## PROJECT: EURO-AUDITS

# THE EUROPEAN ROAD SAFETY AUDITOR TRAINING SYLLABUS

MAIN REPORT

**October 2007**






A European Commission co-funded project

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# The European Road Safety Auditor Training Syllabus

## 1. Background

In the context of its Road Safety Action Programme (2003-2010) and its ultimate objective to halve the number of road fatalities on European roads by 2010, the European Commission has given its support to 13 European road safety projects. 'Euro-Audits', the European Road Safety Auditor Training Syllabus, has been selected to benefit from European Commission support.

The following partners form the Euro-Audits consortium:

**European Union Road Federation (ERF)** is the Project Coordinator. ERF is a non-profit organisation that coordinates the views and concerns of Europe's road sector and acts as a platform for dialogue, information and research on mobility issues.

**TMS Consultancy** is an independent company, which specialises in consultancy, research and training services in connection with road safety, traffic management and highway engineering. TMS has pioneered Road Safety Audit training in the UK, Ireland and Italy for over fifteen years.

**Asociación Española de la Carretera (AEC)** has been dedicated to the promotion of a better highway system in Spain for more than fifty years. AEC is a key contributor to the Guidelines to Black Spot Management project and has been running highly successful Road Safety Audit courses in Spain since 2005.

## 2. Proposal for a Directive of the European Parliament and of the Council

The European Commission has proposed a Directive on road infrastructure safety management. The objective of the Directive is to ensure that safety is integrated in all phases of planning, design, and operation of road infrastructure on the Trans-European Network. The Directive aims to ensure that safety is regarded in its own right in parallel with economic and environmental analysis. The Directive also aims to ensure that road managers are given the **guidelines, training and information** required to increase safety in the road network.

The draft Directive states that training and certification of safety personnel by means of training curricula and tools for qualification validated by Member States should ensure that practitioners get the necessary up-to-date knowledge.

There are four elements of the directive:

- Road Safety Impact Assessment – 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;

- **Road Safety Audits – a detailed systematic and technical safety check relating to the design characteristics of a road infrastructure project and covering all stages from planning to entry into operation;**

- Safety Development of the road network in operation – the reduction of future accidents by targeting remedial treatments to parts of the network where, respectively, accidents occurred most frequently during previous years and accident cost reduction potential is the highest. *This aspect is also known as 'Road Safety Engineering' in some Member States*;

- Safety Inspections –periodical routine visual check of features and defects that require maintenance intervention for safety reasons.

If implemented, the Directive would require Member States to enact legislation to ensure that the above activities take place on those parts of the Trans-European Road Network within their jurisdiction. Articles 3, 4, 5 & 6 of the Directive refer to each of the four elements described above. With respect to Road Safety Audits, Article 4 (2) states that Member States shall ensure that an auditor is appointed to carry out this work, and Article 9 sets out the training requirements for such auditors.

The training requirements include the need for pre-auditing experience, formal training, certification of competence, and periodic re-training

This document provides the basis for a Road Safety Audit teaching syllabus that could be adopted by Member States as a mechanism for training Road Safety Auditors. In addition to the syllabus, the document comments on pre-training experience/qualifications, and also on certification of competence.

The objective is to provide a syllabus that builds on existing best practice from courses already undertaken in some Member States.

## 3. Development of Training Modules

**The Euro-Audits Consortium** has undertaken specifically to develop core and advanced training modules that will provide the necessary knowledge and skills for competent Road Safety Auditing. The aim has been to develop an approach that will be suitable for local adoption whilst maintaining consistency throughout Europe.

### 3.1 Definition of core and advanced training modules

A generic description of the core syllabus for two three-day courses - an introductory and an advanced Road Safety Audit course, are proposed. This includes a brief for each session of the course, suggested case studies and workshop materials. Proposed course evaluation methods are included, together with a delegate feedback framework, which will enable systematic comparison of courses held at different venues and the overall improvement of course standards.

### 3.2 Elaboration of templates

Standard templates are provided for the formal input and output requirements of Road Safety Audit, e.g. the audit team brief, the audit report, the exception report and checklists for each stage of the audit process. The templates will be used during the training process and will be available for general use, with the aim of developing consistency and best practice in European auditing procedures.

### 3.3 Teacher's manual

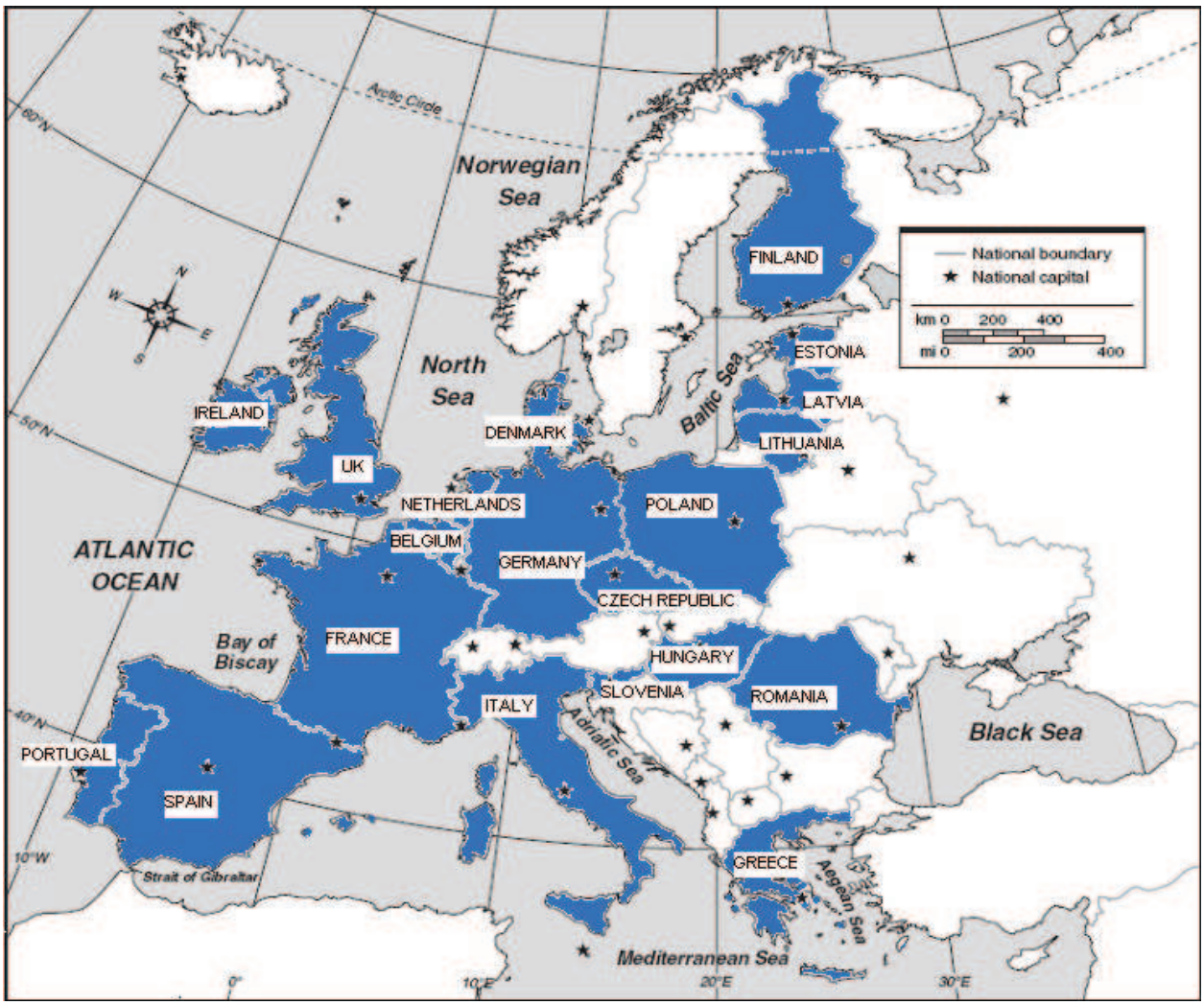
This document can be used as a teacher's manual, which includes PowerPoint templates, workshop guidelines, the evaluation framework and document templates, as listed above.

## 4. Summary of existing European context for Safety Audit training

The first part of this project involved a questionnaire distributed to contacts in Member States who had knowledge of Safety Audit practice in their country. The questionnaire sought responses regarding requirements to undertake Safety Audit, qualifications required for Safety Auditors in those situations where Safety Audit was mandatory, and any training courses available for Safety Auditors.

## 4.1 Countries surveyed




This questionnaire has been sent to professionals, road policies decision makers and experts on road safety in order to determine where Europe can be positioned in the matters of Road Safety Audits, road safety auditors and road safety proceedings. 27 EU member states were surveyed. 20 responses were received, from the following countries: Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, Spain, the Netherlands and United Kingdom.

## 4.2 Main survey results

The situation throughout the Member States remains heterogeneous, but the initial survey found that convergences could be established:

- Around half the Member States surveyed have a requirement to carry out audits on all or part of their network.

- Over half of the Member States surveyed have a voluntary training scheme in place, 10/20 have a mandatory training scheme. In half of the cases, the course is specific to Safety Auditing; in a small number of cases, there is additional training available on road safety engineering.

- The duration of these courses varies greatly, but the majority is between 2-5 days. All of the courses contain a mixture of theory and practice.

- More than half the Member States assess knowledge & competence by means of a formal exam or course work at the end of the training activity.

- Half of the Member States have the training certified by an independent body.

- The majority of Member States surveyed require some form of minimum requirements for admission to a Safety Audit course. This may take the form of previous academic qualifications and/or previous road safety engineering experience.

- In just half of the Member States surveyed, follow-up courses are offered for experienced auditors on a voluntary basis. 5 Member States have formal requirements for Safety Auditors to maintain their skills either through on-site experience or a refresher training course.

# 5 Road Safety Audit Training Syllabus

## 5.1 Training concept

### 5.1.1 Pre-requisites for training

Pre-requisite skills and qualifications currently vary considerably between those European states that provide Road Safety Audit training. Individual Member States should continue to be able to set their own mandatory or recommended attendance requirements. However, it is recommended that pre-requisites for auditor training include qualifications or experience in elements of road safety engineering, road design and/or traffic management. For example, in Spain and Denmark, delegates are required to be graduate engineers with significant experience in road safety. In the UK and Ireland, most auditors should have received formal training in road safety engineering, as well as having practical experience in road safety engineering (safety development of the road network in operation). In some cases, such as in Denmark, delegates are invited to undertake a test prior to attending the course.

The requirement for safety engineering experience as a pre-requisite for Road Safety Auditing poses a problem in those Member States where this type of work is not yet routinely carried out. A possible solution would be to accept

auditors who are roads engineers on condition that they undertake a recognised course in road safety engineering (which could include Safety Audit training). A proposed programme for the equivalent of 10 days or 60-80 hours road safety engineering course is shown in **Appendix A**. One of the core modules should be an Introduction to Road Safety Audit.

**Recommendation**

Pre-requisites for Safety Auditor training should include the following:

- Professional experience in a roads engineering function (highway design and traffic engineering) and attendance on a recognised road safety engineering course;

Or

- Professional experience in road safety engineering.

In addition:

- Member States should be free to add pre-requisite formal qualifications in subjects such as civil engineering or transportation, should they desire, or to ask delegates to undertake simple tests prior to attending the course;
- Member States should be free to impose time-based restrictions on Safety Engineering experience, to ensure that this experience has been gained in recent years;
- Member States should be free to impose minimum time periods for both roads and road safety engineering experience requirements.

5.1.2 Safety Audit training courses

Once a delegate has pre-qualified for Safety Audit training, they will be in a position to attend an appropriate course. In order to cater for individual Member States' specific requirements, it is proposed that a selection of optional training modules is provided, in addition to the essential core modules that should form the basis of all auditor training.

Two three-day training courses are proposed, one at an Introductory level and one at an Advanced level. The proposed Introduction to Road Safety Audit course amounts to three days training, designed to give a comprehensive introduction to Road Safety Auditing. Interactive teaching methods will be used to provide knowledge of the background and principles of Road Safety Audit and to provide opportunities for delegates to acquire, share and practice the practical skills and knowledge required to carry out competent Road Safety Audits.

If this training is obtained as part of the pre-requisite for Safety Auditors as described in 5.1.1 above, it is not necessary to repeat it at this stage.

A proposed programme of core and optional training modules for the Introductory Road Safety Audit Course is included at **Appendix A**

The proposed Advanced Road Safety Audit course is designed to develop the skills of practising Road Safety Auditors to an advanced level, and to keep them up to date with new developments in Safety Audit. This will continue their professional development in this area of work. Interactive teaching methods will be used to provide the additional knowledge and skills required to carry out competent Road Safety Audits of large and complex schemes. This course will again amount to three days training.

An outline programme of core and optional training modules for the Advanced Road Safety Audit course is included at **Appendix A**

The modular nature of the training syllabus will allow each full course to be delivered over three consecutive days, or in smaller sections over an extended period (possibly as an evening course).

**Recommendations**

- All prospective Safety Auditors should attend an 'Introduction to Road Safety Audit' course (which can form part of the pre-requisite training for Safety Auditors);
- Experienced Safety Auditors should attend an 'Advanced Road Safety Audit' course within a period of time specified by the Member State;
- Both courses should be modular in their approach, to allow maximum flexibility for delegates to attend courses;
- Courses should include key core elements and optional elements to allow Member States to select a course programme suitable for local needs.

## 5.2 Teaching Syllabus

### 5.2.1 PowerPoint presentation

Pre-prepared PowerPoint presentations will be used as the basis for the training courses, supplemented by case studies, workshop materials and open discussion. Consistency between courses can thereby be maintained, whilst also providing opportunities for addressing individual and local issues. A suggested PowerPoint presentation template is included at **Appendix B**.

### 5.2.2 Session briefs

The core modules contained in both courses will be relatively prescriptive to ensure that the essential fundamental areas of Road Safety Audit are covered. Nevertheless, there will be opportunities for discussion and debate, and for delegates to raise issues of particular relevance to their own organisations.

The optional modules will enable trainers and delegates to explore the more complex and developing issues of Road Safety Audit and, consequently, the exact format will be less prescriptive, leaving options for topical issues to be included.

Core Modules will be developed from detailed session briefs to ensure some consistency across Member States. Examples of detailed session briefs for each course are included at **Appendix B.**

5.2.3 Case studies

Trainers should be experienced Road Safety Auditors. Examples of Road Safety Audit issues arising from actual audits of highway schemes will be presented for discussion, using plans, diagrams and photographs. **Appendix B** includes examples of case studies.

Delegates will be encouraged to raise issues from their own experience for discussion.

5.2.4 Workshop materials

Delegates will work together in small groups to carry out a number of workshop exercises that are designed to provide opportunities for them to practise Road Safety Audit skills. The following materials may be provided to enable a realistic audit of a variety of highway schemes, building in complexity as the course progresses.

- Audit brief;
- Scale drawings of highway scheme proposals;
- Site photographs;
- Accident data;
- Traffic flow data;
- European accident statistics;
- European legislation dealing with infrastructure safety.

An example of materials to support a workshop exercise is included at **Appendix B**.

Some recently completed highway schemes will be identified within the locality of the training venue and supervised site visits will be organised for the

purpose of carrying out Pre-opening and Early Operation stage Road Safety Audit workshops.

5.2.5 Templates and handouts

Specimen reports and report templates are included in Appendix C to this document (please refer to the Contents page). These will be used throughout the two courses in workshop exercises and will be available for delegates to use in the course of their own employment. Further materials and documents will be used to support individual training sessions and will be supplied to delegates as required.

5.2.6 Teacher's manual

This document is intended to be used as a Teacher's Manual, as well as a basis for individual course design. PowerPoint presentations, workshop materials, specimen reports and standard form templates will be supplied in electronic format, which can be easily adapted to suit individual requirements.

**Recommendation**

- The teaching syllabus should be used by Road Safety Audit trainers as the basis for teaching the course

## 5.3 Course evaluation and development

Delegate feedback on the quality of the course, in terms of content and presentation, will inform the ongoing process of course development. Delegates will be requested to complete Course Evaluation Forms in respect of each day of the course. These will be collected and subsequently analysed by the course provider with a view to maintaining the relevance and effectiveness of the course.

A Delegate Feedback Form template is included at **Appendix C.**

An Evaluation Review Form template is included at **Appendix C**.

Some consideration should be given to exchange of information between course providers in terms of delegate feedback and subsequent course development.

**Recommendation**

- Delegate feedback should be evaluated in a consistent manner and analysis of feedback used to improve future courses
- Course providers should exchange information derived from feedback, possibly via a European platform for Road Safety Auditors

## 5.4 Assessment and certification

### 5.4.1 Pre-assessment (see also Section 5.1.1)

As an alternative, or in addition, to pre-requisite qualifications and/or experience, it may be desirable to require delegates to pass a test of their knowledge in the field of road safety engineering, design and/or traffic management. A pre-course examination or test is part of the auditor training system currently used in Denmark. Although passing this test is NOT a pre-requisite for attending the course, it is necessary for those who wish to go on to take a post-course examination (see 5.4.2).

In the UK and Ireland, Road Safety Audit team members are required to have previously attended at least ten days of formal training in accident investigation or road safety engineering to form a solid theoretical foundation on which to base practical experience.

One option would be to have an on-line multiple choice test available for delegates prior to them attending the course.

