

Road Safety Audit in the Czech Republic

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1. Introduction

Road Safety Audit (RSA) is the important road safety tool when designing new traffic schemes. This article introduces the process of implementing RSA in the Czech Republic.

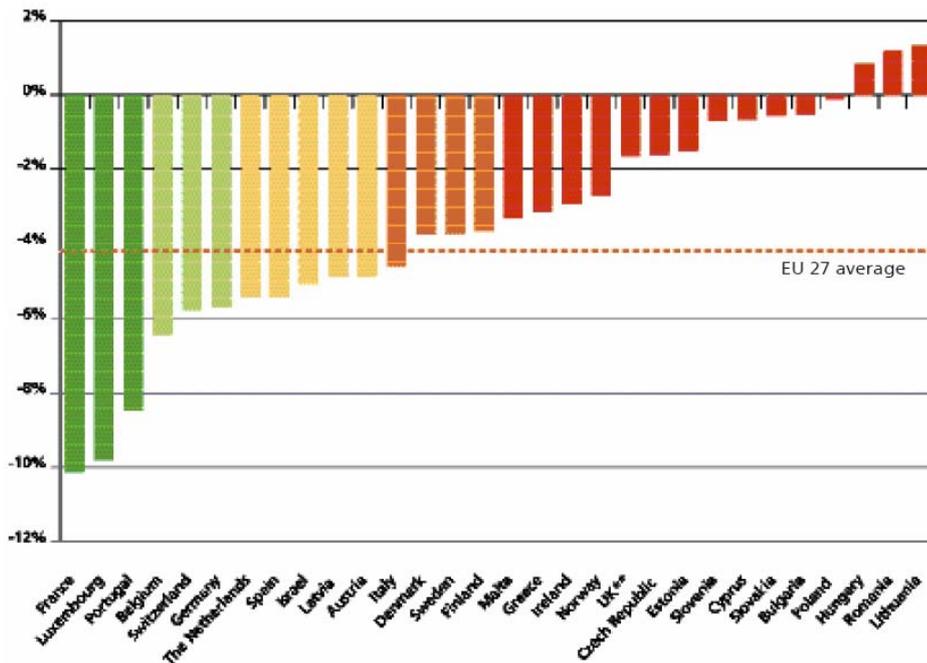
2. Level of Road safety in EU

The European Union has set itself the ambitious target of reducing the yearly number of road deaths by 50% between years 2001 and 2010. This target probably will not be reached and one of the main reasons of that failure is the low level of road safety in Central and Eastern European countries, compared to the rest of EU countries.

What are the reasons of that low level of road safety? It is not only about safer driving culture or modern roads and cars; it is primarily because of long term and systematical road safety management carried out by the state bodies in countries, where the safety level is high.

Based on PIN report published recently by ETSC it is evident that slowest progress in reducing road deaths has been made in Central and Eastern European countries where 2001-2007 reductions did not exceed 1.6%. In Romania, Slovenia, Lithuania, Slovakia and Poland, numbers of deaths actually rose over the last six years. Latvia is the only exception with an outstanding reduction of 25%. Estimated average annual percentage change in road deaths in EU states over the period 2001-2007 is showed at Graph 1.

Graph 1: Estimated average annual percentage change in road deaths over the period 2001-2007 (source: 2nd Road Safety PIN Report, ETSC 2008)



