

International Symposium on Enhancing Highway Performance
7th International Symposium on Highway Capacity and Quality of Service
3rd International Symposium on Freeway and Tollway Operations

June 14 – 16, 2016, Berlin, Germany

Rural Roads Workshop

Friday June 17th 9:00 AM–3:00 PM

Manuel Romana (University of Madrid) and Scott Washburn (University of Florida)

Summary:

Most of the rural transportation system is composed of two-lane highways; and many of them serve as the primary means for rural access to urban areas and freeways. The current capacity and operational performance analysis methods and models for two-lane highways in the Highway Capacity Manual are dated and limited to homogenous segments that do not account for the variations in route operational characteristics. Moreover, U.S. current tools to evaluate existing and proposed designs are inadequate to analyze two-lane highway service in complex circumstances; or alternative road designs, such as the common 2+1 highway e.g. in Sweden, Denmark, or Germany. This type of highway is used in Europe to provide high performance highways as intermediate solution between the common two-lane highway and the freeway. The designer choice on length and spacing of the overtaking lanes accounts for even more variations in route operational characteristics and increases the need for more reliable simulation tools. This is especially the case, if two-lane highways are enlarged to 2+1 highways on a step-by-step basis.

The objective of this workshop is to present the latest research results in 2-lane highways in the Highway Capacity Manual context, the latest practice in 2+1 highways in Europe, and current simulation tools for rural highways.

Firstly, the advances on the ongoing NCHRP 17-65 project “Improved Analysis of Two-Lane Highway Capacity and Operational Performance” will be presented. The objective of this research is to (1) develop performance measures for operational and capacity analyses of two-lane highways and develop models to produce these performance measures in a HCM context, and (2) develop or modify a simulation-based analysis method for two-lane highways and offer guidance for when to apply a simulation versus HCM methods.

Secondly, European experience on the widening of two-lane highways to 2+1 highways will be presented. 2+1 highways are meant to provide a continuous three-lane cross-section with its central lane used as passing lane alternatively for each direction. They can serve as an alternative design for higher volumes when widening from two-lane to four-lane highways or freeways is not practical due to environmental concerns or high costs. Successful experiences reported in Germany, Sweden, Finland, Denmark, or Texas (U.S.) may suggest that they are potentially applicable nationwide or in other countries. The German Highway Capacity Manual HBS 2015 provides performance analysis methods for two-lane highways as well as for 2+1 highways. Operational and safety experience from European 2+1 highways will be summarized.

Finally, most of the operational and capacity analysis methods of rural highways rely on traffic micro-simulation. Some specific simulation programs, such as TWOPAS, TRARR, LASI or LASI2+1 have been used to develop the analysis method, although there are no longer supported and cannot provide as output alternative performance measures. During the last decade, some simulation programs have incorporated the ability to pass considering the opposing traffic (AIMSUN, CORSIM, Paramics, SwashSim, VISSIM). However, they usually lack of field data to adequately calibrate passing behavior or desired speed on horizontal curves. Guidance on the calibration and validation of simulation programs for two-lane highways will be provided.

Program:

9:00 Introduction and Overview

Manuel Romana, University of Madrid

Scott Washburn, University of Florida, Gainesville

9:15 – 10:15 AM: Two-Lane Highways

- NCHRP Project 17-65 Overview

Scott Washburn, University of Florida, Gainesville

10:30 AM – 12:30 PM: From Two-Lane Highways to 2+1 Rural Highways

- Two-Lane and 2+1 Highways in the German HBS 2015

Frank Weiser, Brilon Bondzio Weiser Ingenieurgesellschaft für Verkehrswesen mbH,
Bochum

- Design, Capacity and Traffic safety of 2+1 roads in Sweden

Per Strömngren, Movea Trafikkonsult AB, Stockholm

Torsten Bergh, Movea Trafikkonsult AB

- Danish 2+1 roads, Traffic safety, design and capacity with main focus on capacity

Poul Greibe, Trafitec, Kopenhagen

- Introducing a new type of road: the point of view of Administrations, the case of Navarra and Madrid in Spain

Rafael Diez de Arizaleta, Comunidad Foral de Navarra, Spain

Miguel Nunez, Comunidad de Madrid, Spain

1:30 – 2:30 PM: Micro-Simulation of Rural Roads

- Simulation of rural highways with VISSIM

Jochen Lohmiller, PTV Group, Karlsruhe

- Simulation of rural highways with AIMSUN

Annique Lenorzer, TSS, Barcelona

Ana Moreno, Technical University of Munich

2:30 – 3:00 PM: Final Discussion and Conclusions (Manuel Romana and Scott Washburn)