### 5.4.2 Course examination

Most European states that currently offer Road Safety Audit training do not require or provide certificates of competence. It is, therefore, not current practice to require delegates to undertake any formal assessment of their competence, either before or after a training course.

Those Member States that require evidence of having undertaken Safety Audit as a condition for undertaking more audits, usually do so via a self-completed curriculum vitae, checked by a client representative.

However, in order to provide the basis of a formal qualification in Road Safety Audit, it may be appropriate to require delegates to undergo an assessment of their competence at the conclusion of the training course. The first element of this formal assessment would be a test or examination on the final day of the introductory course.

It would be feasible for the course tutors to mark a short exam paper (e.g. multiple choice) and to notify the results to delegates before the end of the course. A more formal in-depth examination is likely to require the involvement of an independent external examiner and a subsequent notification of results. This latter system currently operates in Denmark.

The Danish examination lasts two hours, and is held directly following the course. It is an open-book exam.

### 5.4.3 Assessment of Competence

Article 9 of the Directive states that Member States shall ensure that Road Safety Auditors hold a certificate of competence (those awarded before the Directive comes into effect shall be taken in to account.)

The second element of a formal assessment of a delegate's competence to carry out Road Safety Audits should be an independent evaluation of the quality of his/her audit reports in respect of actual schemes audited during the period following audit training.

Road Safety Audit reports would be submitted for evaluation, together with supporting drawings and photographs, to an independent examining body, selected and approved by the Member State.

In Spain, delegates who attend the Safety Audit course have one month to prepare an audit report from guidelines and checklists delivered on the course.

In the UK, there has been recent movement towards professional certification in various vocational areas within the transportation field (for example development control, traffic signal design). Some certificates are awarded by academic institutions, others by professional institutes. In each case the awarding body works with a chosen training provider.

### 5.4.4 Independent certification

Certificates of Competence in Road Safety Audit should be awarded by independent examining bodies, approved by individual Member States, when they are satisfied that the applicant has successfully completed the appropriate training course and further demonstrated his/her competence by either sitting an examination and/or by submitting completed audit reports of the required standard.

A methodology for certification is suggested below:

- Professional institute or Academic body appointed to provide certification within Member State
- Delegates for training pre-qualify according to EuroAudit Syllabus/ Member State guidelines
- Delegates attend training course
- Delegates complete post-course examination and/ or assessment of competence, through the professional institute/ academic body
- Certificate of competence awarded
- Top-up courses required to maintain continuing professional development

5.4.5. Central register of auditors

A central register of auditors who have achieved certificates of competence could be made available within each Member State.

In the UK, the IHT has set up a branch specific to Road Safety Audit (SORSA), which could act as a basis for such a list. The Republic of Ireland and Portugal maintain lists of “approved” auditors.

However, many Safety Audit clients will wish to maintain the ability to choose auditors in relation to the scheme being considered. In Ireland, for example, it is being proposed that prospective auditors demonstrate experience, (through their *curriculum vitae*), of having audited schemes of a similar nature to the one being considered.

5.4.6. Continued professional development

It is suggested that a Certificate of Competence should be valid for a limited period of time and that an auditor should be required to demonstrate a continued commitment to professional development in the field in order to renew his/her authorisation to carry out Road Safety Audits. Continuing professional development could be evidenced by attendance on further related training courses, including the Advanced Road Safety Audit Course, as well as by carrying out a minimum number of Road Safety Audits within a given time period.

**Recommendations**

- Member States may wish to introduce a pre-training course test for those delegates who wish to gain a certificate of competence;
- Road Safety Audit competence should be assessed through an examination following the course and/or independent assessment of Audits carried out following the course;
- Certificates of competence should be awarded by appropriate academic or professional bodies within each Member State;
- Each Member State should maintain a central register of competent Road Safety Auditors;
- Auditors should be required to maintain their professional standing by undertaking additional (Advanced) Road Safety Audit courses.

## 6 Conclusions and Summary of Recommendations

**6.1** In response to the EC draft Directive on road infrastructure safety management, the Euro-Audits consortium has proposed a European Road Safety Auditor Training Syllabus. The comprehensive and practical training syllabus is designed to provide the essential core knowledge and skills to prospective road safety auditors in order to ensure that Road Safety Audits of all relevant schemes across the Member States of the European Union are carried out to a consistent high quality by appropriately qualified and experienced auditors.

**6.2** The syllabus aims to provide training at both introductory and advanced levels, using a combination of teaching methods, including interactive presentations by experienced Road Safety Auditors, case studies and practical workshops. A certain level of prior knowledge and experience will be a pre-requisite to training and formal delegate assessments are proposed at the conclusion of the syllabus, as a means to obtain accreditation from an independent body. An expectation of continued professional development will ensure that a high level of expertise is maintained.

**6.3** The Euro-Audits consortium makes the following recommendations in relation to European Road Safety Auditor Training:

6.3.1 Pre-requisites for Safety Auditor training should include the following:

- Professional experience in a roads engineering function (highway design and traffic engineering) and attendance on a recognised road safety engineering course;

Or

- Professional experience in road safety engineering.

In addition:

- Member States should be free to add pre-requisite formal qualifications in subjects such as civil engineering or transportation, should they desire, or to ask delegates to undertake simple tests prior to attending the course;
- Member States should be free to impose time-based restrictions on Safety Engineering experience, to ensure that this experience has been gained in recent years;
- Member States should be free to impose minimum time periods for both roads and road safety engineering experience requirements.

6.3.2 Training Courses

- All prospective Safety Auditors should attend an 'Introduction to Road Safety Audit' course (which can form part of the pre-requisite training for Safety Auditors);
- Experienced Safety Auditors should attend an 'Advanced Road Safety Audit' course within a period of time specified by the Member State;
- Both courses should be modular in their approach, to allow maximum flexibility for delegates to attend courses;
- Courses should include key core elements and optional elements to allow Member States to select a course programme suitable for local needs.

6.3.3 Teacher's Manual

- The teaching syllabus should be used by Road Safety Audit trainers as the basis for teaching the course

6.3.4 Course Evaluation

- Delegate feedback should be evaluated in a consistent manner and analysis of feedback used to improve future courses
- Course providers should exchange information derived from feedback, possibly via a European platform for Road Safety Auditors

6.3.5 Continued Professional Development

- Member States may wish to introduce a pre-training course test for those delegates who wish to gain a certificate of competence;
- Road Safety Audit competence should be assessed through an examination following the course and/or independent assessment of Audits carried out following the course;
- Certificates of competence should be awarded by appropriate academic or professional bodies within each Member State;
- Each Member State should maintain a central register of competent Road Safety Auditors;
- Auditors should be required to maintain their professional standing by undertaking additional (Advanced) Road Safety Audit courses.

**6.4**

An overview of the requirements is shown in the flow chart in Figure 6.1.

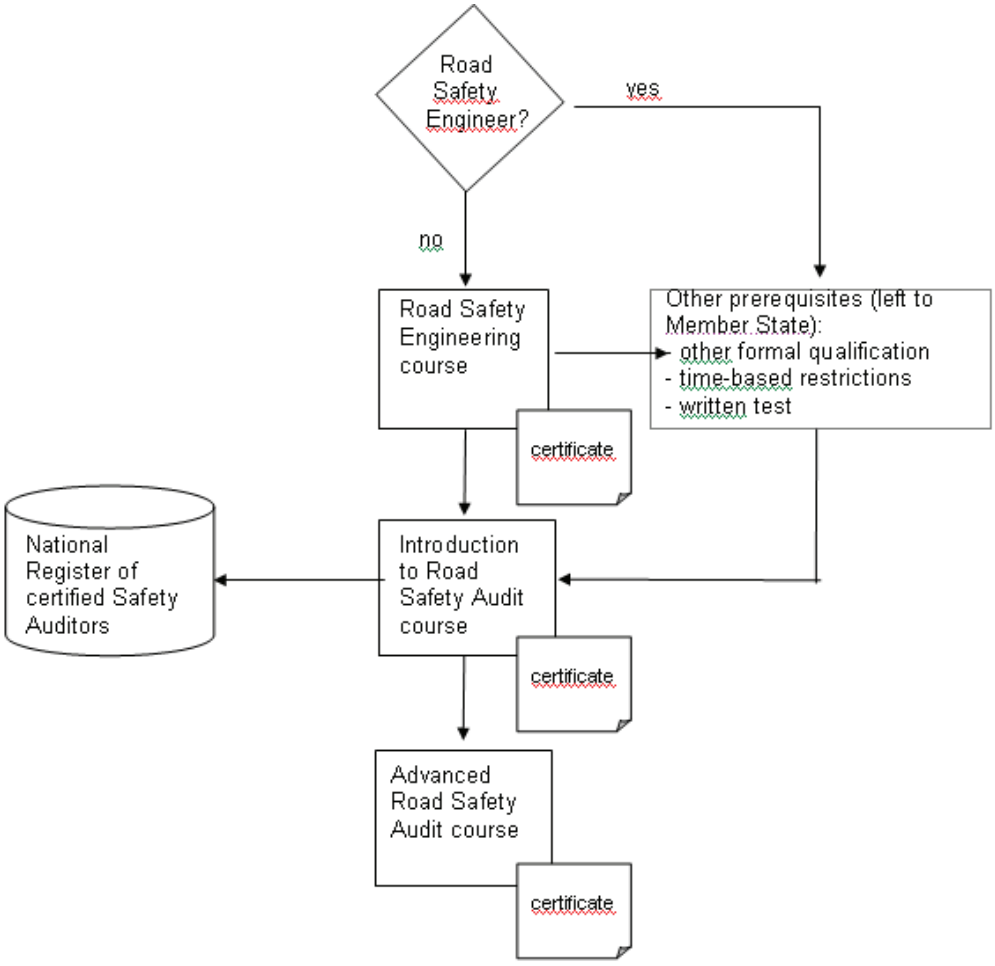



*Figure 6.1 – EUROAUDITS training process*

## PROJECT: EURO-AUDITS

# THE EUROPEAN ROAD SAFETY AUDITOR TRAINING SYLLABUS

## APPENDIX A – PROPOSED COURSE PROGRAMMES

**October 2007**

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# Appendix A

# Proposed Course Programmes

## Contents:

# Road Safety Engineering Course

# Programme

It is suggested that this course fulfils the equivalent of 10 days or 60-80 hours training. This can be achieved in one of the following ways:

- 10 days residential/in-house
- two sets of 5 days residential/in-house
- modular – sets of 1, 2 and 3-day modules
- Distance learning/evening classes

One way of presenting is the course is for the first 5 days to be teaching (supplemented by workshop activity), and the second 5 days to be case study preparation from pre-prepared workshop materials, either to be carried out as individual work, or within a small group of delegates.

Core subjects:

- scale of national accident problem
- European and national legal requirements in road safety & road management
- accident causation and risk assessment
- accident data, use of statistical methods & monitoring
- principles of road safety engineering
- cost benefit analysis for remedial measures
- cost effective solutions to identified problems
- the role of road safety equipment
- application to a site visit
- introduction to road safety auditing

Optional subjects:

- local initiatives in road safety
- preparation of road safety plans
- role of the police in road safety
- accident data systems
- conflict studies
- traffic calming
- speed management
- public consultation
- advanced statistics and calculus
- accident reconstruction

The second part of the course involves delegates carrying out detailed accident investigations on pre-prepared data. Delegates are divided into 4 groups and supplied with accident data and plans for a series of route studies. Delegates analyse the data, visit the sites, and define accident problems using techniques learned previously. A series of recommendations are formally presented by each group at the end of the course, and a written report is handed into the course tutors.

 

# Introduction to Road Safety Audit Course

# Programme

It is suggested that this course fulfils the equivalent of 3 days training.

This can be achieved in one of the following ways:

- 3 days residential/ in-house
- modular – sets of 1, or 2 day modules to make up 3 days
- Distance learning/ evening classes

The course is a mixture of teaching supplemented by workshop activity.

Core subjects for course:

- The European context – how Road Safety Audit relates to European policies
- Overview of Road Safety Engineering and workshop
- What is Road Safety Audit?
- National Standards in Safety Audit (where applicable)
- How to carry out Road Safety Audits
- Safety Audit qualifications
- Common problems and solutions – case studies
- Checklists and control data
- Safety Audit Report writing
- Response to Safety Audit
- Early Operation Audit (on Site – Stage 3 Audit)
- Feedback from site visit
- Design Stage Audit workshops
- Delegate issues

Optional subjects for course. (Some of these would be used as examples for the Design Stage workshops depending on local conditions):

- Alignment issues
- Rural / urban roads
- Priority junctions
- Normal Roundabouts
- Mini-roundabouts
- Pedestrian / cycle crossings
- Traffic signals
- Road signs and markings

 

# Advanced Road Safety Audit Course

## Session Options

It is suggested that this course fulfils the equivalent of 3 days training.

This can be achieved in one of the following ways:

- 3 days residential/in-house
- modular – sets of 1, or 2-day modules to make up 3 days
- Distance learning/evening classes

The course is a mixture of teaching supplemented by workshop activity. Course providers can chooses from a number of options to put together a course designed to provide continuing professional development for Safety Auditors within their Member State area.

| | |
|---|---|
| Option 1 | European Standards and Guidelines |
| Option 2 | Accident data |
| Option 3 | Remedial measures |
| Option 4 | Safety Audit Procedures |
| Option 5 | European Projects / Risk Assessment |
| Option 6 | Safety Audit of Existing Road workshop |
| Option 7 | Safety Assessments and Risk Assessment techniques |
| Option 8 | Auditing unusual/specialist features |
| Option 9 | 'Streetscape' and mobility issues |
| Option 10 | Legal issues in Safety Audit |
| Option 11 | Safety Audit in tunnels |
| Option 12 | Design Standards and Safety Audits |
| Option 13 | Auditing complex junctions |
| Option 14 | Auditing major schemes |
| Option 15 | Road Surfacing |
| Option 16 | Street Lighting |
| Option 17 | Road Restraint systems and Passive Safety |
| Option 18 | Road Geometry and grade separation |
| Option 19 | Safety Audit in work zones |
| Option 20 | Vulnerable Road Users |
| Option 21 | Monitoring scheme performance |
| Option 22 | Delegate Issues |

 

## PROJECT: EURO-AUDITS

# THE EUROPEAN ROAD SAFETY AUDITOR TRAINING SYLLABUS

## APPENDIX B – TRAINING MATERIALS

**October 2007**

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# Appendix B

# Training Materials

## Contents:

# PowerPoint Presentation

Powerpoint training template

# Session Briefs – Introduction to Road Safety Audit Course

## Core Subjects:

**PART 1**

- **Registration and Introductions**

The necessary registration procedures will be completed. The aims of the course, the course format and the programme will be explained. There will be an opportunity for the trainers and the delegates to introduce themselves, explain their professional role, their current level of experience in Safety Auditing and what they hope to gain from the course. Del egates will also be asked to indicate whether they intend to raise any specific delegate issues on Part 3 of the course.

- **The European Context**

An explanation of the road traffic accident problem in a European context will be presented, including a discussion of the contributory role of highway engineering issues. This session will highlight the potential accident savings to be made through an effective system of Road Safety Audit, and examine the current EC Directive in respect of auditor training and certif ication. The four aspects of the Directive will be compared and contrasted.

- **Road Safety Engineering and Accident Investigation Workshop**

The principles of road safety engineering will be explored, including accident causation factors and road user behaviour. The value of compiling accurate accident statistics will be discussed, as well as methods of analysing accident data.

Delegates will carry out a desktop analysis of accident data relating to a hypothetical accident cluster site, with a view to identifyin g appropriate remedial measures.

- **What is Road Safety Audit?**

A discussion of the history of Road Safety Audits and how the term is defined, drawing distinctions with technical design standard checks, structural safety checks, etc. The session will cover wha t schemes should be audited, the distinct audit stages and the necessary qualifications and experience of audit team members.

- **National Standards in Safety Audit (where applicable)**

A presentation to describe any national standards that set out mandatory pro cedures for carrying out Road Safety Audit within that Member State. In addition, any guidelines produced by professional institutions should be referred to.

- **How to Carry out Road Safety Audits**

A presentation on Road Safety Audit methodologies will be give n. The role of the design team will be discussed in relation to supplying an adequate audit brief. The elements of audit will be examined, including the use of checklists and control data. The design stage audit process will be contrasted to the audit proc ess for completed schemes and post -implementation monitoring.

- **Safety Audit qualifications**

National criteria referring to pre -qualification, experience, and training requirements for Road Safety Auditors. In addition, any requirements in terms of numbers of Safety Audits required, types of audit in relation to the scheme being considered by the client, and mechanism used by the client for selecting the Audit team for a particular job.

**PART 2**

- **Common Problems and Solutions – case studies**

An interactive session, illustrated with photographs of a wide variety of common road safety engineering problems and design errors. Delegates will be invited to identify the safety issues and to recommend and discuss practical solutions. Formal notes will be provided showing example of how to get it right compared to how to get it wrong.

- **Checklists and Control Data**

The value of detailed and summary Road Safety Audit checklists will be discussed, with reference to specimen checklists.

The value of accident control data to support audit comments will be discussed. Various sources of control data will be identified and discussed in terms of their relative reliability.

- **Safety Audit Report Writing**

A presentation will be given on the accepted good practice and standard format for Road Safety Audit report writing, with reference to a specimen report. The problem / recommendation format will be described, with examples. The importance of clear and concise wording will be stressed in relation to summarising and describing the safety problem in terms of who could be hurt and in what circumstances. Delegates will practice recommending clear, practical solutions.

