and underpin the actions currently carried out, together with the Guidance. In relation to two of the activities required under the Directive - safety inspections and the provision of warning signs for roadwork’s - those legislative provisions already provide binding duties covering those activities.

The UK Department for Transport has checked carefully the match between the current practice, underpinned by legislation and technical standards, and the requirements of the Directive. It considers that the minor changes needed to comply with the Directive in the UK can be brought about readily and in the course of the next year by changing the technical standards, which are mandatory for the strategic roads authorities.

*Current additional activities in UK:*





1. The Directive requires that appropriate measures be taken to improve safety on the TERN. The UK strategic highway authorities carry out the vast majority of those measures in discharging their duty to maintain a safe network. Moreover, safety is a key consideration when appraising a scheme for possible approval and, following approval, projects will be audited in the same manner and at the same stages of design and early construction, as required by the Directive. Moreover, activities, such as road safety audits, are carried out to the same rigorous and professional standards as required in the Directive. Those activities and the consistency of high standards are maintained through application of the Guidance.
2. A small number of matters are not currently undertaken by highway authorities, notably, the provision of road safety auditor training which results in a certificate of competence and secondly, the dissemination of information to the general public on roads with high concentrations of fatal accidents. The Guidance is being amended to reflect those additional activities. For example, the guidance on road safety auditors will now include the requirement that those who deliver training courses must offer a certificate of competence at its conclusion.
3. This means all the activities required by the Directive will be undertaken by strategic highway authorities in order to meet the December 2011 deadline. Furthermore, such activities are not carried out in an ad hoc or arbitrary manner, but within the clear framework of the guidance.

## Sweden

The provisions of the Directive are implemented in the law and applicable only on those projects that have started after the law entered the force. It means that projects where the planning phase has started before 19.12.2010 will not be affected by the law.

## Belgium

The Directive implementation is subject to a Decree, government decisions and internal instructions peculiar to the Road Department.

**Table 1. Timing of implementation of the Directive in Belgium**

	Short term	Medium term
RSIA Road safety impact assessment	All the projects requiring a building licence for TEN-roads (officially), regional roads (in practice)	
RSA Road safety audits	All the projects requiring a building licence for TEN-roads (officially), regional roads (in practice)	





	+ for communal roads, all projects with a subsidy from the Region	
RSI Road Safety inspections	Motorways and expressways	Regional roads
SR and NSM Ranking of high accident concentration sections	Regional roads	

## Cyprus

Cyprus has prepared a draft for a new legislation for incorporating the new Directive. The associated guidelines regarding the main steps of the Directive will be prepared after the implementation of the new law. Cyprus intends to apply the new law to the whole of the motorway network of Cyprus, which is beyond national legal obligation (the Directive applies to roads which form part of the Trans-European Road Network, TEN-T). The definitions that are included in the Directive have been incorporated in the Cypriot draft law. More details will be included in the guidelines.

## Iceland

Iceland is not a member of the European Union. However Iceland is a member of EEA (European Economic Area). It has already been decided that the directive on Road Infrastructure Safety Management will be a part of the EEA agreement and by that action the adoption process begins. The first step in the adoption process is to have the directive translated into Icelandic.

However, procedures are mandatory for TERN-roads. For other national roads RSIA and RSA should be performed if the cost of the road project exceeds a certain amount. In addition RSIA should be performed if the project in question and it is very important from the view of traffic safety. RSA should also be performed for other infrastructure projects, such as intersections and bus stops and all projects aiming at increased traffic safety. Black spot management and RSI should be performed for all national roads.

## Ireland

General facts about implementation of directive in Ireland (initially the scope is to be TEN roads):

- The aspiration is to implement on all National Primary roads over time.
- It is proposed that the requirements of the Directive be used on all new TEN projects from Dec 19th 2010. Project Management Guidelines have been amended and draft RSIA guidelines have been prepared. Ireland already has Road Safety Audit (RSA) and Network Safety Management (NSM) in place for many years.
- Many of the requirements apply to other roads but not necessarily in a universal manner.





- Ireland has had road safety audit in place since 2001. It is proposed to use the definitions in their road safety audit standard:

"Infrastructure project":

- ‘All works that involve new road construction or permanent change to the existing road layout’.

“Substantial Modification to the existing network which affects the traffic flow”:

- It is proposed to use Table 2 below from National Roads Authority (NRA) Road Safety Audit Standards NRA HD 19/09. Road Safety Impact Assessment (RSIA) will be required for a Major Scheme or a Major Development, as per Stage F RSA at present.

**Table 2. Stages of road safety audit and type of scheme in Ireland**

VOLUME 5 ASSESSMENT AND PREPARATION OF ROAD SCHEMES  SECTION 2 PREPARATION AND IMPLEMENTATION  PART 2  NRA HD 19/09  ROAD SAFETY AUDIT	Table 2/1: Stages of Road Safety Audit and Type of Scheme					
	Type and Complexity of Scheme		Stage			
	F	1	2	1/2	3	
Major Scheme	X	X	X	-	X	
Minor Improvement Scheme #	-	X	X	(X)	X	
Major Development +	X	X	X	-	X	
Minor Development	-	-	-	X	X	
Junction / Traffic Scheme	-	X	X	(X)	X	
Planned diversions *	-	-	-	X	X	

\* See NRA Interim Advice Note 85/06.  
 + Meets criteria in NRA Traffic and Transport Assessment Guidelines Table 2.2  
 \*For planned diversions of significant impact, associated with NRA Major Road projects See paragraph 2.2.

- Any scheme under the control of NRA Majors Section is considered a Major Scheme.
- Usually means a scheme greater than €5m in cost, significantly offline with an element of land acquisition, environmental impact assessment and planning consent.
- It is proposed that the requirements set out in the Directive will be used on all new TEN projects from Dec 19th 2010. NRA Project Management Guidelines have already been amended and draft RSIA guidelines have been prepared.
- In actual fact, NRA designers are currently carrying out RSIA as part of the constraints studies. They simply have to extract this information into a stand-alone report.
- RSA is in place for many years and will continue as is. Training courses have already commenced for auditors to obtain Certificate of Competence and this will be in place long before the deadline of 2013.





