



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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The influence of clear zone size and roadside vegetation on driver behavior

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ABSTRACT

Introduction: Roadside vegetation provides numerous environmental and psychological benefits to drivers. Previous studies have shown that natural landscapes can effectively lower crash rates and cause less frustration and stress to the driver. However, run-off-the-road crashes resulting in a collision with a tree are twice as likely to result in a fatality, reinforcing the need to examine the placement of vegetation within the clear zone. **Method:** This study explores the relationship between the size of the clear zone and the presence of roadside vegetation on vehicle speed and lateral position. A static evaluation, distributed electronically to 100 licensed drivers, was utilized to gather speed selections for both real and virtual roads containing four combinations of clear zone sizes and roadside vegetation densities. A case study was included in the static evaluation to investigate the presence of utility poles near the edge of the road on speed selection. Validation of the static evaluation was performed by a field data collection on the same roadways shown to participants in the evaluation. **Results:** The speeds observed in the field for roadways with medium clear zone/dense vegetation or large clear zone/spare vegetation correlated with the speeds chosen by static evaluation participants. Further field data were obtained on vehicle speeds and lateral positions for additional roads demonstrating the same clear zone size/vegetation density combinations. **Practical application:** This study successfully demonstrates the relationship between clear zone design and driver behavior, which could improve clear zone design practices and thus roadway safety.

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1. Introduction

Positive psychological implications such as reduced stress, decreased road rage, alleviated depression, and expedited recovery from injuries have been associated with natural environments (Cackowski & Nasar, 2003; Naderi, 2003; Parsons, Tassinari, Ulrich, Hebl, & Frossman-Alexander, 1998). While trees provide psychological and environmental benefits, they do pose a potential risk to drivers when placed within proximity to the traveled way. Crashes with fixed objects such as trees account for an estimated 1.9% of all crashes and 46% of crashes with fixed objects are fatal (Dixon & Wolf, 2007).

Trees in particular are often present within a clear zone due to the high cost of removal. As described by AASHTO, the clear zone, a design element on both local and collector roads, is intended to provide a recovery area for errant vehicles and should be a minimum of 7 and

10 ft (2.1 m and 3 m) on roads with and without a curb, respectively (AASHTO, 2004). However, implementation of a proper clear zone is usually hindered by the cost of right of way purchase and tree removal. Trees left within the clear zone increase the likelihood of a fixed object collision in the event of a run-off-the-road crash, therefore decreasing the safety of the road.

Previous studies have emphasized the safety implications of roadway vegetation. A comparison of suburban and urban streets via a driving simulator demonstrated a mean speed reduction of 3.02 mph (4.86 kph) when trees were present along the suburban landscape (Naderi, Kweon, & Maghelal, 2006; Naderi, Kweon, & Maghelal, 2008). Additionally, suburban roadways were perceived to be the safest and the presence of trees aided drivers with sensing the edge of the road. Zhao and Rong (2013) varied the frequency of roadside vegetation during a driving simulator study to determine an optimal spacing of roadside vegetation to keep drivers alert, which was shown to be between 5 and 10 km (3.1 and 6.2 miles) (Zhao & Rong, 2013). A driving simulator study by Bella and Tulini (2010) demonstrated no lateral position change when trees were close to the edge of the road and no guard rails were present (Bella & Tulini, 2010). This observation indicates that drivers did not view trees as hazardous due to the lack of danger presented in a virtual drive, thus performing a field study

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