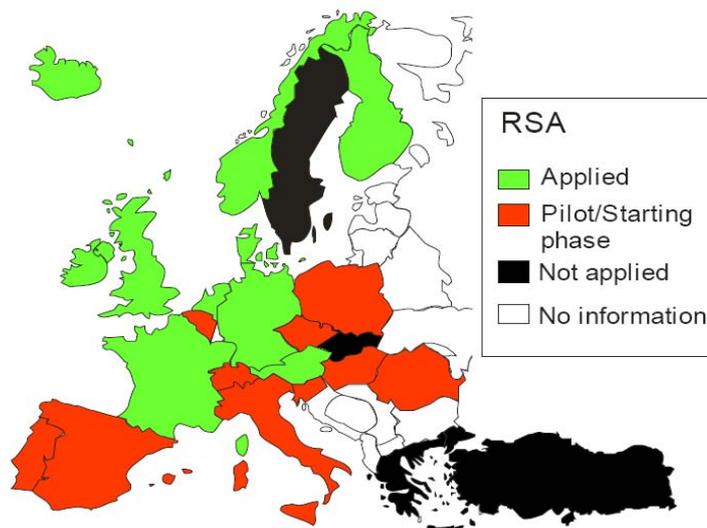
3. RSA – one of the suitable safety measures

Every year, about 40,000 people die in Europe as a consequence of road crashes. Many more are injured. While the number of deaths is falling, studies have shown that faster progress is possible if all effective measures are applied.

After enlargement of EU, the intensive effort to exchange the good practices in the field of road safety can be observed (e.g. great number of international road safety research projects) and new member states have an excellent opportunity to take over the proven procedures.

One of the well-established road safety procedures which can be taken over relatively easily is Road Safety Audit.

Figure 1: Current use (2005) of RSA in Europe (RIPCARD – ISEREST, 2006)



4. History of RSA

Road safety audit originates in an accident investigation. Modern road safety audits were established by British traffic engineers in the 1980's. The idea of safety audits, however, is older. The first procedures date back to the 19th century when senior army railway engineers were ordered to investigate the frequent occurring railway accidents. Based upon their findings, recommendations were made how to prevent similar accidents, and inspections had to be carried out before a railway line was opened (Proctor, 2001).

The procedures developed in the United Kingdom in the 1980's were adopted by many other countries around the world. Australia and New Zealand established RSA procedures in the early 1990's. After the United Kingdom, Denmark, Iceland and Norway were the first countries which introduced RSA procedures in Europe.

In the late 1990's a large number of countries began to show interest in RSA. Among others, these countries were Austria, Canada, France, Germany, Spain, USA etc.

5. Definition of RSA

Several different definitions of RSA exist throughout the world. According to PIARC, a Road Safety Audit is a "formal systematic road safety assessment of the road or road scheme carried out by an independent, qualified auditor or team of auditors who reports on the project's accident potential for all kinds of road users". Although the given definition also includes reviews of existing roads, the current international understanding of RSA refers to examinations conducted in the planning and the design stages of road project before or shortly after a road is opened to traffic or the measure is completed. Reviews of existing roads – without any planned measures – are called **Road Safety Inspections**.

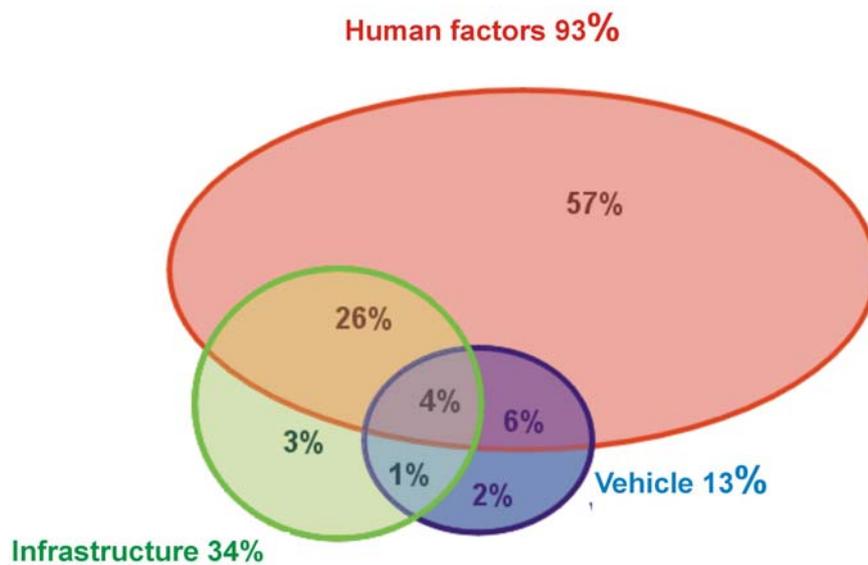
6. Reasons for carrying out RSA

In most countries, technical standards and design guidelines are applied when designing traffic scheme. These standards and guidelines naturally consider road safety issues. Despite this, accidents occur also on new roads, which are built according to the relevant standards.