- See table below for definition of various modes as per NRA standards. It is proposed to have RSIA for Major Schemes and Major Developments that currently require Stage F audits.

## Portugal

Portugal has a project of law at the moment (in the last phase of the approval and promulgation process) concerning the transposition of the Directive, and two projects of regulations – one relating to RSA, the other relating to RSI. All these projects were submitted to the Portuguese Government for approval purposes. Internal instructions delivered by the Portuguese Road Authority are still missing.

A project of law was submitted for national approval and promulgation. According to that proposed legislation, there is no need to change or repeal national laws, with two small exceptions [3].

According to the proposed legislation (now in the last phase of the approval process), the scope is basically the same of the Directive (i.e. TEN-roads), but extended to the rest of the Portuguese National Road Network (NRN) in what respects to Road Safety Inspections (RSI) and, whenever the Portuguese Road Authority decides, to Road Safety Audits (RSA).

The identification and safety management of “black spots” is already in practice, regarding all the NRN, on a yearly basis.

There are plans to apply safety ranking and management of the road network in operation procedures to all the roads belonging to the NRN, beginning in a near future (2 – 3 years), on a 3 year basis. (Note: Portugal had a similar practice some years ago, regarding high accident concentration sections, but it was discontinued due to institutional and organizational changes).

In the long term there are plans to extend all the actions referred above to the Municipal Network, as well. However, no timetable has been decided yet.

Reports on all fatal accidents occurring on all Portuguese road networks (national, municipal) are already drawn up by the police.

Average social costs of fatal and severe road accidents will be calculated for the total number of accidents occurring in the national territory. No disaggregation (by type of road, type of road environment or type of accident) is planned.

A RSA Manual, a RSI Manual and a Road Safety Impact Assessment Manual are in conclusion, all of them elaborated especially to be applied on the NRN.

Copy of legislation will be forwarded as soon as it is approved by the Government and promulgated.





## France

A National Law is necessary for the implementation process. A draft has been prepared and should be adopted soon.

## ROAD SAFETY IMPACT ASSESSMENT (RSIA)

### Sweden

The Swedish Transport Administration regulations already require RSIA to be carried out in all feasibility studies on state road investment projects to be assessed according to the Swedish Road Act. This is also the case for the following stage, the preliminary road design stage. The present requirements well meets the requirements presented in the directive. The Swedish Transport Administration regulations already require Cost-Benefit-Analysis with monetary comparisons of road user, safety and environment effects with investment and maintenance costs. The regulations also require estimates of safety effects in terms of saved fatalities and severely injured as well as travel times and environmental effects. There are also requirements to describe qualitatively effects towards the transport policy goals. The RSIA is an integrated part the initial feasibility study, which is a part of the general planning process. The feasibility study includes discussions about deficiencies, problems and needs. Environmental issues, road safety, accessibility, transport quality, regional development, and gender equality among other areas, are covered in the feasibility study. This also the case for the next step, the preliminary road design step, where the requirements is consistent with the requirements in the first stage.

The first stage is a stage where need and requirements are discussed and alternative solutions are discussed. Not all of these feasibility studies lead to a decision about new reinvestments. At this stage the RSIA is conducted, as an integrated part in the feasibility study.

The next stage is the preliminary design resulting in a proposed right-of-way corridor with a preliminary design used for the judicial procedure according to the Road Act to decide whether the project is feasible compared with costs and intrusions. A legal analysis is carried out on safety matters. An RSIA is also conducted at this stage.

The final design plan procedure depends on procurement type (Only build, Design and Build etc). A final design plan is labored by the Swedish Transport Administration for only build but by the Contractor in other procurement types.

The completion of the project also depends on the contract type with alternative warranty inspections including traffic safety.





The Swedish Transport Administration is reviewing how safety audits should be applied in an effective way. The main proposal is to implement audits before the legal assessment and as a part of the warranty inspections to maximize possibilities to apply recommendations in a cost-effective way. The Swedish Transport Administration cost/benefit analysis requirement procedure defines the boundary as that part of the road system with traffic impacted by the road project.

The present procedure use principal design – planned speed limit, cross-section and clear zones, intersection types, level of access control, separation of vulnerable road users and if any problems with flooding, avalanches and settings. Quantitative safety data are used both for the existing road network and for typical new designs.

The Swedish Transport Administration today commissions the feasibility study from external consultants.

The existing manuals that are used today fulfill the directive. There are manuals on how the assessment should be done quantitatively as well as qualitatively. The use of them is mandatory since they are a part of the procurement document. These documents are published on the web at [www.trafikverket.se](http://www.trafikverket.se).

## Belgium

The whole of road planning projects depends on a priority list. The road safety element is one of the elements fixing the priorities.

Therefore, there is considering different planning possibilities for a road project in Belgium. The project with the most interesting price in connection with advantages/costs is privilege. The road safety element is one of the assessment elements.

The majority of the projects consist of reorganizing crossroads or city crossing. New road sections are rather uncommon.

## Cyprus

The information of the RSIA report is presently contained within Techno-economical study of each project. The standard stages for "initial planning" are the inclusion of a proposed project in the State Budget and the preparation of a Techno-economical Study and a Traffic Modelling/ Impact Assessment Study. Hence, RSIA will be implemented at the same time as the other assessments. The RSIA will now form an independent study.

Responsible national road authority of Cyprus is Public Works Department, Ministry of Communications and Works.





## Iceland

The Icelandic Road Administration has established a new working procedure for Road Safety Impact Assessment (which was former the first stage of Road Safety Audit). RSIA should be performed if the cost of the road project exceeds a certain amount. In addition RSIA should be performed if the project in question is very important from the view of traffic safety.

Law on environmental impact assessment of new road projects (or road projects which will undergo major changes) were enacted in 1993 and normally road safety was covered in one of the subchapters of the written report. With RSIA the discussion of the effects of a new road project (or a road project which will undergo major changes) on road safety will be more extensive and in a separate report.

Road Designers and Road Safety specialists from the Icelandic Road Administration and also in some cases representatives of local authorities are undertaking RSIA. Consultants (engineering firms) can also participate.

