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Effective and coordinated road infrastructures safety operations

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Abstract

The general objective of the ECORoads project is to overcome the barrier established by the formal interpretation of the two Directives 2008/96/EC (on road infrastructure safety management) and 2004/54/EC (on tunnels), that in practice do not allow the same Road Safety Audits/Inspections to be performed inside tunnels.

The main problem is that, while from the user (driver) point of view a road is a unique linear infrastructure generally in open terrain and sometimes in closed environment (tunnels), the strict application of the two Directives leads to a non-uniform approach to the infrastructure safety management outside and inside tunnels.

To overcome this barrier, ECORoads projects aims at the establishment of a common enhanced approach to road infrastructure and tunnel safety management by using the concepts and criteria of the Directive 2008/96/CE on road infrastructure safety management and the results of related European Commission (EC) funded projects.

Such an objective will be achieved through the following specific activities:

Workshops with the stakeholders (European tunnel and road managers); Analysis/review of national practices regarding Road Safety Inspections (RSI) and Road Safety Audits (RSA), starting from the results of the two studies recently launched by the EC's Directorate for Mobility and Transport to assess the impact of the two Directives 2008/96/EC and 2004/54/EC

-Exchange of best practices and experiences between European tunnel experts and road safety professionals;

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-Pilot joint safety operations in five European road sections which feature both open roads and tunnels;
 -Recommendations and guidelines for the application of the RSA and RSI concepts within the tunnel safety operations;
 Thanks to the high transferability of the ECORoads results, the present formal gap between the Directive 2008/96/EC and the Directive 2004/54/EC will be bridged, thus leading to “faster, more sustainable and better planned interventions with maximum safety for the workers and other traffic participants”.

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1. Introduction

The general objective of the ECORoads project is to overcome the barrier established by the formal interpretation of the two Directives 2008/96/EC (on road infrastructure safety management) and 2004/54/EC (on tunnels), that in practice do not allow the same Road Safety Audits/Inspections to be performed inside tunnels, as shown in Figure 1.

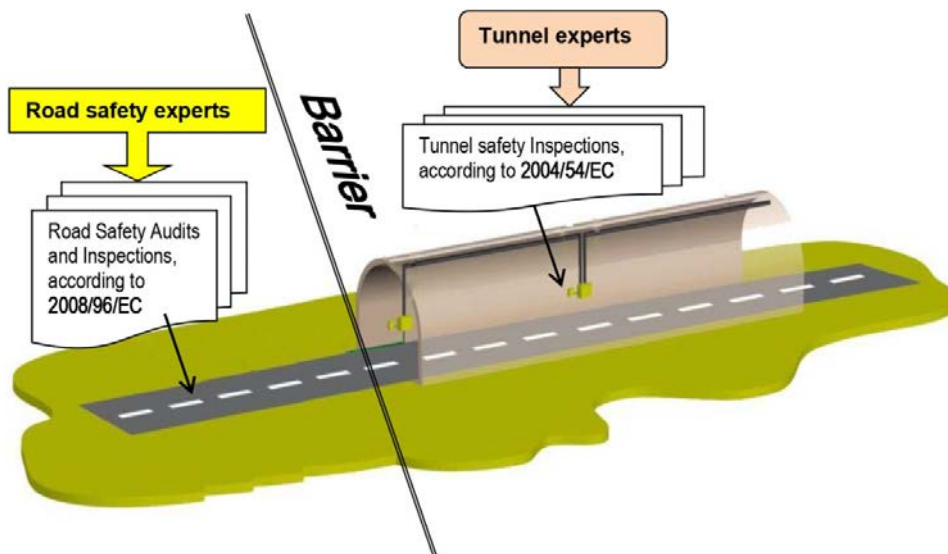


Fig. 1. The “barrier” between the two EU Directives.

The main problem is that, while from the user (driver) point of view a road is a unique linear infrastructure generally in open terrain and sometimes in closed environment (tunnels), the strict application of the two Directives leads to a non-uniform approach to the infrastructure safety management outside and inside tunnels.

This project is the follow-up of the initiative related to the European Road Safety Directives and the two workshops held at the European Social and Economic Committee (EESC) by a group of international stakeholders in February and May 2013: a debate that was initiated as a result of the coach crash in Switzerland that caused more than 28 fatalities, including 22 children¹

¹ <http://www.bbc.co.uk/news/world-europe-17362643> <http://tunnellingjournal.com/news/tragic-tunnel-coach-crash-kills-28/>

The collision occurred in 2012 with the end wall of an emergency parking facility in the Sierre tunnel, Switzerland, which opened in 1999 and was rated as “good” in a 2005 European Tunnel Assessment Programme (EuroTAP) test. The end wall was placed at 90 degrees with respect to the direction of the adjacent traffic flow, without any adequate protection from collision.