This is caused by a number of reasons and factors. Design standards often contain minimum requirements regarding road safety and an inauspicious combination of design elements with minimum standards can lead to dangerous road layout. It is also not always possible to comply with the standards (e.g. in built-up areas or in difficult terrain). Furthermore, the final content of technical standards is mainly the result of compromise between professionals with different opinions, so not all safety issues are involved. Finally, the update of technical standards is a long-term process, so they do not contain the most recent road safety knowledge.

A correct behaviour of the road users is implied by most standards but, according to road safety studies, the human factors play the most important role in more than 90% of all road accidents.

Figure 2: Factors of accidents origins (PIARC, 2003)



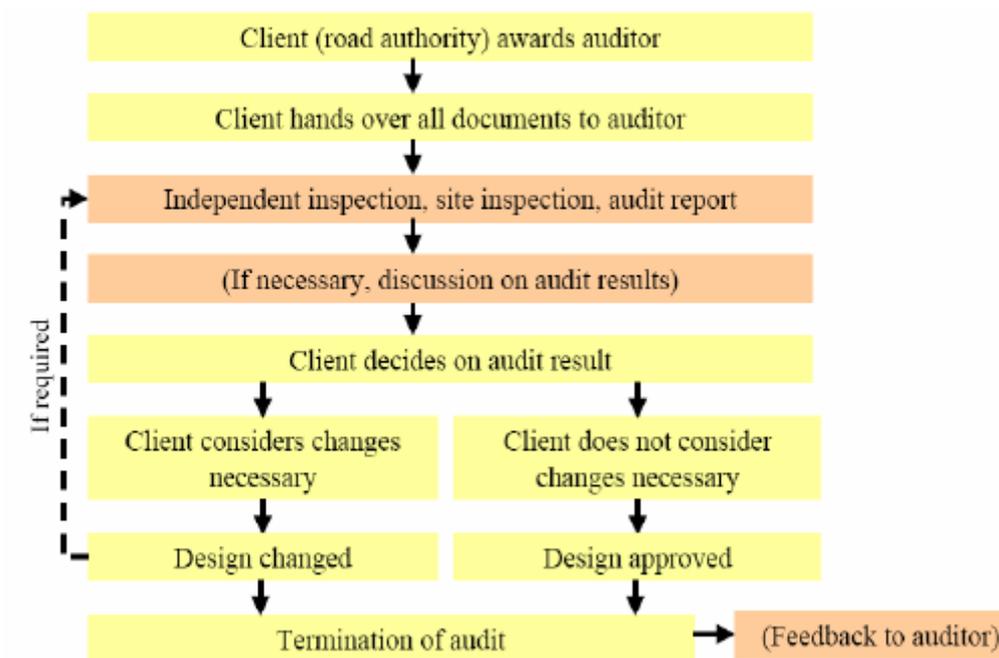
Therefore, road design does not only have to comply with standards but it must also consider human behaviour and the latest road safety research. Road Safety Audits are being carried out by specialists, experienced in road safety and traffic behaviour research to help road designers and road owners to design roads which are as safe as possible for **all road users**.

7. RSA in the Czech Republic

In the period between 1996 and 2000, a group of Czech traffic engineers, inspired by UK experience, elaborated the basic materials for the RSA implementation in the Czech Republic. This work has been done within the research project coordinated by the Transport Research Centre - CDV and has been based on EU project SAFESTAR. Methodology for conducting RSA was produced, the suggestion for Road Safety Audit Act was written and proposals were prepared for legislative changes in the relevant regulations. However, the results of this work were refused by the Ministry of Transport due to the decision-making, political and legislative barriers.