The project manager (design manager) decides which remarks of the RSIA-team will be taken into account in further design of the project. He has to write down his reactions to the RSIA-team's report and send it to the RSIA-team. If members of the RSIA-team consider that some of the remarks that will not be taken into account are extremely important they can send information on the matter to the Director General.

## Ireland

The information for the RSIA report is presently contained within Scheme Constraints study. Now the traffic and road safety information will be extracted separately to form the RSIA. It will also act as a source of information for the independent "Stage F" RSA. Therefore, the RSIA will now form a stand-alone document as part of the larger CONSTRAINTS STUDY for the scheme, which will include documents on Archaeology, Environmental, Economic and all other factors.

The RSIA will be evaluated on cost benefit basis. NRA Project Management Guidelines excerpt below (Fig. 1). RSIA is in Stage 1 [4].





## 6.0 Stage 1 Preliminary Options Assessment

- Description of Route Options identified
- Findings from 1<sup>st</sup> Public Consultation including responses from public bodies
- Engineering Assessment
- Road Safety Impact Assessment
- Environment Assessment
- Economy Assessment (Options Comparison Estimate)
- Framework Matrix (including any amended or amalgamated route options)
- Recommendation on refined number of Route Options to proceed to Stage 2.

## 7.0 Stage 2 Project Appraisal

- Description of the refined number of Route Options.
- Findings from 2<sup>nd</sup> Public Consultation, if held.
- Summary of Economy Appraisal (Options Comparison Estimate and Cost-Benefit Analysis).
- Summary of Safety Appraisal (Road Safety Audit Stage F (Part 1)).
- Summary of Environment Appraisal.
- Summary of Accessibility & Integration Appraisals (typically confirmation of no difference between various route options).
- Project Appraisal Matrix.
- Recommendation on a Preferred Route Corridor, including, where necessary, a statement justifying the selection of the route if it does not have optimum Benefit to Cost Ratio (BCR)

## 8.0 Stage 3 Preferred Route Corridor PABS

- Project Appraisal Balance Sheet (PABS) of the Preferred Route Corridor
- Summary of Road Safety Audit Stage F (Part 2)
- Recommendation that Preferred Route should form the basis of Phases 3 & 4.

Fig. 1. Excerpt from NRA Project Management Guidelines (PMG) in Ireland

NRA Traffic & Transportation Assessment guidelines stipulate that if a development proposes to change the traffic by 10% then it needs to pay the cost of improving the infrastructure to cater for





this increased traffic volume. Annex 1 is used as a basic definition for the elements required in an RSIA. See Project Management Guidelines (PMG) outline requirements for RSIA below (Fig. 2).

### A1.1 Outline Requirements for Road Safety Impact Assessment

A Road Safety Impact Assessment (RSIA) shall include, but not be limited to, the following provisions:

- A Definition of the proposal and a description of the understood need for the Scheme
- An assessment of the existing road safety problems on the current road network and the consequences of a 'Do-Nothing' option. This assessment should cover the entire area of the network where route choice and traffic patterns would be affected by the Scheme, which may be larger than the defined Study Area.
- A description of the understood road safety objectives of the Scheme.
- An analysis of the road safety impacts of each of the proposed options. This should cover effects on the network as well as on the proposed options, and should take account of:
  - All road users, including vulnerable road users;
  - All effects on traffic flow and traffic patterns, including changes in modal split and the differing effects on each vehicle category;
  - The likely range of seasonal and climatic conditions;
  - The provision of a safe number of parking areas.
- A comparison of the options using Cost-Benefit Analysis type assessment of the road safety benefits and dis-benefits of each option, and a ranking of the options in these terms. The comparison and ranking shall include the 'Do-Nothing' option.

Fig. 2. Project Management Guidelines outline requirements for RSIA in Ireland [4]

Guidelines have been developed for RSIA and these are being 'road-tested' at present. RSIA has been included in NRA Project Management Guidelines. Guidelines generate a cost benefit analysis table, based on safety benefits, which rates the various scheme options.

The RSIA document is included in the bigger Constraints study report, and forms part of the evidence for the Public Inquiry into the scheme.





## Portugal

Road Safety Impact Assessment (RIA) means a strategic comparative analysis of the impact of a new road or a substantial modification to the existing network on the safety performance of the road network. According to this definition and the draft of the Portuguese RIA Manual, a RIA may concern:

- Preparatory planning or design to construct a new road link, the remodeling of a stretch of road in operation or merely changes in the traffic control system in a portion of the road network (e.g. an intersection);
- Planning for safety interventions of general scope, not limited to a particular road link, but covering a wider portion of the road network (e.g. the application of a new signaling system on the roads of a given class).

According to the project of regulations that are now in the approval process, the standard stages for “initial planning”, at which RSIA is implemented in the process, are Base Program (Programa Base) and Preliminary Study (Estudo Prévio).

Base Program is the document prepared by the designer based on the preliminary program, with the aim of checking the feasibility of the work and of the alternative solutions, which, when approved by the commissioning body (owner of the road), is the basis for the development of subsequent phases of the project.

Preliminary study is a document prepared by the designer after the approval of the Base Program, in order to define alternative broad solutions that fit the Base Program and select the most appropriate.

Safety performance functions are being developed for road links and intersections that apply to the NRN (National Road Network).

In a RSIA safety levels will be assessed primarily based on expected accident frequencies by accident severity, using the empirical Bayes method. When not possible, accident rates or accident densities will be calculated (based on five year observation periods) and used.

No benefit-cost analysis will be carried out in the first stages, due to absence of current accident cost estimates.

A RSIA Manual is under elaboration. It will be not mandatory, unless explicitly stated in the road concession contract (or other similar document).





## France

Road safety to other criteria like environmental issues by Cost of fatalities, cost of accident are calculated to be used in the socio-economic cost-benefit analysis is compared.

Hence, in the process of assessment are using traffic and accident data.

The Road awarding Authority (DREAL-SMO) at regional level is (are) undertaking RSIA.