- **Response to Safety Audit**

A presentation detailing how to respond to a Road Safety Audit report, including the designer's response, and how the client makes a decision based on potentially conflicting advice from the Auditor and the designer. The Exception Report will be described, and pro-formas used to illustrate the process.

- **Early Operation Audit (Stage 3 - on site)**

An Early Operation Road Safety Audit workshop will be carried out, including a site visit to a location within the locality of the training centre. Delegates will be given appropriate Health and Safety guidance. They will be divided into small groups and provided with sufficient materials to complete an Early Operation Road Safety Audit site visit.

**PART 3**

- **Feedback from Site Visit**

Delegate groups will present the identified problems and recommended solutions relating to the Road Safety Audit site visit. The trainers will facilitate open discussion of the problems and solutions identified, as well as any other issues that were not identified.

- **Design Stage Audit Workshops**

Delegates will carry out a desktop Design Stage Road Safety Audits based on materials supplied, and wil l produce a written Road Safety Audit report in the recommended format. Materials supplied will consist of examples chosen from the options described below:

- **Alignment Issues**

A presentation and opportunity to discuss issues relating to road safety auditing new road schemes, with particular reference to:

  - Accident performance
  - Design issues for safety
  - Vulnerable road users

- **Alignment Workshop**

Delegates will carry out a desktop Road Safety Audit based on materials supplied, and will produce a written Road Safety Audit report in the recommended format.

- **Normal Roundabouts**

A presentation and opportunity to discuss issues relating to road safety auditing normal roundabouts, with particular reference to:

  - Accident performance
  - Design issues for safety
  - Vulnerable road use rs

- **Normal Roundabout Audit Workshop**

Delegates will carry out a desktop Road Safety Audit based on materials supplied, and will produce a written Road Safety Audit report in the recommended format.

- **Pedestrian / Cycle Crossings**

A presentation and opportunit y to discuss issues relating to road safety auditing pedestrian / cycle crossings, with particular reference to:

  - Accident performance
  - Design issues for safety
  - Vulnerable road users

- **Pedestrian Crossing Audit Workshop**

Delegates will carry out a desktop Road Safety Audit based on materials supplied, and will produce a written Road Safety Audit report in the recommended format.

- **Traffic Signals**

A presentation and opportunity to discuss issues relating to road safety auditing traffic signals, with particular reference to:

- Accident performance
- Design issues for safety
- Vulnerable road users

- **Traffic Signals Audit Workshop**

Delegates will carry out a desktop Road Safety Audit based on materials supplied, and will produce a written Road Safety Audit report in the recommended format.

- **Delegate Issues**

Delegates will be given the opportunity to present their own difficult or unusual road safety audit issues for open discussion and the suggestion of practical solutions.

# Session Option Briefs – Advanced Road Safety Audit Course:

- **Registration and Introductions**

The necessary registration procedures will be completed. The aims of the course, the course format and the programme will be explained. There will be an opportunity for the trainers and the delegates to introduce themselves, explain their professional role, their current level of experience in safety auditing and what they hope to gain from the course. Delegates will also be asked to indicate whether they intend to raise any specific delegate issues at the end of the cou rse.

- **European Standards (Option 1)**

The requirements of any common European Safety Audit Standard will be compared to those of individual European countries. Reference will be made to experience, training and qualification requirements for auditors, as well as the extent of the road network to which the process applies.

- **Accident Data (Option 2)**

The disparate sources and relative accuracy and value of accident data will be discussed, with reference to conflict studies, under-reporting issues and data retrieva l issues. The value of accurate data to effective accident investigation and prevention will be explored.

- **Remedial Measures (Option 3)**

The range of accident remedial measures will be discussed, with emphasis on engineering interventions, including traffic calming. Different measures will be compared in terms of relative cost and performance.

Delegates will carry out a desktop exercise to identify suitable accident remedial measures to address certain accident problems.

- **Safety Audit Procedures (Option 4)**

The history and development of the Safety Audit process in Europe will be reviewed. The purpose and aims of Road Safety Audit will be discussed, with reference to the benefits in terms of accident reduction.

- **European Projects / Risk Assessment (Option 5)**

An explanation of relevant European Projects will be presented and comparisons drawn with other measures of accident risk. The role of Risk Assessment in Road Safety Audit will be discussed.

- **Safety Audit of Existing Road Workshop (Option 6)**

Delegates will be d ivided into small groups and provided with sufficient materials to complete an Early Operation Road Safety Audit at a selected site within the locality of the training centre. They will be given appropriate Health and Safety guidance.

Delegate groups will present the identified problems and recommended solutions relating to the Road Safety Audit site visit. The trainers will facilitate open discussion of the problems and solutions identified, as well as any other issues that were not identified.

- **Safety Asse ssments and Risk Assessment techniques (Option 7)**

Basic risk assessment procedures will be described, and then translated into a format suitable for use within Road Safety Audit. Delegates will have opportunities to work in groups to undertake risk assessm ents on Safety Audit comments already recorded from previous workshop activity.

- **Auditing Unusual / Specialist Features (Option 8)**

Practical guidance will be provided on carrying out Road Safety Audits on a selection of schemes that are infrequently encoun tered, such as LRT/guided bus routes, home zones, safer routes to school and innovative cycle schemes.

- **'Streetscape' and Mobility Issues (Option 9)**

The characteristics of residential and shared use urban areas will be discussed in terms of how the methods of Road Safety Audit might be affected. Potential conflicts between 'streetscape' design and impaired road user safety will be highlighted.

Delegates will carry out a desktop Road Safety Audit of a 'streetscape' design to identify the issues of potential conflict.

- **Legal Issues (Option 10)**

The legal implications of Road Safety Audit will be explained, with reference to domestic legislation and case law, including the potential for criminal and civil liability arising both from the audit process and from the failure to carry out road safety audits.

- **Working Safely in Tunnels (Option 11)**

The particular issues arising from carrying out Road Safety Audits of tunnels and working in tunnels will be discussed.

- **Design Standards and Safety Audits (Option 12)**

The value of Design Standards in the context of Road Safety Audit will be discussed, as well as the significance of any departures from Standard. Issues arising from the audit of design features that are not covered by Standards will be discussed.

- **Auditing Complex J unctions (Option 13)**

A presentation and opportunity to discuss issues relating to Road Safety Audit of complex junctions, with particular reference to:

  - Linked traffic signal schemes
  - Signal-controlled roundabouts
  - Grade-separated junctions
  - Other unusual jun ctions

- **Auditing Major Schemes (Option 14)**

The particular issues arising from the audit of major schemes will be explored. Delegates will carry out a desktop Road Safety Audit of a major scheme, based on materials supplied, producing a written Road Safety Audit report in the recommended format.

- **Road Surfacing (Option 15)**

A presentation detailing the road safety implications and research findings from road surfacing techniques. A basic description of road surfacing will be outlined.

- **Street Lighting (Option 16 )**

A presentation detailing the road safety implications and research findings from street lighting techniques. A basic description of street lighting will be outlined.

- **Road Restraint systems and Passive Safety (Option 17)**

A presentation detailing the road safety implications and research findings from road restraint techniques. A basic description of road restraint and passive safety will be outlined.

- **Road Geometry and grade separation (Option 18)**

A presentation detailing the road safety implications and re search findings from highway design techniques. A basic description of highway design will be outlined.

- **Safety Audit in work zones (Option 19)**

A presentation detailing the road safety implications and research findings from road works situations. A basic description of work zone safety will be outlined.

- **Vulnerable Road Users (Option 20)**

A presentation detailing the road safety implications and research findings from catering for vulnerable road users. A basic description of designing for vulnerable road use rs will be outlined (pedestrians, cyclists, equestrians, and disabled road users).

- **Monitoring Scheme Performance (Option 21)**

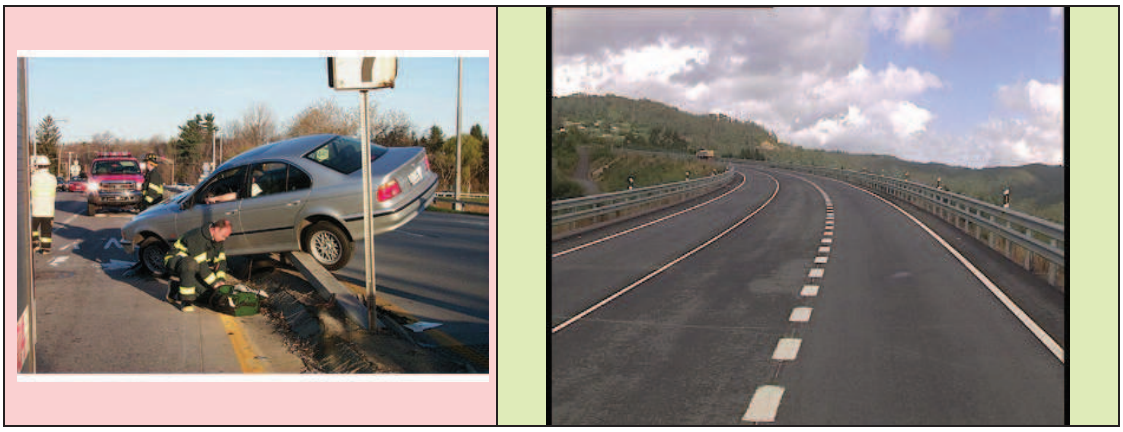
The process of post-implementation auditing of schemes will be explained, with reference to appropriate time intervals and the coll ection of accurate site-specific and control data.

- **Delegate Issues (Option 22)**

Delegates will be given the opportunity to present their own difficult or unusual Road Safety Audit issues for open discussion and the suggestion of practical solutions.

# Case Study Example

<table>
<tr><th colspan="3">SAFETY BARRIERS. BARRIERS NOT HIGH ENOUGH.</th></tr>
<tr><td>PROBLEM</td><td>Low barriers do not avoid vehicule departures, and in some cases they could increase the bad consecuences of an accident.</td><td rowspan="3">When should it be considered?<br>☐ Planning<br>☑ Project<br>☑ Building<br>☐ Operating<br>☑ Maintenance</td></tr>
<tr><td>SOLUTION</td><td>In case of raising of the pavement, it will be necessary to check the existing barrier and to increase it.</td></tr>
<tr><td>OTHER CONSIDERATIONS:</td><td></td></tr>
<tr><td colspan="3">EXAMPLES</td></tr>
<tr><td>WRONG</td><td colspan="2">RIGHT</td></tr>
<tr><td>  <br>Short and low barrier</td><td colspan="2">  <br>Right barrier</td></tr>
<tr><td>  <br>This barrier with enough barrier was insufficient to stop the lorry</td><td colspan="2">  <br>New Jersey</td></tr>
</table>



# Workshop Example

**Whitehill Road / Midland Road – Double Mini-roundabout**

**Road Safety Audit – Draft Design Stage**

It is proposed to construct a double mini -roundabout at an existing staggered priority junction.

The speed limit on all roads is 30mph but 85%ile approach speeds on the main roads are 37mph on Midland Road and 36mph on Whitehill Road.

There have been 5 injury accidents in the last 3 years, of which:

- All involved slight injury
- 2 occurred in darkness
- 1 occurred on a wet road surface
- 1 involved a head-on collision Beveridge Lane (hit and run)
- 1 involved a pedestrian hit by the door of a trailer of a pa ssing goods vehicle on Ibstock Road
- 1 involved a right turn from Ibstock Road
- 2 involved left turns from Ibstock Road

**The plan is at 1 :500 scale**

Write your problems and recommendation in the HA format

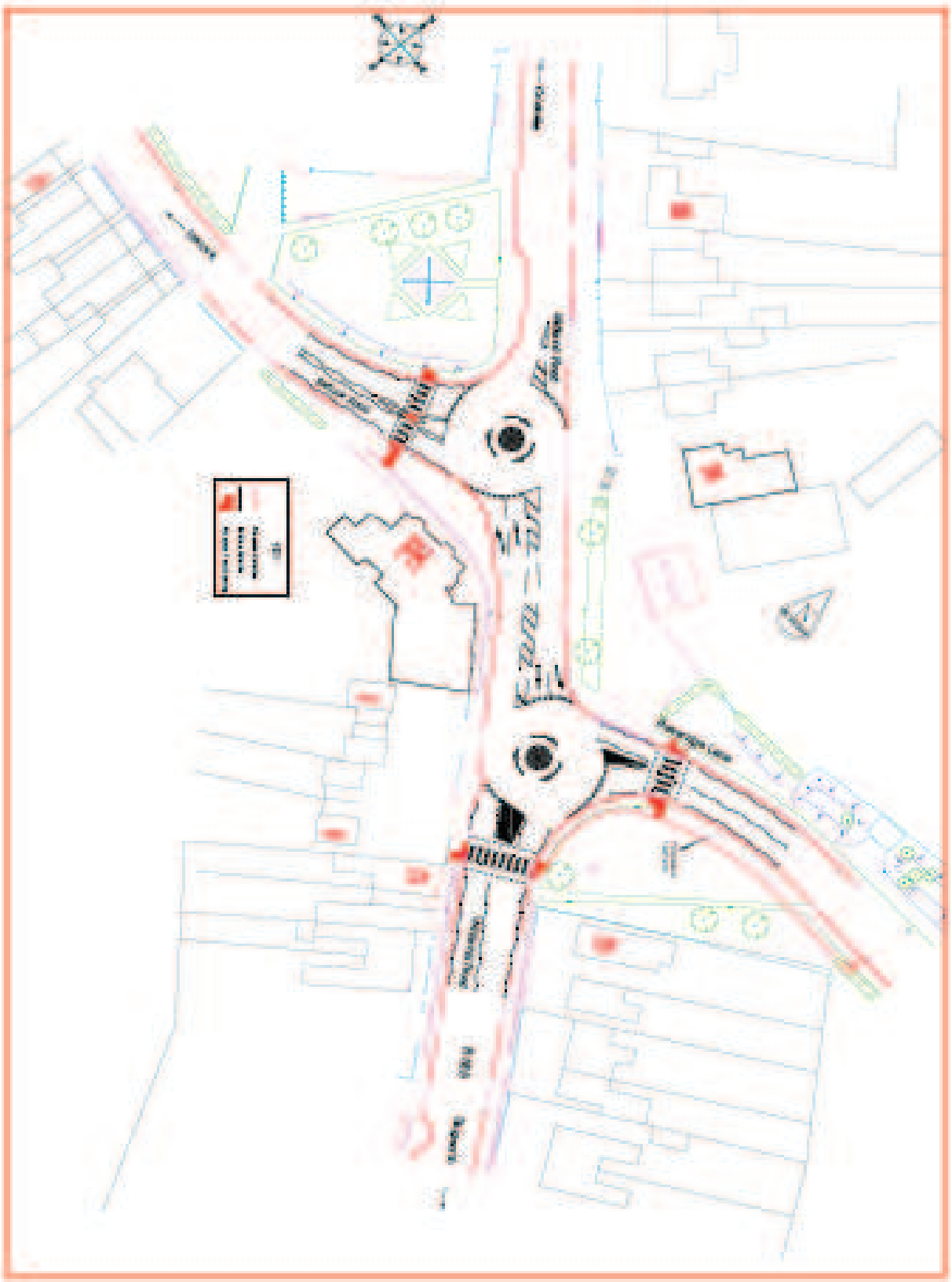
**Problem**

Location ……..

Summary ……..

Full problem……..

**Recommendation**




COMMISSION OF THE EUROPEAN COMMUNITIES

Proposal for a

**DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**

**On road infrastructure safety management**

**ANNEX II**

**Road Safety Audits**

1. Criteria at the feasibility stage:

    a) Geographical location (exposition to landslides, flooding, avalanches, etc);

    b) Types and distances of junctions;

    c) Number and type of lanes;

    d) Kinds of traffic admissible to the new road.

2. Criteria at the draft design stage:

    a) Design speed;

    b) Cross-sections (width of carriageway, cycle tracks, footpaths, etc);

    c) Visibility;

    d) Junctions layout;

    e) Bus and tramway line stops;

    f) Road/rail level crossings.

3. Criteria for the detailed design stage:

    a) Layout;

    b) Horizontal and vertical alignments;

    c) Road signs and markings;

    d) Lighting;

    e) Roadside equipment;

    f) Roadside environment, including vegetation;

    g) Fixed obstacles at the roadside.

4. Criteria for the pre-opening stage:

    a) Users comfort under different conditions such as darkness and bad weather;

b) Readability of road signs and markings;

c) Grip of pavements.

5. Criteria for early operation: assessment of patterns of usage in the light of actual behaviour of users.

Audits at any stage may involve the need to revisit criteria of previous stages.

# Acquis communautaire in infrastructure safety

## Road Safety Action Programme - COM (2003) 311

The Road Safety Action Programme delivered by the European Commission in 2003 was aimed at proposing measures to undertake in order to achieve a halving of the number of fatalities on European roads.

Summary

The European Commission's third Road Safety Action Programme comprises an assortment of some 60 measures geared at sharing information and best practices among Europe's Member States, harmonising safety standards and – where appropriate – legislating on road safety.

Content of the Communication

The human and economic consequences of road accidents (40,000 deaths a year costing up to EUR 160 bn or 2% of EU GDP) led the Commission to propose an ambitious 50% reduction target in its 2001 White Paper. Although not clearly mentioned in the original Communication, the integration of 10 new Member States in 2004 significantly worsened the burden of deaths and serious injuries occurring on European roads, adding some 13,000 deaths to the overall figure. Finally, the implications of a structurally ageing European society – a topic already well-covered by such bodies as OECD - will mean adapting road safety policies, if not the network itself, to a population with lower cognitive faculties and a higher probability of death in the event of an accident.