However, the methodology was tested and pilot audits were carried out by CDV in 2000 – 2005. The methodology intends audits to be carried out in the feasibility stage (1), the preliminary stage (2), the detailed design stage (3) and before the road is opened to traffic (4). The size of the audit teams depends on the projects. The principals and steps of RSA process are very similar to others used abroad (see Figure 3). The check lists are an integral part of the methodology.

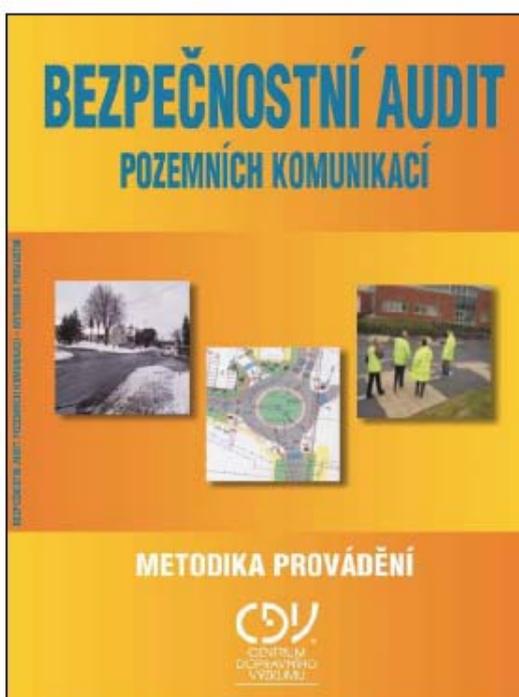
Figure 3: Typical step of RSA (RIPCORDER-ISEREST project, 2007)



There were about 35 road safety audits conducted by CDV for various clients in this period. The team of CDV auditors enlarged to 6 people. Four of them completed a road safety audit training course in the UK, at TMC Consultancy. The suggestions to put the principles of road safety audit into the legislation system have not been repeatedly accepted by the Ministry of Transport.

In the third period, since 2006 until today, RSA Methodology has been upgraded and published in spring 2006 and RSA has become just the voluntary used recommended road safety tool.

Figure 4: Cover of updated Guidelines for conducting RSA, CDV 2006



The accredited educational courses for state administration staff as well as for the independent professional public have been carried out by CDV during 2006 and 2007 with the support of the Ministry of Transport (a little bit of schizophrenia of Ministry of Transport can be observed when dealing with its approach to the RSA – it supports the courses but refused the legislative implementation of RSA). The potential audit clients and local authorities were the target group of these courses. More than 20 of these courses within an accredited educational program were organized and more than 600 participants were trained on principles of safe road infrastructure tools and details of road safety audit.

The training courses for road safety auditors were also prepared by CDV in 2006. 48 auditors were trained in two road safety audit training courses in 2006 and 19 auditors in spring 2007. The course contains from 2 parts. The potential auditor has to attend 3-day course regarding the general issues of road safety and subsequently 5-days detailed course regarding conducting RSA, with site visits, home works etc. The list and contacts of all auditors can be found on internet.

Figure 5: Attendants of RSA training course during site visit



8. A positive development?

The positive statement of the Ministry of Transport, saying that if RSA is conducted, it should be based on CDV Methodology, was published in the Bulletin of Transport No. 12, 7th June, 2006. This statement gives more credit to RSA and support the conducting the RSA.

CDV has been also involved in several international projects dealing with the problems of road safety audit, from which 6 RP EU project RIPCORD-ISEREST is the most important. Its conclusions were presented in autumn 2007 (see <http://www.ripcord-iserest.com/>). This international cooperation enables to introduce the latest knowledge about RSA and about safe infrastructure into the Czech Republic.