No specific procedure lay down for the moment up of the RSIA-report, but for projects subject to public inquiry, the results of the RSIA will be included in the file presented to the public.

## Road safety audit (RSA)

### Sweden

According to the directive and the Swedish legislation, the Swedish Transport Agency is responsible for producing directions. Directions for RSA, including requirements and approval of auditors, will be presented later this year by The Swedish Transport Agency.

A couple a years ago the government did carry through RSAs in Sweden. In these audits, the auditors were independent from the project they audited. This is a normal procedure when it comes to (quality, environmental, internal etc.) audits and there's no reason to argue differently in this case. The auditor shall and will be independent from the project.

In a report initialized by the Swedish Transport Agency, on an assignment from the Ministry of Enterprise, Energy and Communications, procedures, guidelines and manuals are mentioned but they are not yet produced.

According to the Swedish legislation, the general public is granted unimpeded view of activities pursued of the Swedish government, administration and also local authorities. This includes the access to documents.

The different stages of the planning process are described in the Swedish law, which gives the auditor (and the public) a predictable and open view of the process. The auditors will have access to the project, without any limits, according to the Swedish law and the established way of audit customs.

The implementation documents of article 9, training curricula for road auditors, are under production based on the European Road Safety Auditor Training Syllabus and will be implemented before the required deadline 19.12.2011. The preliminary plan is to in the longer term create and use the consultant market for this type of audit services. A major part of the projects,





according to international and Swedish law, are subject to public procurement, internationally announced. This gives access to a market with international consulting firms operational also in Sweden.

## United Kingdom

The duty to maintain roads free from danger is supportive of other activities required by the Directive, such as road safety audits and the ranking of roads which have high accident concentrations. The elimination of danger to road users through ensuring the condition of the highway is well maintained will inevitably have some impact on the degree of accidents on those roads.

## Belgium

The road safety auditor himself determines the possible influence of the project in connection with the road safety. The auditor particularly bases on his experience. The traffic forecasts are also a useful guide to determine the principal effects of the project.

A road safety auditor assesses the impact on the road safety of the project. For the significant projects, requiring a public investigation, the effect inquiry is a part of available consultation documents. For ordinary projects, the concerned entity transfers to the RSIA.

The Administration Officials generally point out the auditors for each project. For the audit of the detailed project step, it should be a particular service of the Road Administration responsible for these audits. No particular audit methods according to the kind of infrastructure. Nevertheless, there is a simplified process for lights works.

The training program for road safety auditors has not yet been established.

What has been considered?:

Admission condition: - a master (engineer, architect, town planner,

- three or five years of relevant experience

Formation: - probably two weeks;

- homework.

Post condition: - a continuous formation;

- a minimum number of audits per year.

The auditors who will have made a certain number of audits could be team leaders. The training process would be validated by the making of an audit.





The Administration Officials has to decide to take (or not) the audit remarks into consideration. The decisions are motivated and the one who makes the decision (high rank in the Administration) is, of course, not the author of the project.

## Cyprus

There will be a specific reference in the proposed law. The Director of Public Works Department of the Ministry of Communications and Works will be responsible for the implementation of the law.

According to the proposed law the auditors must have experience in road design, in traffic management, in traffic safety engineering and in road accident investigation. The other issues will be included in the guidelines.

Two years after the implementation of the Cypriot law all auditors must be certified according to the provisions of the law.

## Iceland

The persons in the audit team shall not have been involved in the design of the project. For the majority of projects it applies that the auditors work at the Icelandic Road Administration. However representatives of local authorities sometimes and also consultants (engineering firms) are participate in the process.

There are Icelandic guidelines and checklists. Originally based on Road Safety Audit in UK but updated with reference to the appendices in the directive. The checklists used as a part of the Icelandic Road Administration's working procedure on RSA. When the working procedure was rewritten the checklists were updated by checking if any items listed in Appendix II were missing.

Courses for road safety auditors have been held twice in Iceland. In both cases specialists from TMS Consultancy in UK came to Iceland and gave (a 2-3 day course). In year 2010 the Icelandic Road Administration plans to have specialists from Denmark to come to Iceland and give a course on RSA.

An auditor needs to have an experience in road design, road safety engineering and accident analysis.

The project manager (design manager) decides which remarks of the RSA-team will be taken into account in the design. He has to write down his reactions to the RSA-team's report and send it to the RSA-team. If the RSA-team considers that some of the remarks that will not be taken into account are extremely important they can send the Director General information on the matter.





## Ireland

The cost of the audit would depend on the amount of the work. Costs are usually in the order of €3,000 to €5,000.

### *Audit Team:*

A competent Audit team consists of a minimum of two persons, independent of the Designer and approved by the Overseeing Organisation. Current NRA training and experience requirements for Audit Teams are available on the NRA website. For schemes designed by the Contractor the Audit Team shall be from a completely separate organisation to the Contractor or Designer (employed by the Contractor) [5].

As per Preamble 6 of the Directive, Ireland already possess a well-functioning RSA system and will continue using existing methods, in so far as they are consistent with the aims of this Directive.

The requirements of RSA standards are consistent with the aims of the Directive.

The training and the certification of auditors are organised:

- University College Dublin is currently running a 10 day course for RSA which will lead to an exam and a Certificate of Competence.
- The basic degree requirement to enter the course is BE Civil Engineering, or equivalent.
- The course duration is 10 days.
- Periodic re-training will initially take the form of a one day seminar/series of lectures on an annual basis, which auditors must attend.

All existing auditors who wish to undertake audits on TEN roads after Dec 2013 must have a Certificate of Competence, so they must all attend the course and pass the exam.

Ireland intend to continue to use they own standards for auditor experience. On obtaining a cert of competence an auditor must attend 5 audits as an observer, then 5 audits as a team member, before they can become a team leader. Audit team is minimum of 2 members.

### *Qualification and Experience Requirement for Road Safety Audit Teams*

For each road safety audit the Employer's Nominated Person for the scheme shall appoint a competent audit team that is independent of the design team.





The qualification and experience status of individuals making up each proposed road safety audit team must be checked by the NRA Road Safety Section for approval before each audit.

