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Evaluation of Left Shoulder as Part-Time Travel Lane Design Alternatives and Transportation Management Center Staff Training Module Development

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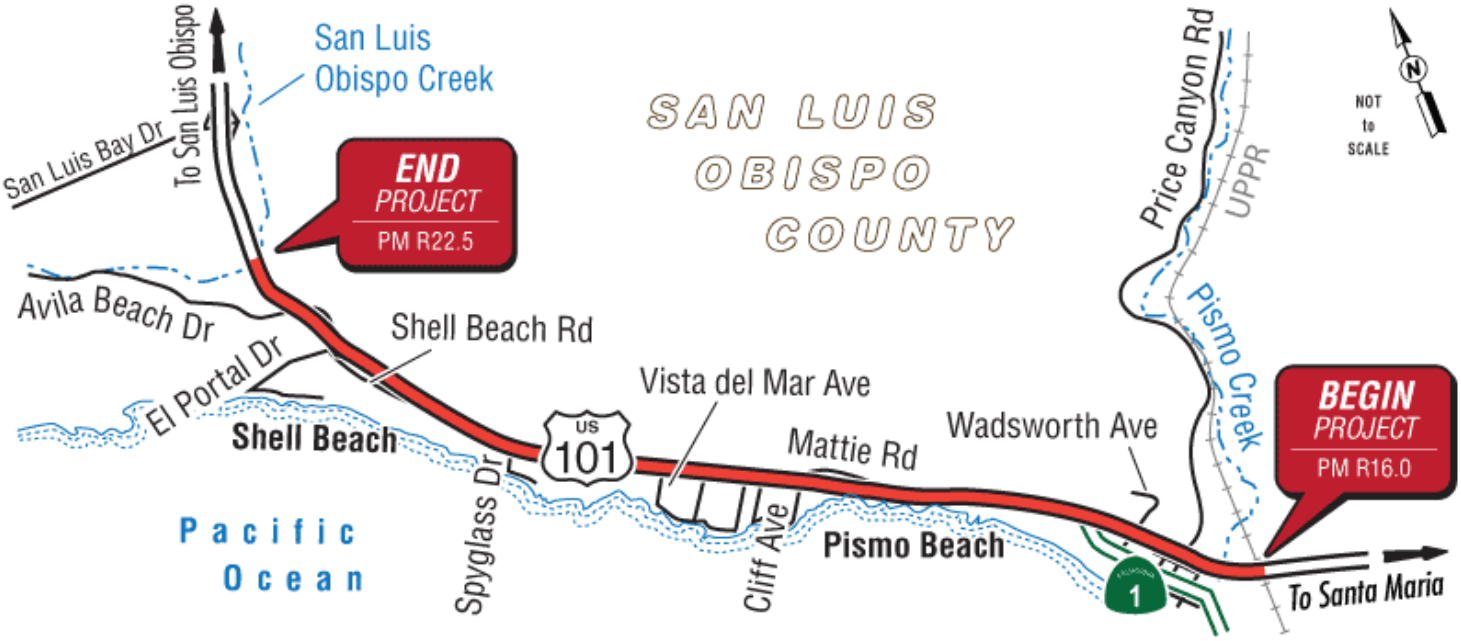

Introduction

Part-time shoulder use during peak hour traffic conditions is an alternative to expensive permanent freeway capacity expansions. Caltrans District 5 is pursuing this strategy on US 101 corridor as part of the planned Five Cities Multimodal Transportation Network Enhancement Project in San Luis Obispo County, California. The project involves piloting the part-time use of the left shoulder, which is less common than the use of the right shoulder, and would be the first such project in the state. Future use of this strategy in the state depends on the outcomes of this pilot project. This research established frameworks for evaluating potential design alternatives for operation and safety and to train the TMC (Transportation Management Center) personnel to operate the left shoulder as a part-time lane.

Study Methods

The study used detailed traffic patterns and roadway geometry data to model the US 101 corridor in a microsimulation environment. The output from simulation models was used to assess the effectiveness of design alternatives proposed by the stakeholders. The measures of effectiveness included travel time as well as surrogate safety measures estimated using detailed vehicle trajectories from the simulation. The simulation models also provided traffic input for the TMC personnel training module development. Cal Poly's TMC simulator was used to create realistic scenarios for training the TMC personnel for the day-to-day operation of the left shoulder as a part-time travel lane.

Findings

The study showed the effectiveness of a microsimulation-based approach in evaluating design alternatives for operational measures (e.g., travel time

or maximum queue lengths) and safety. The safety evaluation of the alternatives for planned installations should be based on surrogate safety measures involving vehicle trajectory data generated by the microsimulation model through the Surrogate Safety Assessment Model (SSAM) developed by FHWA (Federal Highway Administration). Most agencies, including Caltrans, already use microsimulation to assess the operational benefits (e.g., in the form of travel time savings) of future ITS projects. This project documents that a simulation-based approach is viable for operational and safety evaluations of future part-time use of the shoulder.

The study also found that the training provided to TMC operators, specifically to operate part-time use of the shoulder as a travel lane, is not well-documented in publicly available reports or published peer-reviewed articles. The training modules for TMC personnel developed with a microsimulation model as input can support agencies' Transportation System Management and Operations goals.

Part-time use of the shoulder during peak hours may be a viable alternative to permanent freeway widening in many contexts.

Policy Recommendations

The study showed the effectiveness of a microsimulation-based approach in evaluating design alternatives for operational measures (e.g., travel time) and safety. The authors recommend the analysis of vehicle trajectory data generated by the microsimulation model through the SSAM for the safety evaluation of future alternatives. Training programs for TMC staff should also be developed to increase the efficacy of strategies such as part-time use of the shoulder lane. The authors recommend that as the final project moves closer to implementation, details of the project should be more precisely incorporated in the hands-on element of the training module.

About the Authors

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To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/research/2153

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