The European Commission wishes to mobilise Member States around targeted action plans and performance indicators drawn up at national level along general guidelines offered in the Communication.

Specifically, the action programme's guidelines cover :

(1) **Encouraging road users to improve their behaviour**

To encourage road users to improve their behaviour, while harmonising the penalties at EU level, having continuous training for private and commercial drivers, improving police checks and promoting education and road user awareness campaigns.

(2) **Making use of technological progress**

With the objective of making vehicles safer through the harmonisation of passive safety features.

(3) **Encouraging the improvement of road infrastructure**

Promoting the implementation of good practices in road engineering and management, offering legally-binding guidelines, technical harmonisation for the manufacturing of road safety equipment products and e-Roads.

(4) **Safe Commercial goods and passenger transport**

With the objective to reduce the number of accidents involving heavy goods vehicles and regulate the training of commercial drivers and compliance with driving and rest periods.

(5) **Emergency services and care for road accident victims**

To examine best practices in post-accident medical care.

(6) **Accident data collection, analysis and dissemination**

To create a reliable database containing precise figures on road accidents as to timely identify priority fields of action.

(7) **A European Road Safety Charter**

The Creation of a European Road Safety Charter, where each signatory organisation must give specific commitments on road safety which will be publicised, and their compliance with them will be monitored.

# Tunnel Safety Directive – COM(2004) 54

The Directive, which entered into force on 30 April 2004 , requires that all tunnels longer than 500 meters and belonging to the Trans -European Road Network meet minimum safety requirements. More than 500 tunnels in operation, under construction or at the design stage, are concerned b y the Directive.

Overall objectives of the Directive

Objective of the Directive is to prevent accidents endangering human life, the environment and tunnel installations. Moreover, it aims at improving self -rescue conditions for people involved in serious accidents, like large-scale fires.

The Directive defines a set of standards relating to the organisation, the roles and responsibilities of the various bodies in charge of safety in tunnels as well as technical standards for tunnel infrastructure, operati on, traffic rules and user information.

Content of the Directive

The Directive proposes to harmonise the administrative and operational management of tunnels by adopting the following organisationa l model :

- At national level : an **Administrative Authorit y** which oversees tunnel safety and with the power to suspend the operation of a tunnel based on the Inspection Body 's assessment of its compliance with the safety criteria laid out in the Directive. This Authority may also be set up at regional or local le vel and may administer only one tunnel.

- At tunnel level : a **Tunnel Manager** , seconded by a **Safety Officer** , the latter being in charge of operational supervision of preventive measures and emergency operations.

The Directive calls for **Periodic Inspections** to be carried out to ensure compliance as well as **Risk Analyses** to assess the potential risks of any given tunnel .

Every two years, Member States are required to compile **reports on fires in tunnels and on accidents** which clearly affect the safety of road u sers to be transmitted to the European Commission.

The technical requirements cover:

- safety parameters to be taken into account when assessing different tunnels;

- the infrastructure : based on a 5 levels of tunnel classes (according to traffic volume an d length) which determine the mandatory presence of escape routes, minimum levels of equipment etc ;

- the operations : covering procedures to be applied in the case of maintenance work s, tunnel closure and accidents;

- the tunnel users , through mandatory sa fety awareness -raising exercises.

The requirements are i mmediately applicable to all tunnels , whether existing, under construction or at the planning stage.

# European Road Safety Statistics

## Road accidents involving injury - 1970-2005 (thousand)

| | BE | DK | DE | EL | ES | FR | IE | IT |
|---|---|---|---|---|---|---|---|---|
| **1970** | 77 | 19.8 | 377.6 | 18.3 | 58 | 228.1 | 6.4 | 173.1 |
| **1980** | 60.8 | 12.3 | 412.7 | 18.2 | 67.8 | 248.5 | 5.7 | 163.8 |
| **1990** | 62.4 | 9.2 | 389.4 | 19.6 | 101.5 | 162.6 | 6.1 | 161.8 |
| **2000** | 49.1 | 7.3 | 382.9 | 23.1 | 101.7 | 121.2 | 7.8 | 211.9 |
| **2001** | 47.4 | 6.9 | 375.3 | 19.7 | 100.4 | 116.7 | 6.9 | 235.1 |
| **2002** | 41.8 | 7.1 | 362 | 16.9 | 98.4 | 105.5 | 6.6 | 237.8 |
| **2003** | 47.6 | 6.7 | 354.5 | 15.8 | 100 | 90.2 | 6 | 225.1 |
| **2004** | 44.2 | 6.2 | 339.3 | 15.5 | 94 | 85.4 | 5.8 | 229.2 |
| **2005** | 40.5 | 5.4 | 336.6 | 16.9 | 91.2 | 82.7 | n.a | 225.1 |

| | LU | NL | AT | PT | FI | SE | UK | EU 15 |
|---|---|---|---|---|---|---|---|---|
| **1970** | 1.6 | 58.9 | 51.6 | 22.7 | 11.4 | 16.6 | 267.5 | 1,388.5 |
| **1980** | 1.6 | 49.4 | 46.2 | 33.9 | 6.8 | 15.2 | 257.3 | 1,379.5 |
| **1990** | 1.2 | 44.9 | 46.3 | 45.1 | 10.2 | 17 | 265.6 | 1,293.5 |
| **2000** | 0.9 | 37.9 | 42.1 | 44.2 | 6.6 | 15.8 | 233.7 | 1,286.2 |
| **2001** | 0.8 | 35.3 | 43.1 | 42.5 | 6.5 | 15.8 | 229 | 1,281.4 |
| **2002** | 0.8 | 33.5 | 43.2 | 42.2 | 6.2 | 16.9 | 221.7 | 1,240.0 |
| **2003** | 0.7 | 31.6 | 43.4 | 41.5 | 6.9 | 18.4 | 220.1 | 1,208.5 |
| **2004** | 0.7 | 27.8 | 42.7 | 38.9 | 6.8 | 18 | 213 | 1,167.5 |
| **2005** | 0.7 | 27 | 40.9 | 37.1 | 7 | 18.1 | 203.7 | 1,132.9 |

| | CZ | EE | CY | LV | LT | HU | MT | PL |
|---|---|---|---|---|---|---|---|---|
| **1990** | 21.9 | 2.1 | 3.2 | 4.3 | 5.1 | 27.8 | 0.3 | 50.5 |
| **2000** | 25.4 | 1.5 | 2.4 | 4.5 | 5.8 | 17.5 | 0.5 | 57.3 |
| **2001** | 26 | 1.9 | 2.4 | 4.7 | 6 | 18.5 | 0.5 | 53.8 |
| **2002** | 26.6 | 2.2 | 2.4 | 5.1 | 6.1 | 19.7 | 0.5 | 53.6 |
| **2003** | 27.3 | 1.9 | 2.4 | 5.4 | 6.1 | 20 | 1.2 | 51.1 |
| **2004** | 26.5 | 2.2 | 2.1 | 5.1 | 6.4 | 21 | 1.1 | 51.1 |
| **2005** | 25.2 | 2.3 | 2.5 | 4.5 | 6.8 | 20.8 | 1.2 | 40.9 |

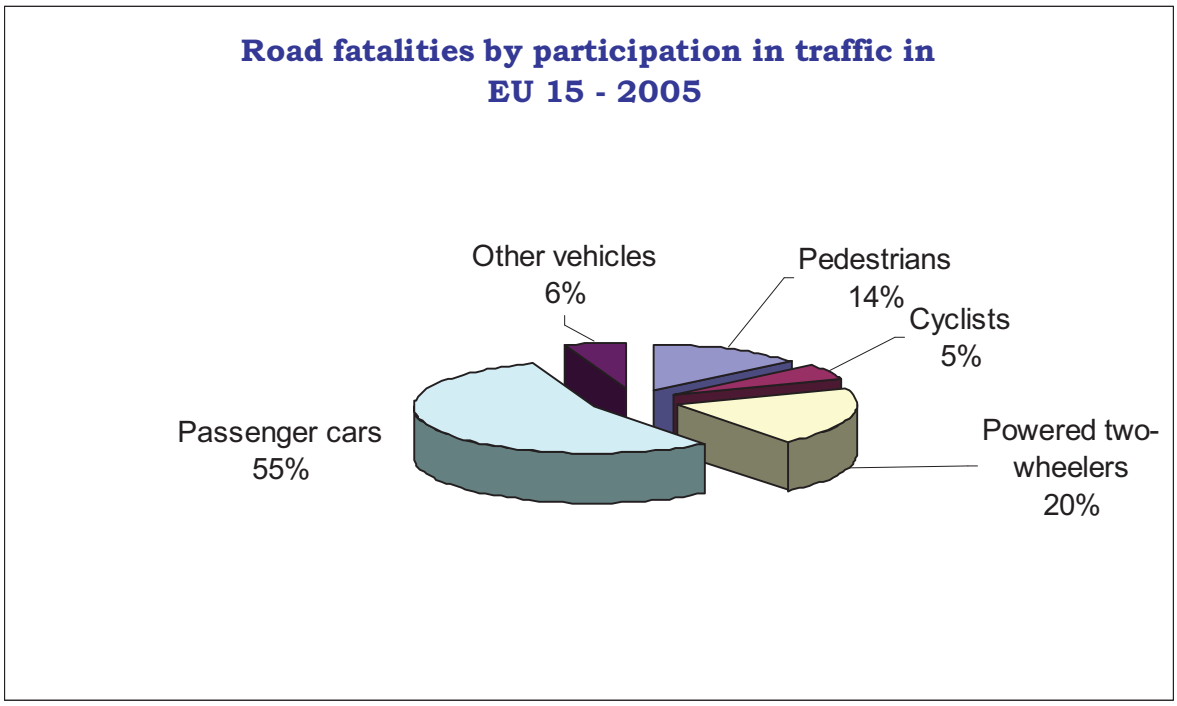
| | SI | SK | EU 10 | EU 25 |
|---|---|---|---|---|
| **1990** | 5.2 | 8.2 | 128.6 | 1,422.1 |
| **2000** | 8.6 | 7.9 | 131.4 | 1,417.6 |
| **2001** | 9.2 | 8.2 | 131.2 | 1,412.6 |
| **2002** | 10.3 | 7.9 | 134.4 | 1,374.4 |
| **2003** | 11.9 | 8.6 | 135.9 | 1,344.4 |
| **2004** | 12.7 | 8.4 | 136.6 | 1,304.1 |
| **2005** | 10.5 | 7.9 | 122.6 | 1,255.5 |

**Source: IRTAD, UN, European Commission, CARE, National Statistics.**
**Corrective factors ar e applied to the figures for EL, ES, FR, IT, AT and PT.**

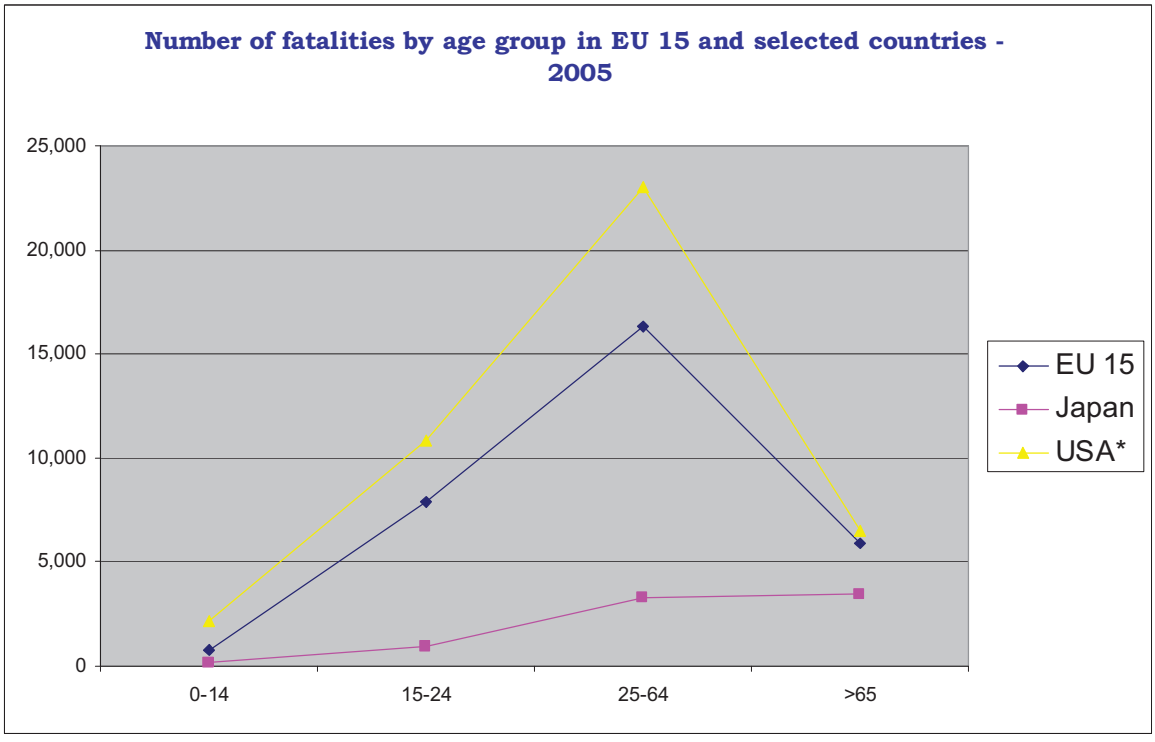
## Road fatalities country rankings - 2005

| | per million inhabitants | | per 100 million pkm* | | per 100,000 passenger cars |
|---|---|---|---|---|---|
| **MT** | 42 | **SE** | 44 | **MT** | n.a. |
| **NL** | 46 | **UK** | 49 | **NL** | 106 |
| **SE** | 49 | **NL** | 50 | **SE** | 106 |
| **UK** | 55 | **FI** | 60 | **DE** | 116 |
| **DK** | 61 | **DE** | 60 | **UK** | 118 |
| **DE** | 65 | **DK** | 62 | **LU** | 150 |
| **FI** | 71 | **IT** | 69 | **FI** | 153 |
| **FR** | 88 | **FR** | 71 | **IT** | 157 |
| **EU25** | 90 | **LU** | 74 | **DK** | 168 |
| **IT** | 93 | **EU25** | 90 | **FR** | 175 |
| **AT** | 93 | **AT** | 92 | **AT** | 185 |
| **IE** | 96 | **BE** | 97 | **EU25** | 188 |
| **LU** | 101 | **MT** | 106 | **ES** | 219 |
| **ES** | 102 | **ES** | 122 | **BE** | 221 |
| **BE** | 104 | **IE** | 158 | **IE** | 240 |
| **SK** | 104 | **SI** | 159 | **SI** | 273 |
| **PT** | 118 | **EE** | 173 | **CY** | 287 |
| **EE** | 125 | **PT** | 181 | **PT** | 297 |
| **CZ** | 26 | **CZ** | 182 | **CZ** | 325 |
| **HU** | 127 | **EL** | 223 | **EE** | 340 |
| **SI** | 129 | **SK** | 225 | **EL** | 369 |
| **CY** | 135 | **HU** | 270 | **PL** | 441 |
| **PL** | 143 | **CY** | 280 | **SK** | 430 |
| **EL** | 145 | **LT** | 291 | **HU** | 442 |
| **LV** | 192 | **PL** | 293 | **LT** | 522 |
| **LT** | 223 | **LV** | 406 | **LV** | 595 |

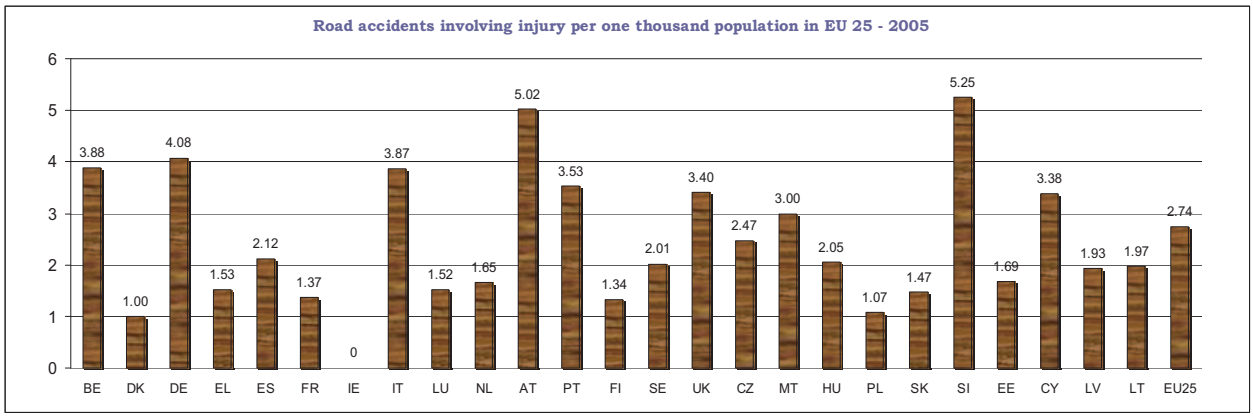
**Source: IRTAD, UN, European Commission, CARE, National Statistics.**
*** p/km: passenger-kilometres of cars and powered two-wheelers only.**