Applications for approval of audit teams must be submitted on the standard form RSA App09 below which can be either sent to the Road Safety Section in NRA, St Martin's House, Waterloo Road, Dublin 4 or emailed to roadsafetyaudits@nra.ie. Approval will be of individuals within each team, rather than of consultancy firms bidding for the work.

The approval procedure must be carried out for each audit stage for each scheme. Quality checks will be carried out on a sample of completed road safety audits and the results of these checks may be taken into account when audit teams are being approved [6].

In order to ensure a consistent approach, all effort should be made to use the same audit team at each audit stage throughout the design and construction of a particular scheme. Notwithstanding this it may in certain circumstances be necessary for NRA to refuse approval for the previously approved team at a later stage audit.

### Current NRA Requirements

The current NRA requirement for Road Safety Audit Teams is as follows. Three categories of person are identified:

*Audit Team Leader.* Audit Team Leaders should preferably be road safety engineers with at least two years' experience of collision investigation and remedial measures, will have taken part in ten road safety audits as team member, and will have attended an accredited three to five day course in road safety audit theory and practice.

In some instances, road engineers with at least two years' experience in road design will qualify provided they have taken part in ten road safety audits as team member, and have attended a two week accredited Road Safety Engineering course as well as the three to five day course in road safety audit theory and practice.

Audit Team Leaders will have done as team members at least two audits of a similar stage and scheme type to that for which approval is being sought. They will also have done at least five road safety audits within the preceding two years.

*Audit Team Member.* Audit Team Members will be road safety engineers, road design engineers or road traffic engineers. They will have taken part as trainees in five road safety audits, and will have attended an accredited three to five day course in road safety audit theory and practice.

*Trainees.* Road engineers who wish to train as road safety audit Team Members may take part in audits as observers. Trainees and observers do not sign the road safety audit report and do not require approval.





The Road Safety Authority will keep the register of approved courses and the register of auditors with cert of competence.

On obtaining a cert of competence an auditor must attend 5 audits as an observer, then 5 audits as a team member, before they can become a team leader.

If they do not complete a minimum of 5 audits in the previous 2 years they lose their team leader status.

**Audit Report.** At each stage, the Audit Team shall prepare a written report, which shall be forwarded directly to the Employer who shall copy the report to the Designer, the Employers Representative and the NRA Road Safety Section. The report must clearly identify the scheme, the audit stage and the Audit Team membership, including the names of others contributing at Stage 3 site visits. The body of the report should be kept brief and shall contain descriptions of the specific road safety problems that the Audit Team believes would be created. It should include background reasoning in support of the findings together with the Audit Team's recommendations to eliminate or mitigate the hazards identified.

For those cases where the Designer and the Audit Team cannot agree appropriate means of addressing an underlying safety problem identified by the audit an *Exception Report* must be prepared on each disputed item in the audit report [5].

## Portugal

The proposed Portuguese regulation on RSA states that auditors may not have had any involvement, in any way, in the project, work or other procedures related to the referred scheme. The proposed regulation also states that auditors cannot perform RSA to the legal person of public law or to the natural or legal person of private law which is binding upon.

There are penalties to those who do not comply with the established.

To the moment, in Portugal, the last phase of an RSA is done a few days before the opening of the infrastructure to traffic. So, it isn't any definition to "early operation".

The assessment is based on the experience of the auditors. Auditors will use data provided by the commissioning body (owner of the road). The proposed regulations on RSA establish the following, relating the qualification of the auditors:

- a) Chartered Civil Engineer (5 years course / master) in Portuguese Institution of Civil Engineers.
- b) Approval on a RSA training course recognised by the Portuguese Road Authority (curricula not yet defined)





- c) Experience (at least ten years experienced in civil engineering, and ten years at least of practice on elaboration or coordination of road projects).
- d) Updating of knowledge (additional training in road safety, recognized by the Portuguese Road Authority).

The procedure for recognition of qualified auditors for the exercise of RSA, as well as requirements to be met by the courses and further training of auditors, will be defined later.

An audit team may be composed by one or more auditors. In this case one of the auditors, designated as coordinator, chooses the other members of the team. All of the members have to be certified as auditors in accordance to the new regulations.

An auditor, to maintain the qualification, will have to do a number of RSA in a given period and to update his knowledge attending additional training in road safety, recognized by the regulatory authority.

The designer or the owner of the future road does not consider an issue identified by the auditor team as a safety problem he must fill in an exception report stating his decision and reasoning.

Changes to the initial design scheme made in response to the audit report must be submitted to the auditor, for analysis.

## France

"Early operation" is defined approximately the first year of operation.

Checklists of RSA in France are built on the seven French criteria of Road Safety.

Auditors should be separate for each stage: Level 1= early operation audit. Level 2 = Level 1 + pre-opening audit. Level 3 = Level 2 + design stage.

The training and the certification of auditors are organised by The ministry of roads, transport and road safety has his own organisation, a "National Road Network audit team", which is allowed to give the accreditation.

Auditors receive initial training during 3 days + they perform one audit with senior auditor (tutorial).

For the moment, criteria used to select auditors for training aren't based on initial training but also on professional experience and knowledge.

The periodic training of auditors is not organised yet.





To be certified, training auditors have to perform an audit with an experienced auditor (training audit).

The ministry in charge of roads, transport and road safety has his own organisation, a "National Road Network audit team", which is allowed to approve the training process.

The ministry in charge of roads, transport and road safety has his own organisation, a "National Road Network audit team", which receives the audit report in order to improve immediately the situation on the corresponding infrastructure and more in general the State-of-the-Art.

## Road safety inspection (RSI)

### Sweden

The process (continuity between RSA phase 4 (early operation) and periodic RSIA for this is not clear yet. Sweden's plan is that the "early operation" phase RSA should be connected to the first RSI. But this is an important issue, which also have to be connected to the process of improvement.

All national roads are subject to periodic maintenance, carried through by contractors. These inspections covers today a range of controls, some directly connected to road safety. There is a road safety part in those periodic maintenance inspections. Inspection intervals and response times depends on road type and AADT. For the training for road safety inspectors there's a framework developed, but no decisions are made so far. How the RSI will be developed is not yet decided.