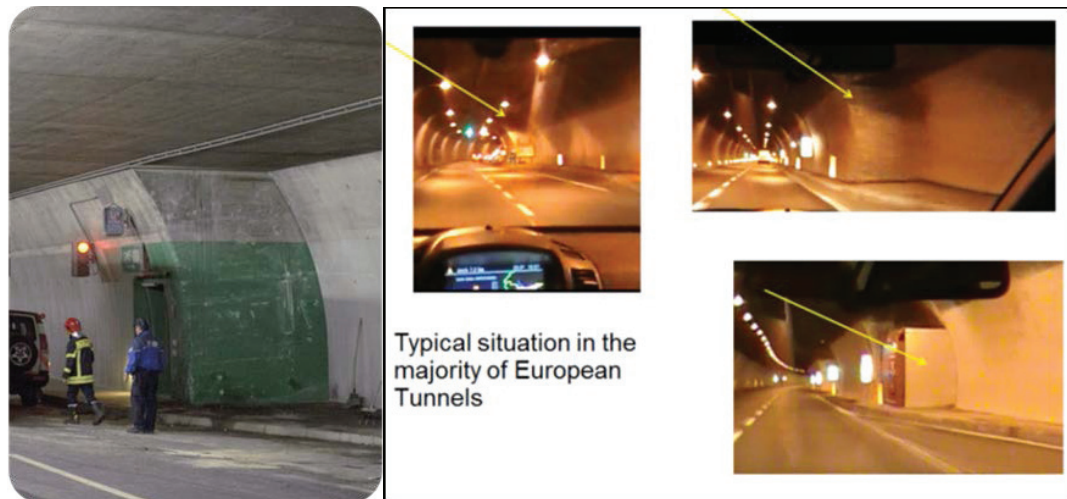


Fig. 2. On the left the lay-by in the Sierre Tunnel; on the right similar situations in several tunnels.

This feature of tunnel design is typical of many European tunnels, as shown in Figure 2 – 90 degrees walls without any protection-, where operations such as RSA during the design process or RSI after opening to traffic, according to the prescriptions of the Directive 2008/96/EC, could be beneficial for risk prevention.

Indeed, this Directive does not apply to road tunnels covered by Directive 2004/54/EC (Art.1, point 4 of the Directive 2008/96/CE).

On the other hand, Directive (2004/54/EC) does not deal directly with RSA or RSI inside the tunnels: There is only a general statement about taking "*all aspects of the system composed of the infrastructure, operation, users and vehicles*" into account in Annex 1. Different interpretation and application by Member States may further amplify the gap between the two Directives.

Some interested stakeholders organised a collection of signatures to address a petition² to the EC at the beginning of the Decade of Action for Road Safety, in order to call for an initiative that aims to fill the gap between the two Directives and therefore contribute to the further reduction of road traffic collision fatalities in Europe.

The petition also recommended a series of workshops to find the way to integrate the two Directives, as well as a meeting of road safety delegates from Member States to agree common objectives to be achieved within this Decade. Following the reply from the Vice President Siim Kallas, in 2013 the EESC hosted two workshops dedicated to the issue³.

The participants, many of whom are represented in the ECORoads project consortium, discussed the best way to deal with the two EC directives and suggested that studies might be needed, as well as reflections on what would be the most appropriate research and finally agreed to act under the umbrella of a Coordinating or Supporting Action to be submitted to Horizon 2020.

Thus, the ECORoads informal consortium was set up, composed by the following thematic associations : **FEHRL**-Forum Des Laboratoires Nationaux Europeens De Recherche Routiere (Belgium); **ETSC**-European Transport Safety Council (Belgium); **ERF**-The European Union Road Federation (Belgium); **ASECAP** - European

² http://www.aipss.it/letter_to_the_commissioner.html

³ (announcement, invitation and agenda are available at <http://www.eesc.europa.eu/?i=portal.en.events-and-activities-road-safety>)

Association with tolled motorways, bridges and tunnels (Belgium); **AIPSS**-Italian Association of Road Safety Professionals (Italy); **SEETO** South East Europe Transport Observatory (Serbia)

The consortium started to draft a proposal aiming at the deployment of mixed groups of tunnel and road safety experts performing joint safety inspections in both tunnels and open roads, in order to find a common agreed inspection methodology able to enhance safety in roads and tunnels.