**Source: IRTAD, European Commission.**




**Source: European Commi ssion.**
*** 2004 Figu res.**




**Source: IRTAD, UN, European Commission, CARE, National Statistics.**

**PROJECT: EURO-AUDITS**

# THE EUROPEAN ROAD SAFETY AUDITOR TRAINING SYLLABUS

## APPENDIX C – DOCUMENT TEMPLATES

**October 2007**

A European Commission co-funded project

# Appendix C

# Document Templates

## Contents:

# Delegate Feedback Form

## [Introductory / Advanced] Road Safety Audit Course
## [dates of course]

Please complete the form and hand in at the end of the session.

| Session | poor | fair | good | excellent | Comments |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Seminar Room | | | | | |
| Catering | | | | | |

where applicable

| | | | | | |
|---|---|---|---|---|---|
| Accommodation - Where did you stay? | | | | | |

**Any other comments on the course content/presentation**

……
……
……
……
……
……

Any other topics you would be interested in

……
……
……
……
……
……

Thank you for attending the course and taking the time to complete this form

# Evaluation Review Form

## [Introductory / Advanced] Road Safety Audit Course
## [dates of course]

| Session | Poor | Fair | Good | Excellent | Comments on the relevance/ content |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Seminar Room | | | | | |
| Catering | | | | | |

where applicable

| | | | | | |
|---|---|---|---|---|---|
| Accommodation - where did you stay? | | | | | |

**Any other comments on the course content/presentation**

# Road Safety Audit Brief

**Scheme name: …… Stage: ……**

**Information supplied (tick as appropriate):**

| | |
|---|---|
| **Design brief** | |
| **A3 / A4 location plan** | |
| **Scheme drawings (list separately)** | |
| **Other details (list separately)** | |
| **Departures from Standard** | |
| **Accident data** | |
| **Traffic survey data** | |
| **Previous Audit Reports** | |
| **Previous Exception Reports** | |
| **Other information (list separately)** | |

# Feasibility Stage Checklist

| | | |
|---|---|---|
| **Site visit** | | |
| **Date:** | **Day:** | **Time:** |
| **Location:** | | |
| **Site Conditions:** | | |
| **Scheme Summary:** | | |

| |
|---|
| **Audit Team Leader:** |
| **Audit Team Members:** |
| |
| **Observer(s):** |
| **Others present:** |

**General**

| | |
|---|---|
| Geographical location | |
| Is the location liable to landslide, flooding, avalanche, etc. | |

| | |
|---|---|
| Consistency of standards | |
| Is the standard consistent with the adjacent road network, especially at tie-ins? | |

| Secondary effects | |
|---|---|
| Are there likely to be any secondary effects on the surrounding road network? | |

| Preferred option | |
|---|---|
| Likely safety performance in relation to alternative options. | |

**Routes**

| Topography | |
|---|---|
| Could local topography conflict with sight lines? | |

| Standard of route | |
|---|---|
| What are the safety implications of design flows and speed? | |

| Junction arrangements | |
|---|---|
| Are the types of junctions consistent with the adjacent network?<br>Are they appropriate to the class and volume of traffic likely to use them?<br>Are the distances between junctions/accesses (public and private) approporiate?<br>Are horizontal and vertical alignments consistent with visibility requirements, both on links and at junctions? | |

| Non-motorised road users | |
|---|---|
| Are facilities to be provided for pedestrians, cyclists and equestrians?<br>Will the scheme have an adverse effect on safe use of adjacent land? | |

| Special provisions | |
|---|---|
| Is there provision for peculiar aspects of traffic composition (e.g. a high level of use by a particular type of road user) or environment (e.g. glare at sunrise/sunset, fog or wind)? | |

**Area Schemes**

| Safety Plan | |
|---|---|
| Is the scheme consistent with the overall area safety plan? | |

| Designated function | |
|---|---|
| Is the scheme consistent with the designation of functions within the road hierarchy? | |

**Other observations**

| |
|---|
| |

# Draft Design Stage Checklist

| | | |
|---|---|---|
| **Site visit** | | |
| **Date:** | **Day:** | **Time:** |
| **Location:** | | |
| **Site Conditions:** | | |
| **Scheme Summary:** | | |

| |
|---|
| **Audit Team Leader:** |
| **Audit Team Members:** |
| |
| **Observer(s):** |
| **Others present:** |

**General**

| | |
|---|---|
| Departures from Standards | |
| Are there any adverse road safety implications of any Departures from Standards or Relaxations? | |

| | |
|---|---|
| Cross-sections | |
| How safely do the cross-sections accommodate drainage, ducting, signing, fencing, lighting and pedestrian and cycle routes? | |

| Cross-sectional Variation | |
|---|---|
| What are the road safety implications if the standard of the proposed scheme differs from adjacent lengths? | |

| Drainage | |
|---|---|
| Will the new road drain adequately? | |

| Landscaping | |
|---|---|
| Could areas of landscaping conflict with sight lines (including during windy conditions)? | |

| Public Utilities / Services Apparatus | |
|---|---|
| Have the road safety implications been considered? | |

| Lay-bys | |
|---|---|
| Has adequate provision been made for vehicles to stop off the carriageway, including picnic areas? | |

| Access | |
|---|---|
| Can all accesses be used safely?<br>Can multiple accesses be linked into one service road?<br>Are there any conflicts between turning and parked vehicles? | |

| Emergency Vehicles | |
|---|---|
| Has provision been made for safe access by emergency vehicles? | |

| Future Widening | |
|---|---|
| Where a single carriageway scheme is to form part of a future dual-carriageway, is it clear to road users that the road is for two-way traffic? | |

| Adjacent Development | |
|---|---|
| Does adjacent development cause interference / confusion? E.g. lighting or traffic signals on adjacent road may affect a road user's perception of the road ahead. | |

| Basic Design Principles | |
|---|---|
| Are the overall design principles appropriate for the predicted level of use for all road users? | |

## Local Alignment

| Visibility | |
|---|---|
| Are horizontal and vertical alignments consistent with required visibility?<br>Will sight lines be obstructed by permanent or temporary features, e.g. bridge abutments or parked vehicles? | |

| New / Existing Road Interface | |
|---|---|
| Will the proposed scheme be consistent with standards on adjacent lengths of road and, if not, is this made obvious to the road user?<br>Does interface occur near any hazard, e.g. crest, bend after steep gradient? | |

| Vertical Alignment | |
|---|---|
| Are climbing lanes provided? | |

## Junctions

| Layout | |
|---|---|
| Is provision for right-turning vehicles required?<br>Are acceleration / deceleration lanes required?<br>Are splitter islands required on minor arms to assist pedestrians or formalise road user's movements to or from the junction?<br>Are there any unusual features that affect road safety?<br>Are widths and swept paths adequate for all road users? Will large vehicles overrun pedestrian or cycle facilities?<br>Are there any conflicts between turning and parked vehicles?<br>Are any junctions sited on a crest? | |

| Visibility | |
|---|---|
| Are sight lines adequate on and through junction approaches and from the minor arm?<br>Are visibility splays adequate and clear of obstructions, such as street furniture and landscaping? | |

**Non-motorised user provision**

| Adjacent Land | |
|---|---|
| Will the scheme have an adverse effect on safe use of adjacent land? | |

| Pedestrians / Cyclists | |
|---|---|
| Have pedestrian and cycle routes been provided where required?<br>Do shared facilities take account of the needs of all user groups?<br>Can verge strip dividing footways and carriageways be provided?<br>Where footpaths have been diverted, will the new alignment permit the same users free access?<br>Are footbridges / subways sited to attract maximum use?<br>Is specific provision required for special and vulnerable groups, i.e. the young, elderly, mobility and sight impaired?<br>Are tactile paving, flush kerbs and guard railing proposed? Is it specified correctly and in the best location?<br>Have needs been considered, especially at junctions?<br>Are these routes clear of obstructions, such as signposts, lamp columns, etc? | |

| Equestrians | |
|---|---|
| Have needs been considered?<br>Does the scheme involve the diversion of bridleways? | |

**Road Signs, Carriageway Markings and Lighting**

| Signs | |
|---|---|
| Are sign gantries needed? | |

| Lighting | |
|---|---|
| Is scheme to be lit?<br>Has lighting been considered at new junctions and where tying in to existing roads?<br>Are lighting columns located in the best positions, e.g. behind safety fences? | |

| Poles / Columns | |
|---|---|
| Will poles / columns be appropriately located and protected? | |

| Road Markings | |
|---|---|
| Are any road markings proposed at this stage appropriate? | |

**Other observations**

# Detailed Design Stage Checklist

**The audit team should satisfy itself that all issues raised at Stage 1 have been resolved. Items may require further consideration where significant design changes have occurred.**

**If a scheme has not been subject to a Stage 1 audit, the items listed in Stage 1 Checklist should be considered as well as the items listed below.**

| | | |
|---|---|---|
| **Site visit** | | |
| **Date:** | **Day:** | **Time:** |
| **Location:** | | |
| **Site Conditions:** | | |
| **Scheme Summary:** | | |

| |
|---|
| **Audit Team Leader:** |
| **Audit Team Members:** |
| |
| **Observer(s):** |
| **Others present:** |

**General**

| | |
|---|---|
| Departures from Standards | |
| Consider the road safety implications of any Departures granted since Stage 1. | |

| Drainage | |
|---|---|
| Do drainage facilities (e.g. gully spacing, flatspots, crossfall, ditches) appear to be adequate? Do features, such as gullies obstruct cycle routes, footpaths or equestrian routes?<br>Do locations of features, such as manhole covers give concern for motorcyclist / cyclist stability? | |

| Climactic Conditions | |
|---|---|
| Is there a need for specific provision to mitigate effects of fog, wind, sun glare, snow or icing? | |

| Landscaping | |
|---|---|
| Could planting (new or when mature) encroach onto carriageway or obscure signs or sight lines (including during windy conditions)?<br>Could mounding obscure signs or visibility?<br>Could trees (new or when mature) be a hazard to a vehicle leaving the carriageway?<br>Could planting affect lighting or shed leaves onto the carriageway?<br>Can maintenance vehicles stop clear of traffic lanes? | |

| Public Utilities / Services Apparatus | |
|---|---|
| Can maintenance vehicles stop clear of traffic lanes? If so, could they obscure signs or sight lines?<br>Are boxes, pillars, posts and cabinets located in safe positions? Do they interfere with visibility?<br>Has sufficient clearance of overhead cables been provided?<br>Have any special accesses / parking areas been provided and are they safe? | |

| Lay-bys | |
|---|---|
| Have lay-bys been positioned safely?<br>Could parked vehicles obscure sight lines?<br>Have lay-bys been adequately signed?<br>Are picnic areas properly segregated from vehicular traffic? | |

| Access | |
|---|---|
| Is the visibility to and from the access adequate?<br>Are the accesses of adequate length to ensure all vehicles clear the main carriageway?<br>Do all accesses appear safe for their intended use? | |

| Skid Resistance | |
|---|---|
| Are there locations where a high skid resistance surfacing would be beneficial, e.g. on approaches to junctions and crossings?<br>Do surface changes occur at locations where they could adversely affect motorcycle stability? | |

| Agriculture | |
|---|---|
| Have the needs of agricultural vehicles and plant been taken into consideration (e.g. room to stop between carriageway and gate, facilities for turning on dual-carriageways)? Are such facilities safe to use and are they adequately signed? | |

| Fences and Road Restraint Systems | |
|---|---|
| Is there a ned for road restraint systems to protect road users from signs, gantries, abutments, steep embankments or water hazards?<br>Do the restraint systems provided give adequate protection?<br>Are the restraint systems long enough? | |

| Adjacent Developments and Roads | |
|---|---|
| Has screening been provided to avoid headlamp glare between opposing carriageways, or any distraction to road users?<br>Are there any safety issues relating to the provision of environmental barriers or screens? | |

## Local Alignment

| Visibility | |
|---|---|
| Obstruction of sight lines by:<br>a) Safety fences<br>b) Boundary fences<br>c) Street furniture<br>d) Parking facilities<br>e) Signs<br>f) Landscaping<br>g) Structures<br>h) Environmental barriers<br>i) Crests<br>j) Features such as buildings, plant or materials outside the highway boundary<br>Is the forward visibility of at-grade crossings sufficient to ensure they are conspicuous? | |

| New / Existing Road Interface | |
|---|---|
| Where a new road scheme joins an existing road, or where an on-line improvement is to be constructed, will the transition give rise to potential hazards?<br>Where environment changes (e.g. urban to rural, restricted to unrestricted), is the transition made obvious by signing and carriageway markings? | |

## Junctions

| Layout | |
|---|---|
| Are the junctions and accesses adequate for all vehicular movements?<br>Are there any unusual features, which may have an adverse effect on road safety?<br>Have guard rails / safety fences been provided where appropriate?<br>Do any roadside features (e.g. guard rails, safety fences, signs or traffic signals) intrude into the driver's line of sight?<br>Are splitter islands and bollards required on minor arms to assist pedestrians or formalise road users' movements to or from the junction?<br>Are parking or stopping zones for buses, taxis and public utilities' vehicles situated within the junction area? Are they located outside visibility splays? | |

| Visibility | |
|---|---|
| Are sight lines adequate at and through the junctions and from minor roads?<br>Are visibility splays clear of obstruction? | |

| Signing | |
|---|---|
| Is the junction signing adequate and easily understood?<br>Have the appropriate warning signs been provided?<br>Are signs appropriately located and of the appropriate size for approach speeds?<br>Are sign posts protected by safety barriers, where appropriate? | |

| Road Markings | |
|---|---|
| Do the carriageway markings clearly define routes and priorities?<br>Are the dimensions of the markings appropriate for the speed limit of the road?<br>Have old road markings and road studs been adequately removed? | |

| T, X and Y Junctions | |
|---|---|
| Have ghost islands and refuges been provided where required?<br>Do junctions have adequate stacking space for turning movements?<br>Can staggered crossroads accommodate all vehicle types and movements? | |

| All Roundabouts | |
|---|---|
| Are the deflection angles of approach roads adequate for the likely approach speed?<br>Are splitter islands necessary?<br>Is visibility on approach adequate to ensure drivers can perceive the correct path through the junction?<br>Is there a need for chevron signs?<br>Are dedicated approach lanes required? If provided, will the road markings and signs be clear to all users? | |

| Mini Roundabouts | |
|---|---|
| Are the approach speeds for each arm likely to be appropriate for a mini roundabout?<br>Is the centre island visible from all approaches? | |

| Traffic Signals | |
|---|---|
| Will speed discrimination equipment be required?<br>Is the advance signing adequate?<br>Are signals clearly visible in relation to the likely approach speeds?<br>Is "see-through" likely to be a problem?<br>Would lantern filters assist?<br>Is the visibility of signals likely to be affected by sunrise / sunset?<br>Would high intensity signals and / or backing boards improve visibility?<br>Would high-level signal units be of value?<br>Are the markings for right-turning vehicles adequate?<br>Is there a need for box junction markings?<br>Is the phasing appropriate?<br>Will pedestrian / cyclist phases be needed?<br>Does the number of exit lanes equal the number of approach lanes? If not, is the taper length adequate?<br>Is the required junction inter-visibility provided? | |

| Adjacent Land | |
|---|---|
| Are accesses to and from adjacent land / properties safe to use?<br>Has adjacent land been suitably fenced? | |

| Pedestrians | |
|---|---|

Are facilities required for NMUs at:
- a) Junctions
- b) Pelican / zebra crossings
- c) Refuges
- d) Other locations?

Are crossing facilities placed and designed to attract maximum use?
Are guard rails / fencing present / required to deter pedestrians from crossing the road at unsafe locations?
For each type of crossing (bridges, subways, at-grade) have the following been fully considered:
- a) Visibility both by and of pedestrians
- b) Use by mobility and sight impaired
- c) Use by elderly
- d) Use by children / schools
- e) Need for guard rails in verges / central reserve
- f) Signs
- g) Width and gradient
- h) Surfacing
- i) Provision of dropped kerbs
- j) Avoidance of channels and gullies
- k) Need for deterrent kerbing
- l) Need for lighting

| Cyclists | |
|---|---|

Have the needs of cyclists been considered, especially at junctions and roundabouts?
Are cycle lanes or segregated cycle tracks required?
Does the signing make clear the intended use of such facilities?
Are cycle crossings adequately signed?
Do guard rails need to be provided to make cyclists slow down or dismount at junctions / crossings?
Has lighting been provided on cycle routes?

| Equestrians | |
|---|---|

Should bridleways or shared facilities be provided?
Does the signing make clear the intended use of such paths and is sufficient local signing provided to attract users?
Have suitable parapets / rails been provided where necessary?

