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Evaluating Transportation Systems Management & Operations (TSM&O) Benefits to Alternative Intersection Treatments

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Five lanes of traffic, three through lanes, and two left-turn lanes wait for a signal to change.

Current Situation

The Florida Department of Transportation (FDOT) has set a goal to optimize existing infrastructure to improve safety, capacity, and reliability while reducing congestion and delays. FDOT is pursuing this goal through Transportation Systems Management and Operations (TSM&O), a program of strategies to improve the performance of multimodal structures.

TSM&O offers strategies to a common interruption of traffic flow: left-turn movements. Traffic flows must be regularly interrupted to allow cross-street traffic to proceed and to allow left turns onto the cross street. Overpasses can be utilized to separate some of these conflicting movements, but left turns must still be provided at street level.

Research Objectives

In this project, University of Central Florida researchers evaluated alternative intersection treatments that reduce or eliminate left-turn conflicts at intersections.

Project Activities

The seven alternative intersection treatments evaluated in the project were the continuous flow intersection, the diverging diamond interchange, the double crossover intersection, the median U-turn, the restricted crossing U-turn, the quadrant roadway intersection, and roundabouts. Studies showed that these designs outperform most conventional intersections and enhance traffic flow. Novel traffic routing in the designs may complicate navigation for pedestrians and bicyclists, so access and safety for these users were top priorities during evaluation.

Alternative intersection treatments were evaluated in two phases. First, the operation of each treatment was described, followed up with a brief description of analyses and their results in terms of performance measures, further studies and reports, and best practices. Second, an in-depth analysis of each treatment was conducted with additional attention to pedestrians and bicyclists. Due to the new configurations of these treatments, the researchers also considered wayfinding strategies, including signage, lighting, and striping, to assist drivers, pedestrians, and bicyclists. This was followed by a benefit-to-cost ratio analysis.

In the final section, researchers considered Florida intersections that are potential candidates for alternative treatments, for example, the intersection of Osceola Parkway and US-441 in Orlando, which includes multiple thru and left-turn lanes in all directions, and which, as a major east-west, north-south intersection is subject to significant delays. These potential pilot projects were analyzed using the same outline as the in-depth analysis.

Project Benefits

Alternative intersection treatments which eliminate left-turn phases reduce traffic conflicts and traffic stoppage, offering cost-effective safety and efficiency benefits for existing roadways.

For more information, please see dot.state.fl.us/research-center