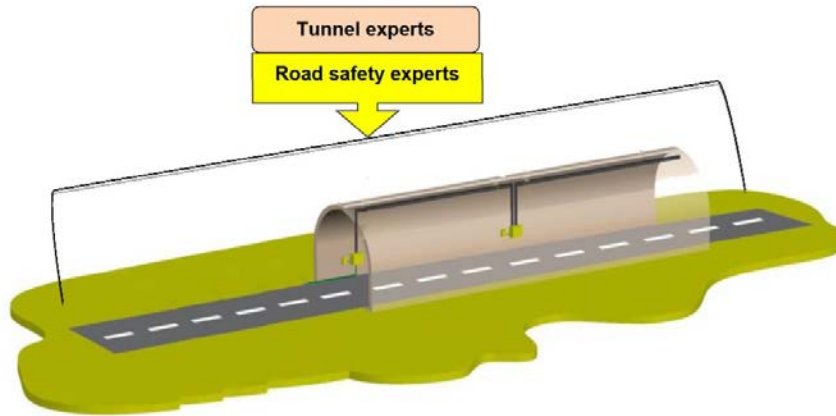


Fig. 3. How to overcome the barrier.

2. Methodology

The ECORoads objective is to ensure that road users can circulate on European roads where uniform safety measures have been planned and implemented, avoiding different approaches stemming from formal discrepancies in the interpretation of EU Directives

The overall approach of the ECORoads is based on the previous successfully project Pilot4Safety and is divided into several phases, including a clear overview of the application of the two Directives in the Member States, a series of workshops with the stakeholders (European tunnel and road managers), and the exchange of best practices between European experts in the two fields:

Clear **overview of the application of the two Directives in the Member States** and the extent of the gap between them already described in the previous section. The analysis/review of national practices regarding Road Safety Inspections (RSI) and Road Safety Audit (RSA), starting from the results of the two studies recently launched by DG MOVE to assess the impact of the two Directives on road infrastructure safety management and tunnels. Such an overview will be the basis of a discussion with the stakeholders through dedicated workshops.

Workshops with the stakeholders (European tunnel and road managers from at least 10 European countries): three workshops will be organised according to the following schedule:

First workshop to discuss the results of the overview of the application of the two Directives and the details of the exchange of best practices and the joint safety operations described further on in this section.

Second workshop to be held after a first set of joint safety operations, in order to analyse the first results and fine tune the second set of joint operations.

Third final workshop to discuss the results of the operations and the first draft of the guidelines.

Exchange of best practices and experiences between European tunnel experts and road safety professionals: three working sessions in Brussels will be attended by safety experts belonging to the two groups (tunnel and roads) from European countries involved in the Action. The experts will spend two days for each session at FEHRL (Brussels), for a total of six days.

In the first session, the tunnel safety operations will be presented by the tunnel experts to the road experts, while in the second session the Road safety Audit and Inspection principles will be explained to the tunnel experts.

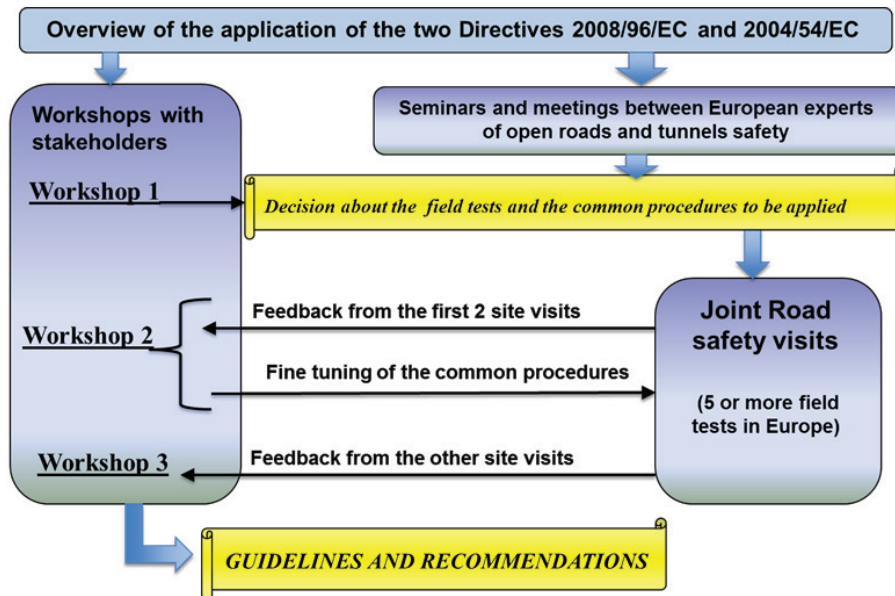


Fig. 4. ECORoads Methodology.