### United Kingdom

Although not part of the actual provision, highway authorities can only discharge that duty fully by implementing a series of periodic inspections of its network to learn whether there is a need for remedial works, to keep road users safe and free from danger. Therefore, it is the case that if a highway authority failed to carry out periodic inspections it would not be able to identify roads requiring repair and therefore meet the statutory duty. Accordingly, it couldn't be assert, that there is already a statutory requirement to carry out inspections.

### Belgium

RSAs stage 4 is carried out a few months after opening. RSI is a regular inspection. RSI is realised 2 or 3 years afterwards. Periodic of the RSI is every 3 years. The Road Administration is undertaking RSI procedure.





The training program for the safety inspectors has not yet been established.

## Cyprus

Public Works Department, Ministry of Communications and Works are the responsible national road authority of Cyprus.

There are no guidelines for RSI in Cyprus yet, but guidelines will be formulated. The already adopted Geometric Design Standards published by the Ministry of Communications and Works will be used.

## Iceland

The Icelandic Road Administration only recently finished work with new guidelines on RSI but plans to perform it periodically, every 3-5 years. The Icelandic Road Administration does not look at RSI as a part of general maintenance, more as a proactive approach to find dangerous places even though accidents have not been a major problem.

Road Designers and Road Safety specialists from the Icelandic Road Administration are undertaking RSI. Consultants (engineering firms) can also participate.

The Icelandic Road Administration has established a new working procedure for Road Safety Inspection. A new handbook (guidelines partly based on the Norwegian ones) on RSI has been written.

## Ireland

On national newer network there would be some continuity. Previous audits on the scheme would be available to the inspectors. On national 'legacy' road network, where no improvements have been made for many years, there would be no audits to fall back on.

## Portugal

RSI are undertaken by the entities who manage the road infrastructures of the NRN (road concession companies in this case). The Portuguese Road Authority can also undertake RSI whenever they want.

The training for road safety inspectors is not formalised. It has to be accepted by the regulatory entity, case by case.

The degree of training is established case by case, provided that the inspectors have to be at least 5 years of professional experience, without any interruption.





## France

Road Operator undertaking RSI which periodic is every 3 years.

Training session for road safety inspectors with training inspection duration is 3 days.

Inspectors come from road operator services, local services or technical services. There aren't any criteria linked to the initial training of inspectors.

Technical guide is published on the Setra website and translated in English. Its use is mandatory.

*UK and Belgium use the French template for RSI report with some changes.*

## Ranking of high accident concentration sections and network safety ranking (NSR)

### Sweden

Sweden has systems for ranking and managing the safety of roads. Accident rates and accident concentrations are reviewed on a regular continuous basis. “Black spot” or “problem” sections (compared with criteria on median separation etc.) are identified giving some of many inputs to the analysis phase of the national and regional investment plans and also to the analysis of existing speed limits. These plans are normally updated approximately every 5 years due to political decisions. There is a new legal proposal which would give a shorter planning interval, probably 3 years. New accident data and changes in the road network system are continuously updated. Traffic data on trunk roads are updated every 3 years and on other roads every 12 years. Safety ranking is done both based on design (EuroRAP lookalike) and accidents.

Road safety inspections are an integral part of the investment planning procedure in the prefeasibility as well as the feasibility stage. There are provisions for the composition of prefeasibility, feasibility, preliminary etc. phases with requirements on safety expertise. These vary slightly depending on project, phase etc.

### United Kingdom

There are provisions which cover the operation, signing and lighting of:

- roadwork's<sup>1</sup>;

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<sup>1</sup> The 1980 Act, section 174. The Road Traffic Regulation (Northern Ireland) Order 1997 S.I. 1997/276 (N.I. 2), Article 31





- street works undertaken by statutory undertakers [5]
- roadwork's undertaken by statutory undertakers

The above provisions impose legal duties on the operation of roadwork's and the necessity of using adequate warning signs, which fully meets the requirement set out in article 5(4) to provide for warning signs when repairs are being undertaken. This is the second activity which is wholly covered by an existing legislative duty.

In addition, highway authorities in England and Wales have a power to place signs in conformity with directions given by the Secretary of State. In other parts of the UK, legislation exists in relation to this area, examples of which are in the footnotes below. Guidance documents also exist which lay down requirements for the safe operation of roadwork's to avoid danger to road users and impacts on traffic flow. This Guidance is used by all highway authorities. In addition, there is a broad statutory provision which imposes a duty on employers to ensure that any works are carried out in a way which does not create a risk to the health and safety of members of the public. Breaching that duty is a criminal offence.

## Belgium

The list of the most urgent projects already has been made. High accident concentration sections are ranking yearly. "Risk zones": zones with high numbers of bodily accidents. This concentration is temporal and geographical. These zones are identified by Road Administration according to an indication of insecurity. This indication takes account on bodily accidents not only on the distance (km) concerned, but also on accidents on the both distances (2 km) on each side, with a decreasing measure of the distance. The same rule is followed according to the time. It's integrated into the accidents, occurred in the month concerned, those which have happened during the 5 preceding months and the 5 following months with a decreasing margin like a parabola. Finally, an average of these monthly indication is calculated for 5 years to determine de "Risk zones" indication higher than 2,4.

## Cyprus.

There are no guidelines or manuals for this procedure in Cyprus.

Information on the safety ranking is updated every three years. The latest 3 years accident data and require 5 injury accidents in a road stretch of one km or a road point (junctions) are used. Reports of the expert's team are published by the competent road authority to define an action plan based on a priority ranking.





## Iceland

Safety Ranking (Black Spot Management) is doing analysing spots with the high level of accidents. SR (BSM) is a reactive approach. On the other hand is a proactive approach in order to find dangerous places even though accidents have not been a major problem. In traditional black spot analysis the main issue to find accident patterns and circumstances at which accidents occur. With the report of the expert team in Iceland should be done:

- Improvements that made based on available funds.
- Improvements that have been implemented are listed in the annual report on implementation of the Road Safety Plan.

At some spots signs are put to tell the road users that many accidents have happened at that particular place.