**Road signs, carriageway markings and lighting**

| ADS and Local Traffic Signs | |
|---|---|
| Do destinations shown accord with signing policy?<br>Are signs easy to understand?<br>Are the signs located behind safety fencing and out of the way of pedestrians and cyclists?<br>Is there a need for overhead signs?<br>Where overhead signs are necessary, is there sufficient headroom to enable designated NMU usage?<br>Do signs need reflectorisation where the road is unlit and is the facing material appropriate for the location? | |

| Variable Message Signs | |
|---|---|
| Are the legends relevant and easily understood?<br>Are signs located behind safety fencing? | |

| Lighting | |
|---|---|
| Has lighting been considered at new junctions and where joining with existing roads?<br>Is there a need for lighting, including lighting of signs and bollards?<br>Are lighting columns located in the best positions, e.g. behind safety fences and not obstructing NMU routes? | |

| Road Markings | |
|---|---|
| Are road markings appropriate to location?<br>a) Centre lines<br>b) Edge lines<br>c) Hatching<br>d) Studs<br>e) Text / destinations<br>f) Approved and / or conform to the regulations | |

| | |
|---|---|
| Poles and Columns | |
| Are poles and columns protected by safety fencing where appropriate? | |

**Other observations**

| |
|---|
| |

# Pre-opening Stage Checklist

**The Audit Team should consider whether the design has been properly translated into the scheme as constructed and that no inherent road safety defect has been incorporated into the works.**

**Particular attention should be paid to design changes, which have occurred during construction.**

| | | |
|---|---|---|
| **Site visit** | | |
| **Date:** | **Day:** | **Time:** |
| **Location:** | | |
| **Site Conditions:** | | |
| **Scheme Summary:** | | |

| |
|---|
| **Audit Team Leader:** |
| **Audit Team Members:** |
| |
| **Observer(s):** |
| **Others present:** |

**General**

| | |
|---|---|
| Departures from Standards | |
| Are there any adverse road safety implications of any departures granted since Stage 2? | |

| Drainage | |
|---|---|
| Does drainage of roads, cycle routes and footpaths appear adequate?<br>Do drainage features, such as gullies obstruct footpaths, cycle routes or equestrian routes? | |

| Climatic Conditions | |
|---|---|
| Are there any extraordinary measures required? | |

| Landscaping | |
|---|---|
| Could planting obscure signs or sight lines (including during periods of windy weather)?<br>Does mounding obscure signs or visibility? | |

| Public Utilities | |
|---|---|
| Have boxes, pillars, posts and cabinets been located so that they don't obscure visibility? | |

| Access | |
|---|---|
| Is the visibility to / from access adequate?<br>Are accesses of adequate length to ensure all vehicles clear the main carriageway? | |

| Skid Resistance | |
|---|---|
| Do any joints in the surfacing appear to have excessive bleeding or low skid resistance?<br>Do surface changes occur at locations where they could adversely affect motorcycle stability? | |

| Fences and Road Restraint Systems | |
|---|---|
| Is the restraint system adequate?<br>In the case of wooden post and rail boundary fences, are the rails placed on the non-traffic side of the posts? | |

| Adjacent Development | |
|---|---|
| Have environmental barriers been provided and do they create a hazard? | |

| Bridge Parapets | |
|---|---|
| Is the projection of any attachment excessive? | |

| Network Management | |
|---|---|
| Have appropriate signs and / or markings been installed in respect of Traffic Regulation Orders? | |

| Visibility | |
|---|---|
| Are the sight lines clear of obstruction? | |

| | |
|---|---|
| New / Existing Road Interface | |
| Is there a need for additional signs and / or road markings? | |

**Junctions**

| | |
|---|---|
| Visibility | |
| Are all visibility splays clear of obstructions? | |

| | |
|---|---|
| Road Markings | |
| Do the carriageway markings clearly define routes and priorities?<br>Have all superseded road markings and studs been removed adequately? | |

| | |
|---|---|
| Roundabouts | |
| Can the junction be seen from appropriate distances and is the signing adequate? | |

| | |
|---|---|
| Traffic Signals | |
| Can the signals be seen from appropriate distances?<br>Can drivers see signals for opposing traffic?<br>For the operation of signals:<br>a) Do phases correspond to the design?<br>b) Do pedestrian phases give adequate crossing time? | |

| T, X and Y Junctions | |
|---|---|
| Are priorities clearly defined?<br>Is signing adequate? | |

**Non-Motorised User Provision**

| Adjacent Land | |
|---|---|
| Has suitable fencing been provided? | |

| Pedestrians | |
|---|---|
| Are the following adequate for each type of crossing (bridges, subways, at grade)?<br>a) visibility<br>b) signs;<br>c) surfacing;<br>d) other guardrails;<br>e) drop kerbing or flush surfaces;<br>f) tactile paving. | |

| Cyclists | |
|---|---|
| Do the following provide sufficient levels of road safety for cyclists on, or crossing the road?<br>a) visibility;<br>b) signs;<br>c) guardrails;<br>d) drop kerbing or flush surfaces;<br>e) surfacing;<br>f) tactile paving. | |

| Equestrians | |
|---|---|
| Do the following provide sufficient levels of road safety for equestrians?<br>a) visibility<br>b) signs;<br>c) guardrails. | |

**Road Signs, Carriageway Markings and Lighting**

| Signs | |
|---|---|
| Are the visibility, locations and legibility of all signs (during daylight and darkness) adequate?<br>Are signposts protected from vehicle impact?<br>Will signposts impede the safe and convenient passage of pedestrians and cyclists?<br>Have additional warning signs been provided where necessary? | |

| Variable Message Signs | |
|---|---|
| Can VMS be read and easily understood at distances appropriate for vehicle speeds?<br>Are they adequately protected from vehicle impact? | |

| Lighting | |
|---|---|
| Does the street lighting provide adequate illumination of roadside features, road markings and non-vehicular users to drivers?<br>Is the level of illumination adequate for the road safety of non-motor vehicle users? | |

| Carriageway Markings | |
|---|---|
| Are all road markings / studs clear and appropriate for their location?<br>Have all superseded road markings and studs been removed adequately? | |

**Other observations**

# Early Operation Stage Checklist

Safety performance monitoring of a new scheme should take place after the first year of operation of a new scheme, and again after three years of operation. It should follow the following process:

- Collect accident data for 12/36 month period from the commencement of operation of the scheme.
- Prepare an accident monitoring report.
- Analyse the accident record in detail to identify:
    - The locations at which personal injury accidents have occurred;
    - Common contributory factors/causes of personal injury accidents.
- Identify any changes in the accident variables and compare with control data.
- Visit the site and record any identified safety issues as per the Pre-opening Stage Checklist.
- Identify the influence of any problems and recommendations identified at previous audit stages, and any Exception Reports.
- Identify any road safety problems indicated by the accident data analysis and site observations.
- Make recommendations for remedial action.

# Road Safety Audit Comment Sheet

**Page … of …**

**Scheme name: …… Stage: ……**

**Auditor: …….. Date: ……..**

| Plan No. | Comment | Comment discussed | Comment included | Reason not included |
|---|---|---|---|---|
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# Road Safety Audit Report Template

LOCATION

SCHEME NAME

ROAD SAFETY AUDIT STAGE [audit stage]

**Ref: ……**

# LOCATION
# SCHEME NAME

## ROAD SAFETY AUDIT STAGE [audit stage]

---

## 1. INTRODUCTION

1.1 This report describes a Stage [audit stage] Road Safety Audit carried out [summary of scheme], on behalf of [client]. The audit was carried out on [date] in the offices of [auditing organisation].

1.2 The audit team members were as follows:-

[name of lead auditor], [qualifications];

[title], [name of organisation].

[name of second auditor], [qualifications];

[title], [name of organisation].

1.3 (except for Stage 3)

The audit comprised an examination of the drawings and other information relating to the scheme supplied by the design office (as listed in Appendix A). Information not available at the time of the audit was [information not available (delete if not applicable)]. The site was visited by the Audit Team on [date of site visit]. The weather was [weather conditions]. The traffic conditions were [traffic conditions].

1.3 (alternative format for stage 3)

The audit comprised a daylight examination of the site by the Audit Team on [date and time of daylight site visit]. The weather was [weather conditions]. The traffic conditions were [traffic conditions].

Also present during the daylight examination was/were:

- [name and organisation of other person present]
- [name and organisation of other person present]

The Audit Team visited the site during darkness on [date and time of night site visit]. The weather was [weather conditions]. The traffic conditions were [traffic conditions].

1.4 The terms of reference of the audit are as described in [current standard]. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria. A Stage [previous audit stage] Road Safety Audit was carried out by [auditing organisation] in [month and year of previous RSA], (reference number [RSA reference number]).

1.5 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence. The locations of the problems are referenced on the plan in Appendix B.

1.6 [scheme description]

## 2. ITEMS RESULTING FROM THIS STAGE 2 AUDIT

(Split into sections below, if necessary, or present problems in order they are encountered, progressing along the length of the scheme)

### 2.1 GENERAL

### 2.2 LOCAL ALIGNMENT

### 2.3 JUNCTIONS

### 2.4 NON-MOTORISED USERS

### 2.5 SIGNS AND ROAD MARKINGS

### 2.6 LIGHTING

2.1 PROBLEM

**Location 2.1** – [Describe location]

**Summary:** [summarise accident problem]

[detailed description of road safety problem, including who is at risk and why]

RECOMMENDATION

[recommended measures to address the problem]

2.2 PROBLEM

**Location 2.1** – [Describe location]

**Summary:** [summarise accident problem]

[detailed description of road safety problem, including who is at risk and why]

RECOMMENDATION

[recommended measures to address the problem]

## 3. AUDIT TEAM STATEMENT

I certify that this audit has generally been carried out in accordance with [current standard].

AUDIT TEAM LEADER: (author of report)

[name of lead auditor], [qualifications];

[title], [name of organisation].

signed.....

date.....…….

AUDIT TEAM MEMBER:

[name of second auditor], [qualifications];

[title], [name of organisation].

[name, full address and contact details of auditing organisation]

# APPENDIX A

**List of Drawings Examined:**

- Drawing No. [drawing number, including revision]
- Drawing No. [drawing number, including revision]

**Other Information Provided:**

- [other information provided (delete as necessary)]
- [other information provided (delete as necessary)]

# APPENDIX B

Plan attached showing the locations of the problems identified as part of this audit (location numbers refer to paragraph numbers in the report).

# Road Safety Audit Feedback Form

**Scheme name: …….. Stage: ……**

**Date: ……..**

| Para. No. in Safety Audit Report | Problem accepted (yes/no) | Recommendation accepted (yes/no) | Alternative measures (describe) |
|---|---|---|---|
| | | | |
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# Exception Report Template

**[LOCATION]**

**[SCHEME NAME ]**

**ROAD SAFETY AUDIT STAGE [Audit Stage]**

**EXCEPTION REPORT**

**Ref: ……**

**[LOCATION]**
**[SCHEME NAME]**

**ROAD SAFETY AUDIT STAGE [Audit Stage]**

**EXCEPTION REPORT**

---

## 1. ROAD SAFETY AUDIT EXCEPTION REPORT

1.1 This Exception Report refers to a Stage [Audit Stage] Road Safety Audit Report, reference number [Ref. No.] submitted by [Auditing Organisation] and to those recommendations within that report that the Project Sponsor proposes should not be implemented.

1.2 A copy of Road Safety Audit Report, reference number [Ref. No.] is reproduced as **Appendix 1** to this report.

1.3 [scheme description]

## 2. ROAD SAFETY AUDIT STAGE [Audit Stage]

2.1 PROBLEM

***Location 2.1 – [As per Audit Report]***

***Summary: [As per Audit Report]***

***Response:***

[reasons for the recommendation not to be implemented]

2.2 PROBLEM

***Location 2.1 – [As per Audit Report]***

***Summary: [As per Audit Report]***

***Response:***

[reasons for the recommendation not to be implemented]

**3. Signed:**

PROJECT SPONSOR: *(author of report)*

[name], [qualifications];

[title], [name of organisation].

signed.....

date.....

**4. Exception Report submitted to:**

DIRECTOR, OVERSEEING ORGANISATION:

date.....

**5. Copies of Exception Report to:**

DESIGN TEAM:

date.....

AUDIT TEAM LEADER:

date.....

# APPENDIX A

## ROAD SAFETY AUDIT STAGE [Audit Stage]

**Ref: ……**

# Specimen Road Safety Audit Report

## BRIDGE ROAD PROPOSED ROUNDABOUT

## ROAD SAFETY AUDIT STAGE 2

**Ref: 0000**

# BRIDGE ROAD PROPOSED ROUNDABOUT

# ROAD SAFETY AUDIT STAGE 2

---

## 1. INTRODUCTION

1.1 This report describes a Stage 2 Road Safety Audit carried out on a proposed roundabout at Bridge Road, Badtown, on behalf of Badshire County Council. The audit was carried out on 13 February 2007 in the offices of TMS Consultancy.

1.2 The audit team members were as follows:-

Harminder Aulak, BSc (Hons), IEng, FIHIE, MCIT, MILT;
Senior Engineer, TMS Consultancy

Martin Belcher, BSc, CEng, MICE;
Director, TMS Consultancy

1.3 The audit comprised an examination of the drawings and other information relating to the scheme supplied by the design office (as listed in **Appendix A**). Information on drainage and landscaping was not available to the audit team.

The site was visited by both members of the Audit Team at 10.00 hours on 10 February 2007. The weather was fine and dry. The traffic conditions were light.

1.4 The terms of reference of the audit are as described in HD 19/03. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria. A Stage 1 audit was carried out by TMS Consultancy in October 2005 (TMS Report No. 3222).

1.5 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence. The locations of the problems are referenced on the plan in **Appendix B**.

1.6 The scheme consists of a four-arm roundabout at the junction of Bridge Road and the A222 in Badtown. The roundabout replaces an existing priority junction, and is being constructed to improve capacity at this junction.

## 2. ITEMS RESULTING FROM THIS STAGE 2 AUDIT

### 2.1 Problem

*Location A: north-west bound approach to the roundabout*

*Summary: risk of overshoot or rear end shunt accidents*

As the north-west bound approach to the roundabout curves to the left, the stopping sight distance to the give way line lies across the nearside verge. The hedge along the verge will obstruct the stopping sight distance, which could result in overshoot or shunt type accidents.

### Recommendation

It is important that the hedge along the nearside verge is removed over the appropriate distance to ensure the stopping sight distance (SSD) is not obstructed (SSD of 215m is required for a 100kph design speed).

### 2.2 Problem

*Location A: north-west bound approach to the roundabout*

*Summary: risk of overshoot accidents*

The chevron and turn left signs (Diagram 515 and 606) on the north-west bound approach to the roundabout are not in the direct line of sight for approaching drivers. Drivers may not judge the distance to the roundabout correctly resulting in overshoot accidents.

### Recommendation

The signs should be moved three or four metres to the right so that they visible to approaching drivers. Alternatively, extra chevrons could be added to the sign assembly.

2.3 **Problem**

*Location B,C: Bridge Road approaches to the roundabout*

*Summary: risk of skidding accidents*

High approach speeds on Bridge Road could lead to skidding accidents particularly on a wet road.

**Recommendation**

High-friction surfacing should be provided on both main road approaches.

2.4 **Problem**

*Location A,B,C,D: all approaches to roundabout*

*Summary: risk of late decision making leading to merging and weaving accidents*

The advance direction signs (reference BR.1, 2, 3 and4) are sited too close to the roundabout at 100m. Drivers approaching at speed may make late decisions and weave across each other on the approach and circulatory area.

**Recommendation**

The advance direction signs should be positioned further from the roundabout, around 200m from the junction. The signs to Diagram 510 may need to be relocated accordingly.

2.5 **Problem**

*Location B,C: Bridge Road approaches to the roundabout*

*Summary: risk of side-swipe accidents on exits*

The two lanes marked as ahead for drivers on both the Bridge Road approaches could result in side-swipe type accidents as there is only one lane on the exits. The direction arrows are also too close to the give-way lines to provide suitable guidance for drivers.

**Recommendation**

There will be little benefit in providing lane arrows for this scheme, as generally, they are only required if there are three or more lanes on an entry to a roundabout. However, if they are to be provided, there should be one lane marked as ahead on the Bridge Road approaches, and the arrows should be positioned at least 15m back from the give-way lines.

2.6 **Problem**

*Location D: south-east bound approach to roundabout*

*Summary: risk of loss of control accidents*

As noted in the Stage 1 Audit Report, south-east bound drivers may look along the old line of the road and not see the roundabout. This could lead to loss-of-control accidents where lamp columns 18 and 19 are located. There is a risk of serious occupant injury if a vehicle strikes a lighting column.

**Recommendation**

Marker posts should be provided to highlight the new kerbline on the south-east bound approach. The columns should be set back at least 2m from the kerb edge.

2.7 **Problem**

*Location E: pedestrian crossings*

*Summary: wheelchair users may be in conflict with traffic*

The proposed upstand at the dropped kerbs is stated as being 10mm. However, wheelchair users find it difficult to negotiate upstands greater than 6mm, and may become stranded within the carriageway.

**Recommendation**

The upstands at the dropped kerbs should be no more than 6mm.

2.8 **Problem**

*Location F: lighting columns on footways*

*Summary: pedestrians may step into the road in conflict with traffic. Errant vehicles may strike lamp columns leading to occupant injury.*

It appears that some of the lamp columns may obstruct the footways, forcing pedestrians to step into the carriageway. Some of the lamp columns are positioned close to the edge of carriageway where they could be a hazard to errant vehicles.

**Recommendation**

Lamp columns should be positioned at the back of footways.

2.9 **Problem**

*Location: general*

*Summary: cyclists may be in collisions with motor vehicles*

Casualty statistics for similar junctions in Badshire show that cyclists are vulnerable when negotiating roundabouts. Around 40% of collisions at roundabouts of this type involve cyclists, and the severity of injury to cyclists is higher than the norm.

**Recommendation**

The footway on the south-west side should be widened to accommodate cyclists. Extending this path to the north-west side of the roundabout would enable cyclists to avoid the roundabout and would give pedestrians a route with fewer road crossings.

## 3. AUDIT TEAM STATEMENT

I certify that the terms of reference of the audit are as described in HD 19/03.