The third and last session will be used to plan the joint safety operations in five different locations in Europe, where each location will have a section on an open road together with a section in a tunnel. There will also be discussions/exchanges on technical aspects, such as the possible technological measures to mitigate the risk associated with lay-bys. Vehicle restraint systems are designed to work in a road environment not in a tunnel, which means that typical road solutions will not be directly implementable in tunnels.

A link to other EU projects, those outputs can feed into ECORoads are going to be established by the specific dissemination work package:

- RIPCORDER-ISEREST
- SOLUTIONS: Sharing Opportunities for Low carbon Urban transportation
- ERA-NET ROAD 2009 "Safety at the Heart of Road Design"
- PILOT4SAFETY 2010-2012 Pilot project for common EU Curriculum for Road Safety experts: training and application on Secondary Roads
- ERA-NET ROAD 2010 "Effective Asset Management meeting Future Challenges"
- ERA-NET ROAD 2011 "Energy – Sustainability and Energy Efficient Management of Roads"
- CEDR 2013 Theme C: Safety
- Guideline for safety evaluations of road tunnels according to RABT 2006 (Section 0.5)
- Konzeption der Sicherheitsdokumentation für Straßentunnel nach EG - Richtlinie 2004/54/EG
- Leitfaden zur Erstellung einer Sicherheitsdokumentation gemäß RABT 2006 (Abschnitt 1.1.5)

After several discussions among the project partners, a preliminary long list of field tests has been identified, as shown in Table 1.

Table 1. Long list of test sites.

1. Germany- Bundesautobahn (BAB) A71 between AS Geraberg and AD Suhl BAB A71 between AS Geraberg and AD Suhl	<i>Pre-selected</i>
2- Germany - E55/BAB A17 between AS Dresden-Gorbitz and AS Dresden-Südvorstadt	
3. Belgium Kennedytunnel, Antwerp	<i>Pre-selected</i>
4 Czech Republic :Tunnel Klimkovice - Road category: Four lane motorway D47 (TENT network)	
5 Albania Tirane (Ring road) –Elbasan - Corridor VIII - SEETO Area	<i>Pre-selected</i>
6 Tirane (Brari Bridge) –Vasha Bridge (Bulqizë) - SEETO Area	
7 Bosnia and Herzegovina Karuse-Ozimica - Corridor Vc - SEETO Area	
8 Bosnia and Herzegovina Topcic Polje-Lasva - Corridor Vc - SEETO Area	
9 Bosnia and Herzegovina Ustipraca-Medjedja SEETO Route 3 - SEETO Area	
10 Montenegro Bypass Rozaje SEETO Route 6a - SEETO Area	
11 The former Yugoslav Republic of Macedonia Veles-Katlanovo Corridor X - SEETO Area	<i>Pre-selected</i>
12 The former Yugoslav Republic of Macedonia Demir Kapija-Udovo Corridor X - SEETO Area	
13 Serbia Belgrade by pass - Sector 5 Corridor X - SEETO Area	<i>Pre-selected</i>
14 Serbia Dimitrovgrad bypass - Corridor Xc - SEETO Area	
15 Italy Regional Road 3 “Via Flaminia”, 2 km north from the ring of Rome	

Each proposed site provided a candidature dossier, as well as a letter of commitment duly signed by the owner of the infrastructure; on August 2015 a specific project committee has pre-selected 5 sites by voting according to the following criteria:

- Relevance to the project (1-5 points)
- Completeness of the site description (1-5 points)
- Organisation of the inspection (logistics and safety measures) 1-5 points
- Estimated costs of the inspection (travels, accommodation, duration) 1 -3 points

The final confirmation is expected immediately after the first Workshop , already scheduled on 30 September 2015.

It is to be underlined that more locations can be proposed, even by Road Authorities not directly participating at the project, just by submitting the candidature before the second Workshop scheduled in middle 2016 and by guaranteeing the availability of the site and the safety measures for the inspectors (traffic calming , presence of the Police, etc.); the number of effective operation could therefore be higher than the five originally scheduled, depending of the cost of each operation respect to the assigned budget.

