

# ADVANCES IN TRANSPORTATION STUDIES

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Alessandro Calvi

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## Editorial

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This Special Issue reports on papers covering a wide range of research topics, provides a collection of new approaches and methods and gives an interesting overview of the current and innovative research in the fields of traffic behavior and management, road design and safety.

The seven papers included in this volume address: the evaluation of the stopping sight distance using two different innovative approaches, taking into account trucks' characteristics, the first, and using the 3D configuration of a road, in the second paper; the investigation of driver's lane changing behavior under different traffic conditions; the proposal of a new traffic congestion measure for freeways; the assessment of gap-acceptance behavior using a microscopic approach; the relationships between drivers behavior and accident involvement; the suggestion of a method of traffic assignment that takes into account air quality constraints.

More specifically a brief description of the papers published in this Special Issue follows:

*“Review and evaluation of stopping sight distance design - cars vs. trucks”*

This paper, after a review of the design standard related to the stopping sight distance, traditionally based on passenger cars parameters, and an analysis of the need for trucks' features in addition to the values for cars, includes in the design process for the evaluation of the stopping sight distance the trucks characteristics, such as braking system and driver eye height, specifically for crest and sag vertical curves. Recommended truck stopping sight distance design values have been supplemented.

*“Continuous three dimensional Stopping Sight Distance control on crest vertical curves”*

This study proposes an accurate method for the evaluation of the stopping sight distance that relates the 3D configuration of a roadway (for both existing and new road sections) to the dynamics of a vehicle moving along the actual roadway path, based on the difference between the provided (defined from the mass point model adopted by AASHTO enriched by the actual values of grade and friction variation) and the demanded (described as the 3D driver's line of sight towards the object height) stopping sight distance.

*“An investigation of lane changing parameters on an urban arterial for different traffic congestion levels”*

In this study the changes in accepted gaps and lane change duration on an urban arterial under free flow, recurrent, and non-recurrent traffic conditions are explored. The results of the study indicate that degree of frustration may be a reason for drivers accepting smaller gaps during congested traffic conditions. The findings from this study have direct implications on the lane changing parameters (accepted gaps and lane change duration) used in microscopic traffic simulation specifically for an urban arterial under different traffic conditions.

*“A new, comprehensive, congestion measure for freeways”*

This paper develops a new and objective measure, defined as the Critical Occupancy Point (COP), to evaluate freeway congestion, based on the evaluation of the change in occupancy vs. speed and the identification of the point where congestion begins. The methodology, applied to a freeway in Israel, demonstrates that each segment provides different congestion characteristics and that COP is able to identify recurrent and non-recurrent congestion and the breakdown before it actually occurs.

*“Estimation of critical headways at unsignalized intersections - a microscopic approach”*

An alternative estimation method for the assessment of gap-acceptance behaviour is proposed in this paper. The method is based on the interactions between the entry and opposing vehicles, described at microscopic level. The model is calibrated and validated among several case studies with different geometric and traffic characteristics. The resulting estimates are close to the results of conventional estimation methods, suggesting that the proposed model is a promising alternative to field observations, particularly for the study of non-conventional intersections.

*“Aberrant driving behaviours in two Maghreb countries: Tunisia and Algeria”*

This study investigates the factorial structure of the Driver Behaviour Questionnaire (DBQ) in Tunisia and Algeria, and examines the relationship between the factors of the DBQ and accident involvement. The results of this study describe the aberrant driving behaviour in both countries, analysing the characteristic features of drivers, and permit to clarify how driving behaviour can be taken into account during a driving competency evaluation in order to develop relevant remediation actions.

*“A convex approach to traffic assignment problem under air quality constraints for planning purposes”*

This paper presents a method to assign traffic in an urban network considering constraints of both travel time and air quality. Specifically the proposed approach can not only provide the emission concentration for any location in the study area, but also demonstrate its capability of solving a traffic assignment problem in a large scale network for planning purposes. The results demonstrate that with this traffic assignment approach air quality can be improved without causing much worsening of conventional operation performance measures.