Summary of Final Report, Contract BD545-23
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THE ROADWAY FACILITY BICYCLE LOS: LINKING THE SEGMENT AND INTERSECTION MODELS

BACKGROUND

In 2000, the Department adopted the operational Bicycle LOS Model for the segment portions of the roadway facility. In 2002, the Department completed the development of an intersection bicycle LOS model for through bicycle movements. These two models provide important and reliable insight into the two major features of bicycle travel: road segments and intersections, and have proven useful to transportation professionals throughout Florida and across the nation.. However, there was no method available to link these models together to confidently measure bicycle travel along a roadway facility.

Consequently, a Bicycle LOS model was needed for several reasons. First, most of the analysis and planning of Florida's collector and arterial roadway system is conducted at the facility level, and concurrency management systems, development impact assessment, mitigation measure identification, Work Program, Capital Improvement Programs, and Transportation Improvement Program (TIP) developments are accomplished considering the facility analysis level results. Second, during more detailed analysis, planning, and design of transportation facilities, route alternatives for the bicycle mode cannot be accurately measured and evaluated without a statistically reliable method of combining the segment and intersection components. Finally, the successful development of a facility-level model can provide insight and, potentially, verify the current assumption of multiple segment LOS weighting within FDOT's Multi-Modal Q/LOS Manual.

OBJECTIVES

The overall goal of this research was to create a user-calibrated method which could be used to rate a wide range of arterial roadway conditions for how well they serve the bicycle mode. The research used a video simulation methodology to represent the more extreme traffic conditions found on some arterial roadways. This methodology required developing, testing, and refining a moving camera filming platform configuration to do the following:

- Portray the full range of roadway conditions.
- Accurately simulate a bike ride along an arterial.
- Allow extended viewing by study participants.
- Ensure the safety of the videographer/bicyclist filming the simulation.
- Ensure motorists' passing behaviors are not changed.

FINDINGS AND CONCLUSIONS

The researchers developed a model that accurately predicts how bicyclists perceive arterial roadways. The Bicycle LOS for Arterials model is based upon Pearson correlation analyses, stepwise regression, and PROBIT modeling of approximately 700 combined real-time perceptions (observations) from bicyclists riding a course along arterial roadways. An additional 700 combined perceptions obtained from the participants viewing a video simulation were used to refine the model for arterial roadways. The study participants represented a cross section of age, gender, riding experience, and residency. The Bicycle LOS for Arterials model provides a measure of the bicyclist's perspective on how well an arterial roadway's geometric and operational characteristics meets his/her needs. This model is highly reliable, has a high correlation coefficient (R^2=0.72) with the average observations, and is transferable to the vast majority of metropolitan areas throughout Florida and the United States.

BENEFITS

This research resulted in the development of a user-calibrated model that predicts how well bicyclists perceive arterial roadways to meet their needs. These results will be incorporated into FDOT's *2002 Quality/Level of Service Handbook* for use by FDOT, MPOs, and communities around the state.

The simulation video platform and protocol developed during this effort appears to have wide potential for professionals in the bicycle engineering, planning, and educational fields. Because of its high fidelity to the roadway environment and the portability of the project, this simulation methodology can be used to evaluate any number of roadway/path cross sections and traffic conditions to determine their effect on the perceptions and safety of bicyclists. Using this methodology, it is possible to represent roadway conditions without putting subjects into actual traffic. The portability of the simulation methodology means that study subjects from across the United States can be exposed to identical roadway conditions. It has already been used to provide simulation video for the current NCHRP Project 3-70 Level of Service for Arterial Roadways project.

The researchers found the simulation methodology to be an excellent method for documenting motorist/bicyclist conflicts on roadways and sidewalks. Because of its low impact on motorists' behaviors, the researchers were able to film conflicts and riding conditions that occur for cyclists riding with traffic on the roadway and for those riding against traffic on sidewalks. Additionally, FDOT and the University of Florida have used this methodology to evaluate bicycle facilities in construction zones, and the simulations filmed in that effort have been shown to engineers and students to demonstrate the impacts of design on bicyclists.

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