## Ireland

Collision cluster ranking are doing every year. For that are using the latest 3 years crash data, require 3 crashes in a km + crash rate twice average for that road type to constitute a cluster. Information must be provided on the safety ranking. The clusters are then studied by a team of road safety engineers and the sites are broken down into engineering, education and enforcement issues. The engineering issues are then taken and designs prepared by LA's to implement in the road safety remedial measures programme for the following year. The education and enforcement clusters are forwarded to the relevant agencies for their attention. Clusters identified then examined in detail by Road Safety Engineers - break down into Engineering, Education & Enforcement. Engineering clusters included in subsequent years work programme.

Police Collision data is provided on an annual basis through the road safety authority.

## Portugal

According to the proposed legislation (not yet approved), the Portuguese National Authority for Road Safety (Autoridade Nacional de Segurança Rodoviária) is the entity which is responsible to the classifications relating the Safety Ranking. Safety Ranking is doing According to the methodology defined by the Portuguese Road Authority, and to ensure that stretches of highway that may be priority according to the results of the classification of high accident concentration sections and the classification of the subsections with high potential for accident reduction are evaluated by teams of experts, where at least one of them has the quality of auditor under the proposed RSA regulations. According to the proposed legislation, the information on the safety ranking will be updated at least every 3 years.

The Portuguese National Authority for Road Safety (Autoridade Nacional de Segurança Rodoviária) has all the information relating to road accident characteristics and victims, such as





the numbers of injury accidents, fatal accidents, fatalities, severely injured victims, etc. In general data of the last 3 years will be used. On the other hand, the road concession companies, supervised by the Portuguese Road Authority (InIR) provide data relating road lengths, category and geometric characteristics of roads and volumes and typology of traffic.

Theoretical and methodological issues are being treated and will be applied by the Portuguese Laboratory of Civil Engineering (LNEC). The Portuguese Road Authority (regulatory and supervisory authority) will monitor the implementation of the measures recommended in the report. In principle the list of the high accident concentration sections will be presented to the general public in the website of the Portuguese National Authority for Road Safety and in the press.

The possibility that the road concession entities (i.e., the road manager entities) may apply signs / panels at the entrances of those high accident concentration sections (with a message like “accident zone in ... metres”, eventually associated to a sign to limit speed), has to be studied.

## France

Safety ranking (stake analysis of NSM) is updated each 3 years. Reports of the expert team on SR are used by the Road Authority (Local Road Operator) to define an action plan. Accident rate maps are published on the National Road Safety website. Accident reports are using data of assessment.

## Other information relating to the Directive

### Sweden

There is the agency responsible for the transport policy analysis in Sweden. They analyse and evaluate proposed and implemented measures within the sphere of transport policy and are also responsible for official statistics in the transport and communication sectors.

*Primarily accident reports* are drawn up by the police authorities for every fatal accident. The Swedish Transport Administration makes an in-depth-study to find out the reason for the accident. The statistics are used in planning work to define the most effective measures for improving road safety. The knowledge is also used in the so called OLA-method. OLA is a Swedish abbreviation for Analysis of Objective facts (what has happened?), Solutions (what can be done?) and Intentions (what will be done and by whom?). Every stakeholder who has a possibility to affect a certain safety problem is invited to present which intentions they have to do something. An OLA can be made for a certain problem area, for example railroad crossing accidents, work zone accident.

*The socio-economic cost* for a traffic accident consists of a risk value that will reflect the cost for individuals because of loss of lives or health, material costs in the form of costs for healthcare,





administration and damages on property and production loss due to the impossibility to work or deaths as a result of the accident. In 2006 years the price reach approximately 400 000 Euro for severe injured and 2 200 000 euro for death.

## United Kingdom

The Secretary of State has a power to promote road safety by means of informing or advising the general public on issues relating to the safety of roads. Such a power is used to produce and provide annual statistics on accident data and to obtain accident data from the police who underpins those statistics and is a very longstanding, formal arrangement. In addition, local highway authorities are under a duty to carry out surveys into road accidents on their network and take appropriate measures based those surveys in pursuance of controlling, protecting or assisting the flow of traffic. Furthermore, in the same legislative provision, local highway authorities must, when constructing new roads, take appropriate measures to reduce accidents on those roads.

## Belgium

The social costs of fatal and severe accidents are not used in the safety program of the road network in Belgium. They are optional in assessing the ratio advantages/costs and to decide about the planning priorities. Accidents reports and road infrastructure are using in:

- General and detailed statistics
- Ranking of high accident concentration sections
- For the safety projects for parts of roads and crossroads: analysis of the reasons of accidents in order to determine the best actions
- Evaluation of the planning made in the past (ex: The Safety of Roundabouts and Traffic lights in Belgium)

## Cyprus

Accidents reports and road infrastructure are using in:

- Preparation of the Traffic Safety Strategy of Cyprus.
- In- depth investigation of accidents.
- Preparation of black spot studies and proposes possible remedial measures.





## Iceland

The Road Traffic Directorate uses accident reports for official accident statistics for Iceland. The Icelandic Road Administration uses them for accident analysis at black spots and the Road Accident Analysis Group investigates all fatal accidents and sends its remarks to the relevant bodies (f.ex. the Icelandic Road Administration) so they can prevent further accidents occurring where circumstances are similar.

## Ireland

The cost of fatal and severe accidents calculation (collisions) are based on Goodbody Economic Consultants report 'Cost Benefit Parameters and Application Rules for Transport Project Appraisal' which was approved by the Department of Transport.

The Irish Police (An Gardai) prepare collision reports for all injury collisions, not just fatal. Accidents reports are using for the statistical analysis.

## Portugal

There are no current up to date accident costs in Portugal. The most recent accident cost evaluations date back to 1987, and their most recent updating dates back to 1995. Accident reports have been used by Justice in trials. The accident reports be studied by the different road authorities and managers of the roads, with the aim of establishing solutions for the detected problems.

## France

Costs for fatalities and casualties were calculated by a complex analysis (Rapport Boiteux) in 2001 and are updated each year by the National Interministerial Road Safety Observatory. Accident costs are calculating by the Setra every year, based on the national accident data and the costs of casualties.