AUDIT TEAM LEADER:

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signed.....

date.....……

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# APPENDIX A

## List of Drawings Examined:

- Drawing number 600/R01/01
- Drawing number 600/R02/04
- Drawing number 600/R06/06
- Drawing number 600/R07/07
- Drawing number 600/R11/08
- Drawing number 600/R12/09
- Drawing number 600/R13/10
- Drawing number 600/R13/11

## Other Information Provided:

- Signs schedule

# Specimen Designer's Response

## 1. Introduction

This Report provides the designer's response to the Stage 3 Road Safety Audit carried out by TMS Consultancy for the Section 38 and Section 278 works associated with the New Aldi Store, Salutation Square, Haverfordwest.

This Report is structured to show the problems and recommendations of the Audit followed by the Designer's Response using the same nomenclature as in the Stage 3 Road Safety Audit.

## 2. Designer's Response

### 2.1 Problem

**Location – North end of new service road, footway leading to Scotchwell Walk.**

**Summary: Absence of tactile paving at flush kerb may lead to injuries to sight impaired pedestrians.**

A flush kerb has been provided at the north end of the new footway to facilitate access between the footway and Scotchwell car park. There is no tactile paving to indicate the kerb edge to sight impaired pedestrians and there is a risk that they may walk into the carriageway inadvertently.

**Recommendation**

Buff coloured dimpled paving should be provided to a depth of 400mm across the width of the flush kerb.

**Designer's Response**

Recommendation accepted - 400mm depth and buff coloured tactile paving will be constructed.

**2.2 Problem**

**Location – North end of new service road.**

**Summary: Unfinished footway will be a trip hazard to pedestrians.**

The footway around the base of the two diagram 816 signposts is unfinished. The uneven surface will be a trip hazard to pedestrians.

**Recommendation**

The gaps in the footway should be infilled.

**Designer's Response**

Recommendation accepted - Footway is being reinstated as part of the agreed snagging works.

**2.3 Problem**

**Location – Vehicle crossovers from the new service road to Green's Motors.**

**Summary: Unmarked dropped kerbs may be hazardous to sight impaired pedestrians.**

The vehicle accesses to the car showroom and to the 4x4 display area have dropped kerbs of less than 25mm upstand. Sight impaired pedestrians may walk into the carriageway inadvertently.

**Recommendation**

The kerb upstand at the vehicle accesses should be increased to at least 25mm to provide a detectable kerb edge for sight impaired cane users.

**Designer's Response**

Recommendation accepted – 25mm upstand will be constructed.

**2.4 Problem**

**Location – Mill Road stepped access to Green's Motors.**

**Summary: Unmarked steps may be hazardous to sight impaired pedestrians.**

There is no tactile warning of a flight of concrete steps leading from the footway down to the car showroom forecourt. A sight impaired pedestrian might be seriously injured falling down the steps.

**Recommendation**

Corduroy paving should be provided on the footway at the top of the steps to a depth of 400mm across the width of the steps.

**Designer's Response**

Recommendation accepted - 400mm depth of corduroy paving will be provided across the back of the footway for the entire width of the steps.

**2.5 Problem**

**Location – Mill Road.**

**Summary: Unfinished pedestrian guardrail may be hazardous to sight impaired pedestrians.**

Two sections of tubular guardrail at either end of the car showroom building are unfinished, leaving a trip hazard and an unprotected drop into the showroom's forecourt areas.

**Recommendation**

Pedestrian guardrail construction should be completed.

**Designer's Response**

Recommendation accepted – guardrail is to be finished as part of the snagging.

## 2.6 Problem

**Location – Mill Road**

**Summary: Drainage overspill may be hazardous to pedestrians.**

Large capacity rainwater downpipes from the roof of the car showroom building terminate above smaller drainage gullies at the footway edge. During heavy rainfall, water may overspill across the footway, creating a hazard to pedestrians, especially if the water freezes.

**Recommendation**

Drainage arrangements should be checked to ensure that they are adequate.

**Designer's Response**

No evidence to date has shown a problem with the discharge of the RWP's into the gullies beneath. Situation to be monitored through the maintenance period by Pembrokeshire.

## 2.7 Problem

**Location – South side of pelican crossing in Mill Road.**

**Summary: Inadequate tactile paving may be hazardous to sight impaired pedestrians.**

The area of tactile paving on the south side of the crossing is not large enough to ensure that a sight impaired pedestrian will encounter it. The pedestrian might miss the controlled crossing and attempt to cross the road at an inappropriate location or step over the tactile paving and walk into the carriageway inadvertently.

**Recommendation**

The tactile paving should be provided to a minimum depth of 800mm across the width of the dropped kerb and the tail should extend to the back of the footway at a width of 1200mm. The service cover should be incorporated into the tactile paving with an infilled cover to match.

**Designer's Response**

Recommendation accepted – minimum depth to be increased to 800mm and tail extend to back of footway and increased in width to 1200mm incorporating a recessed cover.

**2.8 Problem**

**Location – Cartlett Road at the old crossing location.**

**Summary: Residual road markings may confuse pedestrians and motorists.**

The stop line and crossing delineation studs from the old pelican crossing remain in the carriageway. Motorists and pedestrians may be confused as to the location of the existing crossing. Pedestrians may attempt to cross at an unsafe location. Drivers may not stop at the appropriate stop line.

**Recommendation**

The old crossing markings should be removed.

**Designer's Response**

Recommendation accepted – studs and markings will be removed as part of the snagging.

**2.9 Problem**

**Location – Access to car showroom forecourt from Cartlett Road.**

**Summary: Absence of tactile paving may be hazardous to sight impaired pedestrians.**

A flush kerb has been provided at the end of the new footway, where it crosses the forecourt access, but no tactile paving has been provided to indicate the kerb edge to sight impaired pedestrians, who may step inadvertently into the path of moving traffic.

**Recommendation**

Buff coloured tactile paving should be provided to a depth of 1200mm across the width of the dropped kerb at both sides of the access.

**Designer's Response**

These works are outside of the 278 works for this scheme.

**2.10 Problem**

**Location – North side of pelican crossing in Mill Road.**

**Summary: Ponding of rainwater may be hazardous to pedestrians.**

There is evidence of water ponding at the carriageway edge adjacent to the crossing point on the north side of Mill Road. This could be a hazard to pedestrians, particularly in freezing conditions.

**Recommendation**

Drainage arrangements should be checked to ensure that they are adequate.

**Designer's Response**

Kerb Line to be amended at crossing point as part of snagging.

**2.11 Problem**

**Location – Pelican crossing of Cartlett Road.**

**Summary: Uneven surface may be a trip hazard.**

The road surface within the confines of the crossing is uneven and might be a trip hazard for pedestrians, especially those who are sight or mobility impaired.

**Recommendation**

The road surface at the crossing should be repaired.

**Designer's Response**

The road surface/trench is to be reinstated as part of the snagging.

**2.12 Problem**

**Location – Pedestrian refuge in centre of Cartlett Road.**

**Summary: Absence of pedestrian guardrail may be hazardous to pedestrians.**

The pedestrian guardrail provided does not extend through the whole stagger. Sight impaired pedestrians will not be guided to the correct crossing point and other pedestrians, particularly children might attempt to cross at inappropriate locations.

**Recommendation**

Pedestrian guardrail should be provided on the west side of the staggered refuge.

**Designer's Response**

Pedestrian guardrail is to be provided to enclose the centre pedestrian island as part of the snagging.

**2.13 Problem**

**Location – Splitter island in Cartlett Road.**

**Summary: Unmarked kerb extension may be hazardous.**

The kerb nosing that extends northwards into Cartlett Road from the splitter island is unmarked. It is likely to be struck by weaving vehicles, causing loss of control accidents.

**Recommendation**

A plain-faced bollard should be provided on the kerb nosing.

**Designer's Response**

This is an existing removable island and is not part of the Section 278 works.

## 2.14 Problem

**Location – A40 junction with the new service road.**

**Summary: Vehicles exiting the service road may conflict with eastbound A40 traffic.**

There is evidence that some vehicles leaving the Aldi car park are turning left in contravention of the one-way system and exiting the service road onto the eastbound carriageway of the A40. The kerb alignment at the junction, the speed of traffic on the dual-carriageway and the possibility of exiting vehicles turning right onto the A40 against the flow of traffic, all increase the likelihood of a serious accident.

**Recommendation**

Further measures should be provided to reinforce the new one-way traffic management system. It is possible that temporary additional measures may suffice, until local drivers become accustomed to the new system.

**Designer's Response**

Recommendation is accepted. It is considered that a design solution is required. We propose to provide design solutions which should be tabled at a meeting between the Designer, Pembrokeshire County Council and South Wales Trunk Road Agency to enable the best solution to be adopted.

## 2.15 Lighting Issues

(a) The diagram 616 (No Entry) sign on the west side of the service road opposite the car park entrance was unlit.

(b) Both bollards on the splitter island at the Mill Road pedestrian crossing were unlit.

(c) The diagram 506.1 (Junction Ahead) sign on the A40 prior to the service road was unlit.

(d) Lamp column No. 11 on the west side of the service road was unlit.

**Designer's Response**

Lighting issue noted. The Contractor is to ensure that these units are lit.

# APPENDIX D

## *SELECTED CASE STUDIES*

### INDEX OF CONTENTS

## 1. ROADSIDE. SIDE SLOPE

| | |
|---|---|
| **PROBLEM** | Fill slopes steeper than 3:1 are non-recoverable and non-traversable. Therefore they could be considered roadside obstacles and hazards. |
| **SOLUTION** | • Slopes designed steeper than 3:1 within the clear zone should be protected with a barrier.<br>• A fill slope between 3:1 and 4:1 is considered as traversable, but non-recoverable. Therefore, obstacles should be removed, where feasible, beyond the bottom of the 3:1 slope for a distance to be determined on a case by case basis according to engineering judgment. If a traversable slope terminates within the clear zone, a recovery area should be provided to a distance at least equal to the clear zone or a barrier should be installed.<br>• Fill slopes 4:1 or flatter are recoverable and traversable, so if no obstacle is located within the clear zone, the barrier does not need to be provided. |
| **OTHER CONSIDERATIONS**: | |

**When should it be considered?**

| | |
|---|---|
| | Planning |
| ✓ | Project |
| ✓ | Building |
| | Operating |
| ✓ | Maintenance |

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  |  |
|  |  |
|  |  |

## 2. ROADSIDE. DITCH BOTTOM

| | |
|---|---|
| **PROBLEM** | Ditches have to carry out their function and not to be obstacles in road departures.<br>The problem is wronger if the ditch is oversized. |
| **SOLUTION** | It is necessary to project and build ditches with enough hydraulic capacity, and they should be as flat as possible for two reasons:<br>(1) flatter slopes provide a safer recovery area for errant vehicles leaving the roadway surface<br>(2) problems from drifting snow are reduced by flatter slopes.<br>In case of existing ditch, other options can be:<br>• Install a modular ditch (a celular channel involved in geotextil and covered with gravel).<br>• Protect them with a safety barrier. |
| **OTHER CONSIDERATIONS**: | The Intersafe Guide adopts a ditch width from 1 m to 2´5 m and a deep from 0´2 m to 1/5 of the wideness. |

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  <br>Impassable ditch without protection |  <br>Modular ditch in performance |
|  |  <br>Appropiate and "friendly" ditch |
|  |  <br>"Clement" bench and ditch. |

## 3. SAFETY BARRIERS. UNION BETWEEN FLEXIBLE AND RIGID BARRIERS

| | |
|---|---|
| **PROBLEM** | Safety barriers are efficent when they convert frontal impact into side collision. If the union between a flexible and a rigid barrier is wrong, the vehicule that crashes against the flexible barrier will go to the roadside when the barrier is finished (if it is not joined to a rigid barrier), or it will crash against the beginning of the rigid barrier (if the joining is not sufficient and, for that, there is a suddenly stiffening). |
| **SOLUTION** | Transition sections are necessary to provide continuity of protections when two different barriers are joined together (i.e. flexible to semi-rigid barrier or from a semi-rigid to rigid barrier). |
| **OTHER CONSIDERATIONS:** | |

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

**WRONG**

Wrong joining between barriers

**RIGHT**

Correct overlap

Wrong union can have dangerous consecuences

Consecuences of an unproper union

## 4. SAFETY BARRIERS. BARRIERS NOT HIGH ENOUGH.

| | | When should it be considered? | |
|---|---|---|---|
| **PROBLEM** | Low barriers do not avoid vehicule departures, and in some cases they could increase the bad consecuences of an accident. | | Planning |
| **SOLUTION** | In case of raising of the pavement, it will be necessary to check the existing barrier and to increase it. | ✓ | Project |
| | | ✓ | Building |
| **OTHER CONSIDERATIONS**: | | | Operating |
| | | ✓ | Maintenance |

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  Short and low barrier |  Right barrier |
|   This barrier with enough barrier was insufficient to stop the lorry |  New Jersey |
|  |  |

## 5. ROUNDABOUT. TANGENT ENTRY LINES

| | |
|---|---|
| **PROBLEM** | Tangent entry lines present two problems:<br>1. The driver does not percive the roundabout.<br>2. The vehicle access to the roundabout with high speed and does not respect the give way sing to the vehicule which is inside the roundabout. |
| **SOLUTION** | Entry lines should be perpendiculars to the circle of the roundabout and they have to invite the driver to reduce their speed. |
| **OTHER CONSIDERATIONS:** | |

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [ ] Maintenance

**EXAMPLES**

**WRONG**


The driver does not notice the roundabout.

The right line of the road is a tanget entry line

Right line against traffic way

**RIGHT**


## 6. ROUNDABOUT. POOR LANE MARKING CONFIGURATION.

**PROBLEM**

Motorists and other road users require clear, unambiguous guidance when entering the roundabout. Although signing is important, properly designed roadmarkings should provide the primary means of guidance.

Poor or insufficient roadmarkings can confuse road users and provide little guidance for the driver approaching and travelling through the roundabout. One of the most common problems occurs at multi-lane roundabouts where no guidance is provided within the circulating roadway.

Inadequate or poor roadmarkings can:

- Lead motorists into unsafe situations and confuse motorists.
- Reduce the capacity of the roundabout to handle the intended traffic volumes.
- Increase speed through the roundabout.
- Lead to unexpected weaving manoeuvres through the roundabout or on the approaches.

**SOLUTION**

- Ensure roadmarkings provide a clear indication of what is expected of the driver and other users of the roundabout.
- Remove old roadmarkings to avoid confusion.
- Provide roadmarkings within the circulating roadway.
- Adopt a consistent marking style nearby roundabouts.

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

**WRONG**

Multi-lane roundabout providing no guidance to motorists in the circulating roadway

**RIGHT**

Good clear roadmarking provide motorist with clear intruction.

## 7. ROUNDABOUT. OBJECTS ON THE CENTRAL ISLANDS.

| | |
|---|---|
| **PROBLEM** | Obstacles in central island can increase the consecuences of an accident when a vehicle access to this island. |
| **SOLUTION** | • To remove objets.<br>• It could be useful to provide a gravel bed or not compacted grown soil. |
| **OTHER CONSIDERATIONS:** | |

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

**WRONG**

Tree too close

**RIGHT**


The use of a curve entry line allow to decorate with a ship the central island

## 8. ROUNDABOUT. RADIAL ROADS ON EXITS LINES.

| | |
|---|---|
| **PROBLEM** | Radial roads too close to exit lines could generate accidents. |
| **SOLUTION** | The access to service roads would be through the roundabout. In other cases, the access would be apart from the roundabout and correctly signed (at a distance longer than total stopping distance) |
| **OTHER CONSIDERATIONS:** | Vegetation should not obstruct the vision of the access to a service road. |

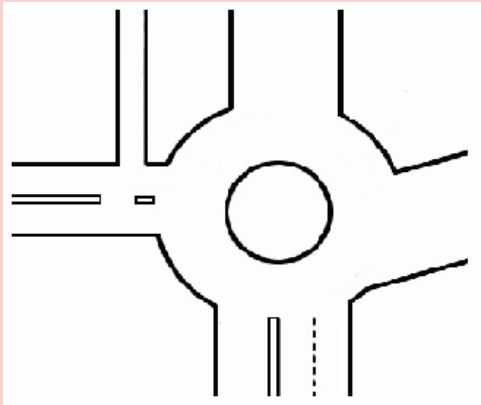
**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [ ] Maintenance

**EXAMPLES**

**WRONG**

Service road too close to the roundabout



**RIGHT**

Access to the service roads through the roundabout

## 9. ROUNDABOUT. POSITION OF PEDESTRIAN CROSSING

| | | |
|---|---|---|
| **PROBLEM** | Pedestrian crossing locations at roundabouts are a balance among pedestrian convenience, pedestrian safety, and roundabout operations. Inadequate pedestrian provisions at roundabouts can lead to:<br>•Rear end accidents resulting from poorly sited crossing locations.<br>•Severance of existing pedestrian routes without making suitable alternative provision. | **When should it be considered?**<br>☐ Planning<br>☑ Project<br>☑ Building<br>☐ Operating<br>☑ Maintenance |
| **SOLUTION** | • Clear, safe guidance of pedestrian to appropriately located facilities.<br>• Provision of guard fences and handrails to control pedestrian movements.<br>• Locating pedestrian facilities as far from the roundabout as possible without reducing the attractiveness of facility.<br>• The distance between the pedestrian crossing and the roundabout will allow a vehicle to stop out of the circle line and not to get high speed.<br>• Pedestrian facilities should be correctly signed. A good solution is to use lightening signals<br>• Pedestrian can not be hidden by vegetation. | |

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  <br>Where is the pedestrian crossing? |  <br>Pedestrian crossing marked by a lightening signal. |
|  |  |
|  |  |

## 10. INTERSECTIONS. SIGNALS AND TRAFFIC GUIDANCE EQUIPMENT.

| | | When should it be considered? |
|---|---|---|
| **PROBLEM** | Signals and traffic guidance equipment may help the drivers to perceive the road environment, specially at intersection.<br>It is frequent that drivers on the road were unaware of the junction. | ☐ Planning<br>☑ Project<br>☑ Building<br>☐ Operating<br>☑ Maintenance |
| **SOLUTION** | Warning signs on the approach to the junction and the delineation of the junction should be improved.<br>Vegetation interfering with the sight line must be cut.<br>In very dangerous crossroads it would be necessary to use special pavements. | |
| **OTHER CONSIDERATION:** | | |

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  |  |
|  |  |
|  |  |

## 11. INTERSECTIONS. OLD ROAD MARKINGS

| | |
|---|---|
| **PROBLEM** | Motorists require good clear signage and marking to ensure correct decisions are made when approaching, entering and exiting any intersection. Old signs and marking need to be removed otherwise motorist are not provided with correct information:<br>• old marking can lead motorists into the path of an oncoming vehicle, particularly at night.<br>• old signs may incorrectly inform motorist. |
| **SOLUTION** | • Permanently remove all old markings<br>• Remove all redundant signs. |
| **OTHER CONSIDERATION:** | |

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

**WRONG**

Old markings confuse pedestrian and motorists. Redundant reflective markers misguide motorist.