9. Evaluation of RSA process

Between 1997 and 2007 more than 70 road safety projects have been carried out by CDV. There have been more than 40 road safety audits carried out exactly according to the current methodology. The rest of the projects were partly evaluations, expertises or inspections. Compendium of projects reports forms a very important background material for RSA training courses, but also for upgrading the Methodology (2006). After the initial period road safety audits have been carried out routinely. Audits were carried out for various

clients. A significant proportion of RSA clients were private investors (often developers trying to join their properties to the existing road system), whose construction activities have been very intensive (and sometimes problematic) in the recent years. However, road safety audits are in many cases ordered only after some serious disproportions had occurred during preparation works.

Most of the audits were dealing with roundabouts schemes and traffic calming of through-passes. Most of RSA were conducted in stage 2 or 3. There was no audit carried out in stage 4, in Pre-opening phase. The acceptance of RSA findings has not been exactly evaluated, but it is obvious that the earlier stage the RSA is carried out in, the more recommendations of auditors are accepted. One of the main reasons of the non-existence of such precious evaluation is lack of feedback from designers or clients. The condition of written client's reaction on RSA finding should be pointed out in contract. The other problem is that there is no organization over helming the RSA, which could collect the audits clients' reports and evaluate them.

The conducting of RSA is not very time consuming, the average length of the whole process from first contact with client to creating the audit report is about 70 man-hours. The audit's recommendations are usually low-cost and in case of their acceptance by client the budget of whole project increases just minimal. The effect of conducted audits on number of prevented accident has not been evaluated yet in the Czech Republic. The main reason of that is the lack of necessary data. The number of RSA, which could be used for safety analyses, is very limited (the evaluated projects have to have similar traffic characteristics). Evaluated period after the implementing the audit's recommendation should be 3 years. Due to recent start of RSA in the Czech Republic (and due to the quality of accident data), there are only few projects that fulfil criterions for their safety effects evaluation.

The usage of checklist when carrying out RSA is not very popular between auditors, because they mostly rely on their own experience.

10. Evaluation of decision-making process

It is evident that even without support of Ministry of Transport it has been possible to implement the principles of RSA into design process. The whole implementation process can be described as "bottom-up" one, because the initiative has started from research institute and had no official support from decision-makers. As a result, RSA is a voluntary tool, which usage is based on the willingness of clients to order the conducting of audit or on the knowledge of local authorities, which are aware of usefulness of RSA and put the condition that RSA should be carried out on particular project into relevant project contracts. The voluntariness of carrying RSA limits its usage so CDV supports the mandatory application of RSA.

11. Practice example - RSA of Urban Roundabouts in the Czech Republic

Mostly traffic calming and roundabout schemes were audited by the team from CDV during the pilot audits. The following text describes the experience learned from RSA of urban roundabouts.

A typical Czech urban roundabout has four approaches, an inscribed diameter of up to 35m, and single approach, departure and circulating lanes. The main reason for implementing this form of intersection control is mostly the aim of increasing safety of all road users by decreasing speeds through and near the intersection, and reducing the number of potential collision points. Roundabouts have become quite popular in the last five years in the Czech Republic and more and more of them are installed on road network. Unfortunately, the

safety potential of most of them is reduced by design deficiencies, caused mainly by a lack of updated guidelines and many inexperienced designers.

Figure 6: Examples of Czech roundabouts. Left – Lázně Bohdaneč; right - Ždírec



The most common safety deficiencies identified during pilot audits were:

- Approach lanes too wide [auditor's recommendation: the width should be 3,75 – 4,00m in order to reduce approach speeds]
- Departure lanes too wide [auditor's recommendation: the width should be 4,00 – 5,00m, so that vehicles can leave the roundabout conveniently but without excessive acceleration towards the pedestrian crossings]
- Excessive width of the circulating lane [auditor's recommendation: the width should be reduced depending on diameter, in order to reduce unexpected driving behaviour and to reduce speed]

Absence of splitter islands on the approaches

- Pedestrian crossing situated too far from the roundabout [auditor's recommendation: move the pedestrian crossing up to 5-10 meters from the intersection]
- Apron missing or too narrow
- Too much visibility through the central island

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