Police and Gendarmerie are drawing up the accident reports for fatal accidents. The main issue is to analyse the accidents with wrong-way drivers, strong slope roads, safety at level crossings. National next main issue is to improve road safety for Powered Two Wheelers.

## Legal acts relating to the analysis of the implementation of this Directive adopted in the BRS countries

In the stage of preparation of above mentioned procedures is necessary to analyse the national implementing measures relating to the EU directive in BSR countries. Below are listed legal acts





relating to the analysis of the implementation of this Directive adopted in the Lithuania, Latvia, Estonia and Sweden.

## Lithuania

There are 6 Commandment of Lithuanian Road Administration under the Ministry of Transport and Communications of the Republic of Lithuania, 1 Commandment of the Ministry of Transport and Communications of the Republic of Lithuania, 1 Resolution of the Government of the Republic of Lithuania and 2 Commandments of Lithuanian Police Commissioner General relating to the implementation of the Road infrastructure safety management Directive has been approved in Lithuania before April 2011:

The Order of Lithuanian Road Administration under the Ministry of Transport and Communications of the Republic of Lithuania „ON THE APPROVAL OF ROAD SAFETY INSPECTION PROCEDURES”

The Order of Lithuanian Road Administration under the Ministry of Transport and Communications of the Republic of Lithuania „ON THE APPROVAL OF ROAD SAFETY AUDIT REQUIREMENTS”

The Order of Lithuanian Road Administration under the Ministry of Transport and Communications of the Republic of Lithuania „ON THE APPROVAL OF ROAD SAFETY AUDIT PROCEDURE”

The Order of Lithuanian Road Administration under the Ministry of Transport and Communications of the Republic of Lithuania „ON THE APPROVAL OF ROAD SAFETY IMPACT ASSESSMENT PROCEDURES”

The Order of Lithuanian Road Administration under the Ministry of Transport and Communications of the Republic of Lithuania "ON THE APPROVAL OF ROAD NETWORK SAFETY RANKING PROCEDURE”

The Order of Lithuanian Road Administration under the Ministry of Transport and Communications of the Republic of Lithuania „ON THE APPROVAL OF GUIDELINES RISEP10 OF ENGINEERING ROAD SAFETY MEASURES DESIGN AND USE”

The Order of the Ministry of Transport and Communications of the Republic of Lithuania „METHODODOLOGY FOR IDENTIFICATION OF ACCIDENT CONCENTRATION PLACES ON NATIONAL SIGNIFICANCE ROADS“

The Order of Lithuanian Police Commissioner General „ ON THE APROVAL OF THE ADMINISTRATIVE LAW INFRINGEMENTS AND ACCIDENT REGISTER DATA MANAGEMENT “





The Order of Lithuanian Police Commissioner General "ON THE APPROVAL OF ADMINISTRATIVE LAW INFRINGEMENTS AND ACCIDENT REGISTER DATA MANAGEMENT"

The Resolution of the Government of the Republic of Lithuania "ON THE APPROVAL OF ROAD MAINTENANCE PROCEDURE"

## Latvia

There are 3 Orders of the Ministers Cabinet of the Republic of Latvia relating to the implementation of the Road infrastructure safety management Directive has been approved in Latvia before April 2011:

The Order of the Ministers Cabinet of the Republic of Latvia "ON ROAD SAFETY AUDITOR CERTIFICATION PROCEDURES"

The Order of the Ministers Cabinet of the Republic of Latvia "PROCEDURES FOR THE CLASSIFICATION OF ROAD SECTIONS WHERE OFTEN OCCUR TRAFFIC ACCIDENTS, AND ROAD NETWORK SAFETY IN THE EUROPEAN ROAD NETWORK".

The Order of the Ministers Cabinet of the Republic of Latvia "ROAD SAFETY AUDIT REGULATIONS".

## Estonia

There aren't any approved legal acts relating to the implementation of the Road infrastructure safety management Directive in Estonia. There are some methodologies relating to this case:

ROAD SAFETY IMPACT ASSESSMENT METHODOLOGY. Prepared by the Tallinn Technical University. 2010.

NETWORK SAFETY MANAGEMENT. METHODOLOGICAL GUIDE AND MAP. Prepared by the Engineering company Stratus. 2010.

## Sweden

There are two approved legal acts and one regulation relating to the implementation of the Road infrastructure safety management Directive in Sweden:

Regulations and general advice of Swedish Transport Agency (TSFS 2010:183) about ROAD SAFETY.

ORDINANCE OF ROAD SAFETY (2010:1367).

LAW OF ROAD SAFETY (2010:1362).





## References

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2. CIRCA – a collaborative workspace with partners of the European Institutions. <http://circa.europa.eu/> (See in 2011 03)
3. Amendment of Article 2 of the Decree (Portaria) n.º 340/2007, of 30 March, and Article 2 of the Decree-Law n.º 77/2007, of 29 March.
4. National Road Authority 2010 Project Management Guidelines. Excerpt from NRA Project Management Guidelines (PMG) in Ireland. See in : [http://www.google.it/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&sqi=2&ved=0CB4QFjAA&url=http%3A%2F%2Fwww.nra.ie%2FRepositoryforPublicationsInfo%2Ffile%2C17012%2Cen.pdf&ei=g6abUP\\_uF87esgaap4HwCw&usq=AFQjCNE3wZdS8RIVdmTnrTyzBzwxCfucxA](http://www.google.it/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&sqi=2&ved=0CB4QFjAA&url=http%3A%2F%2Fwww.nra.ie%2FRepositoryforPublicationsInfo%2Ffile%2C17012%2Cen.pdf&ei=g6abUP_uF87esgaap4HwCw&usq=AFQjCNE3wZdS8RIVdmTnrTyzBzwxCfucxA) (2011 02)
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6. The New Roads and Street Works Act 1991 c.22 (“the 1991 Act”), section 65. The Street Works (Northern Ireland) Order 1995 S.I. 1995/3120 (N.I. 19), Article 25 The National Roads Authority (NRA) site. See in : <http://www.nra.ie/>