**RIGHT**

Clear roadmarkings.

## 12. INTERCHANGE. LIGHTING

| | |
|---|---|
| **PROBLEM** | A driver could have problems to understand road aligment especially during the night. |
| **SOLUTION** | For an easy understanding of the aligment it is important to light up motorways and widening roads interchanges. It is recomended to light up interchanges and close zones from an AADT of 7,000 veh/day. The following advantages should be considered:<br>• safer and more confortable driving<br>• avoid drivers falling asleeps<br>• safer conditions for pedestrians and cyclists. |
| **OTHER CONSIDERATION**: | |

**When should it be considered?**

- ☐ Planning
- ☑ Project
- ☑ Building
- ☐ Operating
- ☑ Maintenance

**EXAMPLES**

**WRONG**

A curve or a roundabout?

**RIGHT**

## 13. ROADS WITH TWO SEPARATED CARRIAGEWAYS. GLARE.

| | |
|---|---|
| **PROBLEM** | Problems related to glare usually appear on dual carriageways with narrow central reserve. |
| **SOLUTION** | Increase thee distance between opposite flows of traffic. When this is not possible, it would be necessary to install antiglare screen or shrub elements between flows of traffic, ensuring the suitable stopping sight distance. |
| **OTHER CONSIDERATION:** | Glare is a slighter problem at sufficiently lighted areas. |

**When should it be considered?**

- [x] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

**WRONG**

Short distance between central lines and service road.

**RIGHT**

It should be necessary to checkout stopping sight distance on curves.

Antiglare slats on narrow central reserve.

## 14. SIGNS/TRAFFIC GUIDANCE EQUIPMENT.CREDIBILITY.

| | | When should it be considered? |
|---|---|---|
| **PROBLEM** | In some cases traffic signals are not credible. | ☐ Planning |
| **SOLUTION** | Check credibility of traffic signs.<br>A correct signposting should allow a confortable driving for 85% of users, and 99% of them should be safety. | ☑ Project<br>☑ Building<br>☐ Operating<br>☑ Maintenance |
| **OTHER CONSIDERATION:** | | |

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  |  |
|  <br>It is possible to improve these signals |  |
|  |  |

## 15. PEDESTRIAN. CROSSROADS

| | | When should it be considered? |
|---|---|---|
| **PROBLEM** | Pedestrians crossing can be dangerous if the right perception of motorists is not guaranteed; signing is not always enough.<br>The problem severity should be determined by: aligment, environment, visibility, pedestrian intensity, AADT and speed. | ☐ Planning<br>☑ Project<br>☑ Building<br>☑ Operating<br>☑ Maintenance |
| **SOLUTION** | 1. To install footbridges or pedestrian underpasses.<br>2. To install central refuge islands to aid pedestrians wishing to cross the road.<br>3. It is necessary to guarantee speed restriction on pedestrian crossing with hight speed or AADT. | |
| **OTHER CONSIDERATIONS**: | | |

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  |  |
|  <br>Warnings were not enough to avoid accidents. |  |
|  |  |

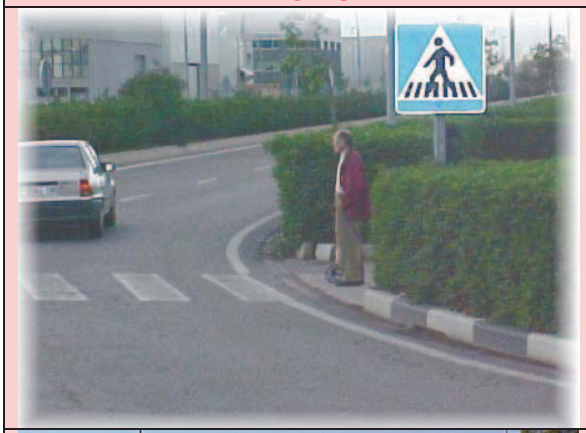
## 16. PEDESTRIAN. VISIBILITY ON PEDESTRIAN CROSSING.

| | |
|---|---|
| **PROBLEM** | Vegetation too close to pedestrian crossings could hide pedestrians and increase the risk of accident. |
| **SOLUTION** | 1. To install vegetation on central reserves and edges that could not hide pedestrians.<br>2. To swamp out existing vegetation. |
| **OTHER CONSIDERATION:** | This recommendation can be use in any case when visibility is restricted by vegetation. |

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  |  |
|  |  |
|  |  |

## 17. CYCLIST. SHOULDER.

| | |
|---|---|
| **PROBLEM** | Cyclists on road shoulders can be easily involved in serious accidents. |
| **SOLUTION** | • To install at least especific signals to advise motorists.<br>• Frecuently cleaning of shoulder.<br>• 50 m before the end of the shoulder paint line road marking. |
| **OTHER CONSIDERATIONS:** | |

**When should it be considered?**

- [ ] Planning
- [x] Project
- [x] Building
- [ ] Operating
- [x] Maintenance

**EXAMPLES**

| WRONG | RIGHT |
|---|---|
|  |  |
|  |  |
|  |  |

## PROJECT: EURO-AUDITS

# THE EUROPEAN ROAD SAFETY AUDITOR TRAINING SYLLABUS

## APPENDIX E – SURVEY RESULTS

**October 2007**

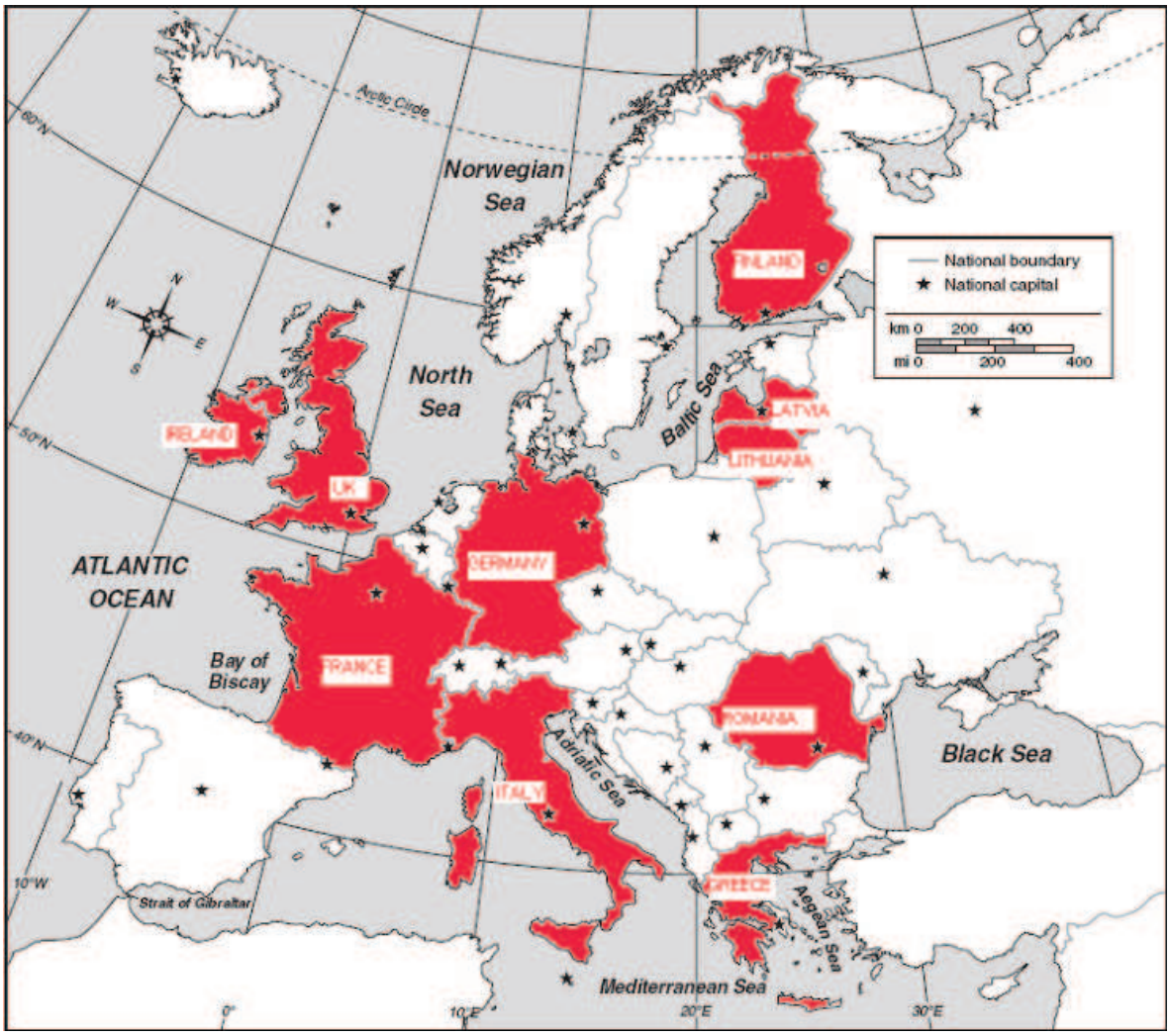
A European Commission co-funded project

# Appendix E

# Survey Results

## Contents:

***EUROAUDITS survey results***




*Countries with requirements to carry out RSA on all or part of their road network.*

The 20 countries within the European Union which have replied to our survey are the following: Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, Spain, The Netherlands and the United Kingdom (please, see map on 4.1). Amongst them, only 10 countries show requirements to carry out road safety Audits on all or part of their road network, as it is presented on the map above: Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Romania and the United Kingdom.

A brief description of road safety audit practices background in these Member States is provided:

In **Belgium** there are not requirements for road safety audits yet, according to the Belgium Ministry of Infrastructure, neither a road safety audit training scheme. However, there are some documents and directives related to, which could give way to the adoption, in the future, of procedures and requirements to carry out road safety audits. Regarding training of future road safety audits, the expertise could be found at the Administrations. There are some points of contact with existing trainings at the university, though.

In **Czech Republic**, according to the Transport Research Centre, it is the same case as in Belgium: currently there are no requirements for RSA. However, the Czech National Road

Safety Strategy, dated April 2004, presumes mandatory RSA before 2010, as well as subsequent mandatory training scheme, methodology and certification.

In **Denmark**, the National Road Directorate indicates that there are not requirements but strong recommendations in order to carry out road safety Audits. Actually, the Danish Road Directorate has published the Manual of Road Safety Audit. There are training courses for auditors carried out by the Danish Road Sector Institution for Post-graduate Education and certified by the National Road Standards Board.

In **Estonia** there are not requirements for road safety Audits but strong recommendations from consulting companies ordered by Estonian Road Administration. Safety conditions in Estonia determine the fact of carrying out road safety audits. Within the Estonian Road Administration there are some training courses for auditors certified by Tallinn University of Technology.

In **Finland**, on the contrary, there are requirements to carry out road safety Audits which are compiled under the guidelines of Finnish Road Administration ("Safety audit for infrastructure projects", *Road Safety Audit*, 2001). They will take place on public road network. The Finnish Road Administration carries out voluntary road safety training seminars for auditors.

In **France**, as well as in Finland, there are requirements to carry out road safety audits (Ministry Order, May 2001) on national free-road network and there is a road safety audit training scheme. It is mandatory to realise some training in order to carry out audits, according to the binding text. These courses are developed and organized by the Road Administration and certified by road inspectors.

In **Germany** there are requirements to carry out road safety audits, and they are mandatory in most of the Federal States. The reference document is "Guidelines for Road Safety Audits in Germany" (2002). RSA affect mainly Federal and State roads. Regarding training courses, there are standardised ones, whose curriculum was financed by the Federal Ministry and supervised by the German Road and Transportation Research Association, and which are addressed to auditors and organised by an independent partnership of universities.

In **Greece** there are requirements to realize road safety audits which affect the whole road network, especially national road network. The Greek Ministry of Environment, Physical Planning and Public Works is developing the whole scheme, whose firsts intends appeared between 1999 and 2000 and afterwards translated into the Road Safety strategic Plan 2001-2005. Regarding RSA training courses, auditors have attended courses provided by both private and public companies.

In **Hungary** there are not requirements for RSA, but a recommendation from the Ministry of Economy and Transport and a guideline, issued by the Ministry and produced by Szechenyi Istvan University and invited experts from other organisations. There has been a road safety training course organized by the university and certified by the Hungarian Ministry of Economy and Transport.

In **Ireland** there are requirements to carry out road safety audits and are mandatory on all national road network. The binding document is the "National Roads Authority Design Manual for Roads and Bridges", which contains Standard HD19 Road Safety Audits, by the National Roads Authority, on behalf of the Department of Transport. There also exists in Ireland road safety training courses developed by a private company in conjunction with the National Roads Authority.

In **Italy** it is the Italian Ministry of Public Works who has fixed the guidelines to carry out RSA. In theory these guidelines are indicated as mandatory. TMS in Italy has carried out some programmes for road safety audit and road safety inspection techniques training courses, which in some cases are certified by an Institution of Highways.

In **Latvia**, there are mandatory road safety audits in all road traffic projects and designs. This system was created to cover all types of road. The binding document that determines the

procedures is the Governmental Act, defined as Regulations of Cabinet of Ministers, whose preparation falls over the Ministry of Transport. There is also RSA training scheme, to be accepted by the Government, and road safety auditors must have a certificate. This certificate has been proposed to be issued by the Ministry of Transport.

In **Lithuania** road safety audits are being implemented and auditors have to be experienced. RSA affect national road network and it is the Lithuanian Road Administration the body which regulates them. However, no training courses have been developed yet.

In **Poland** there are road safety audit voluntary requirements, which are recommended by General Directorate of National Roads and Motorways for selected projects of national roads. There were some guidelines developed by university contexts, but there is also an internal rule developed by General Director of National Roads and Motorways. A group of the Polish National Road Safety Program from Krakow and Gdansk Universities of Technology has developed some workshops and lectures as road safety auditors training course, which is mandatory for auditing designs of national roads. The entities responsible for its organisation and development are Krakow University of Technology, the Highway and Traffic Eng. Department and, in certain cases, road administration. The General Directorate of National Roads and Motorways certifies the road safety audit training courses.

In **Portugal** there are not yet mandatory requirements for road safety audits, though there is some legislation on RSA and RSI (inspections) since 1998. The regulation is currently being prepared, for governmental approval, and it will extend RSA to all national road network. The body responsible for RSA legislation is the Portuguese National Road Safety Authority. However, regarding RSA training, CRP and the Technical University of Lisbon carry out two Road Safety Auditing Courses, certified by the National Engineering Organisation.

In **Romania** there are requirements regarding road safety audits, which are compulsory in the cases of construction of new roads, rehabilitation/upgrading projects and urgent needs. They will be applied to the national road and motorways network. The document which regulates these procedures is the Road Safety Audit Manual in conjunction with the Romanian legislation and norms. Romania also counts with a RSA training scheme organized by a certified entity. Normally these courses are developed by private companies.

In **Slovenia** there are no requirements in force to carry out RSA, and there is no experience of road safety audits procedures realized in any part of the Slovenian road network. Therefore, there in no road safety audit training scheme.

In **Spain** there are no requirements to proceed with road safety audits and there are not standards available on them. However, there is a road safety audit training scheme promoted and organized by regional road administration, universities and the Spanish Road Association and are certified by different universities. As formally audits are not required, there is no obligation to have attended the training course.

In **The Netherlands** there are no requirements to carry out road safety audits, which are still voluntary. So far, there are no restrictions concerning the kind of road affected and the Road Safety Audit document provides information on the possibilities and uses. The training of auditors is also voluntary.

Finally, in the **United Kingdom** there are requirements to realize road safety audits and these should consider all highway improvement schemes on the national motorway and trunk road network. The standard which contemplates RSA is HD 19/03 Road Safety Audit (Design Manual for Roads and Bridges). Regarding the RSA training for auditors, there are not specific schemes in the UK and auditors do not have to attend training courses compulsorily. However, some universities, private companies and the Royal Society for the Prevention of Accidents organize training on accident investigation, road safety engineering and RSA.