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Editorial

Letter from the Editors

The *Journal of Safety Research* is pleased to publish in this special issue the proceedings of several papers presented at the 4th International Conference on Road Safety and Simulation convened at Roma Tre University in Rome, Italy, October 2013. This conference serves as an interdisciplinary forum for the exchange of ideas, methodologies, research, and applications aimed at improving road safety globally.

Conference proceedings provide the opportunity for research in its formative stages to be shared, allowing our readers to gain early insights in the type of work currently being conducted and for the researchers to receive valuable feedback to help inform ongoing activities. This conference in particular offers an array of research topics not often covered by this journal from researchers practicing in over 11 countries. As is common with publishing conference proceedings, the papers published in this issue did not go through the normal *JSR* review process. Each paper included in this issue did meet the Road Safety and Simulation conference review requirements. They reflect varying degrees of scientific rigor, methodological design, and groundbreaking application.

The proceedings published in this special issue of *JSR* draw from the following road safety research sectors represented at the conference: driving simulation, crash causality, naturalistic driving, and new research methods.

It is our hope that the publication of these important proceedings will stimulate vigorous dialogue, rigorous research, and continuing innovative initiatives and applications, leading, ultimately, to fewer traffic fatalities, injuries, and crashes.

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Analyzing road design risk factors for run-off-road crashes in the Netherlands with crash prediction models

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ABSTRACT

Problem: About 50% of all road traffic fatalities and 30% of all traffic injuries in the Netherlands take place on rural roads with a speed limit of 80 km/h. About 50% of these crashes are run-off-road (ROR) crashes. To reduce the number of crashes on this road type, attention should be put on improving the safety of the infrastructure of this road type. With the development of a crash prediction model for ROR crashes on rural roads with a speed limit of 80 km/h, this study aims at making a start in providing the necessary new tools for a proactive road safety policy to road administrators in the Netherlands. *Method:* The paper presents a basic framework of the model development, comprising a problem description, the data used, and the method for developing the model. The model is developed with the utilization of generalized linear modeling in SAS, using the Negative Binomial probability distribution. A stepwise approach is used by adding one variable at a time, which forms the basis for striving for a parsimonious model and the evaluation of the model. The likelihood ratio test and the Akaike information criterion are used to assess the model fit, and parameter estimations are compared with literature findings to check for consistency. *Results:* The results comprise two important outcomes. One is a crash prediction model (CPM) to estimate the relative safety of rural roads with a speed limit of 80 km/h in a network. The other is a small set of estimated effects of traffic volume and road characteristics on ROR crash frequencies. *Practical applications:* The results may lead to adjustments of the road design guidelines in the Netherlands and to further research on the quantification of risk factors with crash prediction models.

1. Introduction

1.1. Background

About 50% of all crashes resulting in fatalities and 30% of all crashes resulting in severe injuries[1] in the Netherlands take place on rural main roads with a speed limit of 80 km/h (further referred to as rural roads). Since these roads account for only a relatively small portion of the total road network, these roads are seen as the most unsafe roads in the Netherlands. Furthermore most of the crashes take place on a road section and about 50% of these crashes are run-off-road (ROR) crashes.

An important aspect in reducing the amount of crashes on rural roads is the improvement of the safety of both existing and new roads. This is the task and the responsibility of road administrators. There are some obstacles, however, that need to be overcome to enable an efficient and proactive policy by road administrators on the improvement of traffic safety on rural roads.

First of all, road administrators face a limited budget for the implementation of safety measures. Second, traditional black spots fall short in supporting a proactive traffic safety policy since they are unable to identify potential hazardous road stretches in case of low crash frequencies. Such is the case on these roads with an average of 0.5 crashes per kilometer. Third of all, there is a lack of knowledge with respect to the quantitative relation between traffic safety and the cross sectional road design elements and traffic safety measures. This becomes apparent in the Dutch road design guidelines of rural roads, where only few of the guidelines are quantitatively related to crashes.

1.2. Crash prediction models

To enable an efficient allocation of tight resources, new knowledge and instruments are needed for the detection of unsafe road sections and for the estimation of the effects of safety (design) measures. Crash prediction models (CPMs) can be used to estimate the crash frequency on road section related to the traffic flow, road length, and risk factors such as cross sectional design elements (further referred to as road characteristics). These models can help in investigating the quantitative relations between road characteristics and crashes; they can be used for identifying relative unsafe road section in a network and for estimating the effects of the implementation of safety measures on a road section.

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[1] A severe injury is defined as an injury with a maximum abbreviated injury score (MAIS) score of MAIS = 2 or higher. A severe accident is defined as an accident where the MAIS of one of the actors is MAIS = 2 or higher

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