Common (road and tunnels) inspection procedures for the test fields will be agreed by the partners, taking into account the following aspects:

- a. Composition of the joint team: at least three experts, with minimum one road and one tunnel expert, coming from different countries; participation of further people as “observers” is allowed

- b. Checklists: The usage of checklists should not been mandatory during the inspection, but it is recommended to use them, especially after conducting the inspection
- c. Safety of the inspection team and other road users during the operations
- d. Modern technologies: definition of cameras and/or other specific tools that can possibly be used and a standard procedure
- e. Point of view of all road users: the inspection should not only be car oriented. It is necessary to check the safety issues from the point of view of all road users allowed to use the infrastructure.
- f. Inspection report: scheme and content of the report, including the relative importance of each deficiency, in order to allow the infrastructure manager to take appropriate decisions
- g. Feedback from the infrastructure manager: scheme of the written response the road authority should provide after having received and analysed the report

3. Expected results

At the time of the submission of this paper, the project has been just initiated, so no results has been delivered yet. However, a first local workshop held in Rome⁴ with a relevant participation of road managers , tunnel managers and the Italian Authority on Tunnels, underlined how the ECORoads approach appears particularly promising. Namely the integration of inspections with the joint presence of different experts, able to collect all the information needed for the risk analysis, has been considered very positive from all the audience.

The main impact of the project is to overcome the barrier established by a formal interpretation of the two Directives which do not currently allow infrastructure safety checks (RSI and RSA) to be performed inside tunnels; therefore ECORoads will deliver a common approach to road infrastructure safety monitoring, thus optimising the time, quality and costs of the safety checks.

This project will harmonise infrastructure safety monitoring: the life span of ageing infrastructure, particularly in the transition areas between tunnels and the open road, will therefore be extended due to better attention being given to their inspection. The Guidelines and Recommendations delivered by the project are an effective tool to meet cost-effectiveness and sustainability goals

4. Conclusions

ECORoads was submitted under the Horizon 2020 call 2014 - topic MG-8.1b-2014 “Smarter design, construction and maintenance” and was selected for financing with a start date of June 2015. It will lead to a fruitful exchange of experiences, the cross-fertilisation between the two disciplines of tunnel safety and road safety and better implementation of all safety operations along road infrastructures.

The project will allow good practices to be shared and define a common agreed approach for applying the concepts of the Directive 2008/96/CE on road infrastructure safety management in tunnels and in the transition areas between tunnels and open roads, without affecting (but completing) the usual tunnel safety management operations.

Thanks to the high transferability of the ECORoads results, the present formal gap (explained in detail in the following paragraph) between the Directive 2008/96/EC and the Directive 2004/54/EC will be bridged, thus leading to faster, more sustainable and better planned interventions with maximum safety for the workers and other traffic participants, according to needs of “Effective and COordinated ROAD infrastructure Safety operations”. The project will thus contribute to the implementation of coherent safety procedures on the whole road network, both at the Member State and EU level.

Moreover, during the Stakeholder Conference on EU Directive 2008/96/EC held on 13th June 2014, the possibility to merge the Directives together in 2016 was not excluded, depending on the stakeholders’ position and the next Commissioner’s approach.

⁴ Workshop: sicurezza delle gallerie e delle infrastrutture stradali - Valutazione del rischio e finalità delle attività ispettive – Rompe 07/09/2015; proceedings at: www.aipss.it/seroma1-en.html

This project will therefore provide valuable input to the work of the EC and the possible future revision of one or both Directives.

Moreover, up to early2017 and depending to the budget availability, there will be the possibility to add more test sites: any interested stakeholder from Europe and Neighbourhood Countries may ask to the project to include a site visit on a specific location.

References

ECORoads project www.ecoroadsproject.eu

EU Directive 2004/54/EC on minimum safety requirements for tunnels in the Trans-European Road Network

EU Directive 2008/96/EC on road infrastructure safety management

HORIZON 2020 - Work Programme 2014 – 2015: Smart, green and integrated transport

Open letter to the EU Commissioner on Transport http://www.aipss.it/letter_to_the_commissioner.html

PILOT4SAFETY 2010-2012 Pilot project for common EU Curriculum for Road Safety experts: training and application on Secondary Roads

Workshop at the European Economic and Social Committee <http://www.eesc.europa.eu/?i=portal.en.events-and-activities-road-safety>)