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Enhancing and Generalizing the Two-Level Screening Approach Incorporating the Highway Safety Manual (HSM) Methods, Phase 2

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Current Situation

With tens of thousands of miles of roadways in Florida, prioritization systems are important to assure that limited funds are spent where they will do the most good. The examination and prioritization of high crash locations is now conducted on an intersection or road segment basis. Large-scale safety analysis can be cumbersome and time-consuming.

Research Objectives

University of Central Florida researchers developed a novel method to locate hotspots and hot zones, locations where a higher than average number of collisions take place and which should be prioritized for investigation and intervention by transportation planners.

Project Activities

The *Highway Safety Manual* (HSM; American Association of State Highway and Transportation Officials) provides tools for screening roadway networks to locate high risk areas. HSM tools are based on microscopic methods, analyzing traffic on the level of individual vehicles. The researchers employed these procedures and extended them to the macroscopic level, where traffic is analyzed on a cumulative level, considering the flow, speed, and density of traffic. The scale of macroscopic methods requires the definition of zones – traffic analysis zones, or TAZs – on a traffic network. This has specific disadvantages, but the researchers overcame these limitations in two ways. First, they developed a new study unit, the traffic safety analysis zone (TSAZ), which combines TAZs with similar crash rates. Second, they considered larger geographic units, such as traffic analysis districts (TADs) and counties.

Using these methods, the research team derived safety performance functions (SPFs), a quantitative measure of how safe a roadway is. At the macro level, 204 SPFs were developed for 17 crash types, and contributing factors for each crash type were identified. At the micro-level, 404 Florida-specific SPFs were estimated for 13 road segment types and 16 intersection types.

It was found that statewide TAZs are the optimal zone system for analyzing non-motorized crashes such as pedestrian and bicycle crashes whereas TADs were found to be the best geographic unit for all other crash types. Zones were ranked in subsequent screening analysis at micro and macro levels using HSM tools to estimate the potential for safety improvement. Using TAZ and TAD screening in sequence could be suggested as a simple way to identify high risk locations. Screening results from the two levels were compiled in Excel spreadsheets for convenient use, providing a comprehensive perspective on appropriate traffic safety plans and helping practitioners screen and rank any area, segment, or intersection in the state.

Project Benefits

Better identification and prioritization of areas with higher than average collision rates will allow planners to find solutions that lower collision rates and make Florida's roads safer.

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



Intersections are often a hotspot for collisions. Screening tools help planners quantify which areas need their attention the most.