Available online at www.sciencedirect.com

ScienceDirect

Transportation Research Procedia 3 (2014) 730 – 739

Transportation Research Procedia

www.elsevier.com/locate/procedia

17th Meeting of the EURO Working Group on Transportation, EWGT2014, 2-4 July 2014, Sevilla, Spain

Tools for road infrastructure safety management – Polish experiences

Kazimierz Jamroz[a], Marcin Budzyński[a], Wojciech Kustra[a], Lech Michalski[a]
Stanislaw Gaca[b]

[a]*Gdansk University of Technology, Civil & Environmental Engineering Faculty, Highway Engineering Department, 11 Narutowicza str, 80-232 Gdansk,*
[b]*Cracow University of Technology, Civil Engineering Faculty, Road Construction & Traffic Engineering Department 24 Warszawska str, 30-962 Cracow*

Abstract

The objective of road safety infrastructure management is to ensure that when roads are planned, designed, built and used road risks can be systematically identified, assessed, removed and mitigated. There are a number of approaches to road safety management. European Union Directive 2008/96/EC requires EU member states to use four basic tools of road safety infrastructure management. An overview of the methods in these countries shows a variety of approaches to how these tools are used in practice. The paper presents a systematics of these tools and a concept of how they could be developed in Poland. It looks at the life cycle of a road structure and the requirements of risk management processes. The paper focuses on elements of scientific support to help build the necessary tools. To help with assessing the impact of a road project on the safety of related roads, a method was developed for long-term forecasts of accidents and accident victims and accident cost estimation as well as a risk classification to identify risks that are not acceptable risks. With regard to road safety audits and road safety inspection, a set of principles was developed to identify risks and the basic classification of errors and omissions. In the case of road network safety management, measures of individual and societal risk were selected. A method for classifying dangerous road sections was developed as well. An estimation is given of the consequences and effects of applying the tools of road safety management on the network of national roads in Poland until 2020.

Selection and peer-review under responsibility of the Scientific Committee of EWGT2014

Keywords: road safety management, risk management, effectiveness of management tools

Selection and peer-review under responsibility of the Scientific Committee of EWGT2014
doi:10.1016/j.trpro.2014.10.052

1. Introduction

Road transport safety is significantly less developed than that of rail, water and air transport. The average individual risk of being a fatality in relation to the distance covered is thirty times higher in road transport that in the other modes. This is mainly because the different modes have a different approach to safety management and to the use of risk management methods and tools. Regardless of the type of transport, the key to successful safety management is a detailed risk analysis, thorough risk assessment, quantitative risk acceptance criteria, methods for selecting effective measures and on-going monitoring of the risks and communicating them. In recent years Poland has had one of the European Union's highest road death numbers. In 2012 there were 3574 fatalities on Polish roads with 45,800 injuries*. Protecting road users from the risk of injury and death should be given top priority. While Poland's national and regional road safety programmes address this problem and are instrumental in systematically reducing the number of casualties, the effects are far from the expectations. Modern approaches to safety focus on three integrated elements: infrastructure measures, safety management and safety culture (Burman and Evans, 2008). Due to its complexity, the process of road safety management requires modern tools to help with identifying road user risks, assess and evaluate the safety of road infrastructure and select effective measures to improve road safety. One possible tool for tackling this problem is the risk-based method for road infrastructure safety management. The objective of road infrastructure safety management is to apply procedures that will ensure that when road infrastructure is planned, designed, built and used road risks can be systematically identified, assessed for road user risks, removed and mitigated in terms of injuries, deaths and the economic costs of road accidents (Jamroz, 2011).

Road safety improvement is also a key objective of the European Union's transport policy. Its aim is to halve fatalities within the next decade and achieve Vision ZERO by the mid 21st century. One of the most important documents, which determines directions of road safety actions is EU Directive no. 2008/96/WE of 19 November 2008 on road infrastructure safety management (European Parliament, 2008). Many surveys and studies preceded development of the Directive assumptions, issues or outlines. One of the most important work, lying foundations of the future Directive, were surveys conducted by RIPCORD-ISEREST in the Sixth Framework Programme for Research and Technological Development in 2005-2008 (Ripcord-Iserest, 2005).

In other works or documents preceding the Directive implementation, we can also find issues connected to road safety management (Eenink et al., 2005; Elvik and Vaa, 2004; PIARC Technical Committee 18, 2004a, 2004b).

The Directive recommends that member states should use tools for managing road safety such as: road safety impact assessment (RIA), road safety audit (RSA), road safety ranking (RSR) and road safety inspection (RSI). While Poland is developing the legislation to implement the Directive, it will only cover national roads that are part of the TEN-T without equipping road authorities with the necessary tools. The specificity of Poland's roads and road user behaviour makes a direct adaptation of European research projects difficult (such as ROSEBUD, SafetyNET, DaCoTa, etc.). In an effort to meet the needs of Poland's road authorities (at the national, regional and local level) the Gdansk University of Technology (Department of Highway Engineering) in cooperation with the Krakow University of Technology (Department of Road Construction and Road Traffic Engineering) have developed several basic tools for managing road infrastructure safety in Poland (Budzynski et al., 2013, 2011). This work has added to the Polish experience of preparing and implementing such tools within the competent road authorities

2. Methodology basis

Safety management methods are developed primarily to help road authorities with decision-making on issues involving road safety, road infrastructure safety and reducing the costs of using road structures in their particular life cycles (Jamroz, 2011). It is agreed that risk management in highway engineering involves a formalised and repetitive procedure which integrates two stages: risk assessment and risk response with regard to the road structure

---

* *In Poland a road accident injury is when the person injured has had to stay in hospital for at least seven days.*