

Improving Work Zone Planning & Capacity

(STRIDE Project B2: Evaluation of Work Zone Mobility by Utilizing Naturalistic Driving Study Data)

PROJECT OVERVIEW

As the National Highway System grows older, an increasing number of work zones have been implemented to address the growing needs of maintenance and construction. However, reduced operating speeds, narrowed lane width and shoulder clearance, and other construction activities, have not only resulted in crashes but also caused excessive delays.

Although the freeway work zone capacity methodology proposed in the latest edition of the Highway Capacity Manual (HCM) has been substantially improved over previous editions, it is still limited by the macroscopic model, which cannot account for various work zone configurations. Naturalistic driving study (NDS) data offer a unique opportunity to observe actual driver behaviors negotiating various freeway work zones under different traffic conditions.

RESEARCH GOALS

A one-year proof-of-concept study evaluated if existing NDS work zone data collected by the second Strategic Highway Research Program (SHRP2) could be reused to develop new (or update existing) capacity and traffic flow models for work zones.

FINDINGS

Results suggest the capacities predicted by HCM are lower than that by NDS regression models. This implies the additional parameters (such as headway selection by different drivers) should be developed to improve operational analysis of work zone traffic flow by the existing planning and simulation tools.

Phase II of the project is currently ongoing and will collect more NDS data for developing new methods for work zone capacity analysis and calibrating work zone planning and simulation tools. More information can be found on Phase II at <https://stride.ce.ufl.edu/project-13/>.

IMPACTS

First project to use Naturalistic Driving Study (NDS) data to study car following and traffic flow modeling at work zones.

Preliminary headway table can be used to improve the existing work zone planning and capacity analysis tools.

Speed-flow-density relationship models from NDS data can be applied to future connected vehicle studies.

WHO BENEFITS?

- State Departments of Transportation
- Local transportation agencies

RESEARCH TEAM

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PRODUCT

Preliminary Headway Table for Traffic Simulation Software

Naturalistic Driving Study (NDS) work zone data was reused to develop new (or update existing) capacity and traffic flow models for work zones.

The free-flow speeds predicted from NDS models for specific work zone configurations can be used to improve or calibrate the planning and simulation tools. In addition, time and space headway and their relations with driver characteristics is useful to estimate the work zone capacity at the planning level. For example, free-flow speeds and headway distribution by different driver characteristics can be calibrated in VISSIM to provide better prediction of work zone capacity.

The speed-flow-density relationship models from NDS data can be applied to future connected vehicle studies, as the NDS data contain the kinematics of the participant vehicle and the front vehicle, which can be treated as a small moving segment. This is similar to the connected vehicle environment.

State Departments of Transportation (DOTs) and transportation agencies can use the preliminary headway table to better understand work zone traffic flow distribution and to plan construction with least traffic impact.

For more information on Project B2 (Evaluation of Work Zone Mobility by Utilizing Naturalistic Driving Study Data), visit <https://stride.ce.ufl.edu/project-b2/>

About STRIDE

The [Southeastern Transportation Research, Innovation, Development & Education Center](#) (STRIDE) is the 2016 Region 4 (Southeast) U.S. Department of Transportation University Transportation Center headquartered at the [University of Florida Transportation Institute](#) (UFTI).

