PEDESTRIAN MID-BLOCK CROSSING DIFFICULTY

PROBLEM STATEMENT

The Florida Department of Transportation (FDOT) recently initiated a Multimodal Quality of Service Program to improve the methodologies contained in its *Level of Service Handbook* and ART_PLAN software so that they can be used to evaluate arterial level of service from a multimodal perspective. This initiative was motivated by two factors. First, at the national level, the Transportation Equity Act for the 21st Century (TEA-21) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) have led to a national desire to know the levels of service for automobile users as well as for transit users, pedestrians, and bicyclists. Second, at the state level, the Florida legislature in 1999 passed the *Urban Infill and Redevelopment Act*, which requires that local governments use professionally accepted methodologies for measuring multimodal level of service. It also requires that FDOT develop these methodologies and provide technical assistance in their applications.

The FDOT has already developed or adopted methodologies for evaluating transit level of service, bicycle level of service for riding along roadways, and pedestrian level of service for walking along roadways. Currently, however, there are no known methodologies for evaluating pedestrian level of service for crossing streets at mid-block locations.

OBJECTIVES

The objective of this research was to develop a pedestrian level of service methodology for street crossing at mid-block locations. It should be capable of providing a measure of effectiveness that indicates pedestrians' perceived quality of service in crossing roads at mid-block locations. This measure of effectiveness could then be converted to a level of service designation. The methodology should be generally consistent with other level of service methodologies being developed as part of FDOT's Multimodal Quality of Service Program.

Researchers used a statistical calibration and validation process, which involved collecting actual site characteristics and stated levels of quality of service by a sample of persons at a sample of sites, to determine the variables that correlated with pedestrians' perceived quality of service for mid-block crossing. These variables included those that were most important to the FDOT and local governments for improving pedestrian mobility, safety, and livability.

FINDINGS AND CONCLUSIONS

This project developed an issue paper that described the research design in terms of data needs, data collection, and statistical modeling of pedestrian quality of service for crossing streets at mid-block locations. In addition, the issue paper described background information in detail and outlined the various approaches that the FDOT could use to establish a pedestrian level of service methodology for crossing streets at mid-block locations.

Based on a comprehensive statistical analysis of the data as collected from Hillsborough and Pinellas Counties, the following model of perceived pedestrian mid-block crossing difficulty was developed:

Pedestrian Mid-block Crossing Difficulty =

−2.4778
+0.4937 ∗ Share of pedestrians age 65 or older
+0.0758 ∗ Total traffic volume (1,000 vehicles per hour)
+0.0015 ∗ Turning movements (vehicles per hour)
+0.0107 ∗ Traffic speed (mph)
+0.0295 ∗ Crossing distance (feet)
−0.0661 ∗ Restrictive medians (feet)
+0.0712 ∗ Non-restrictive medians (feet)
−0.2762 ∗ Crosswalks (0-1)
−0.4930 ∗ Pedestrian signals (0-1)
−0.0142 ∗ Signal cycle (seconds)
+0.0007 ∗ Signal spacing (feet)

LOS Breakdown
LOS = A if Value <= 1.5
LOS = B if Value > 1.5 and <= 2.5
LOS = C if Value > 2.5 and <= 3.5
LOS = D if Value > 3.5 and <= 4.5
LOS = E if Value > 4.5 and <=5.5
LOS = F if Value > 5.5

The variables listed in the above equation, which measure the pedestrians' sensitivities to the varying elements of mid-block crossing, combine to determine mid-block pedestrian level of service. By applying actual values to each, a numerical result is obtained that will correspond to one of the designations listed in the LOS breakdown chart. The designations rate the level of service (i.e., A is best, F is worst).

The model can thus serve as an available tool for determining pedestrian mid-block crossing level of service in planning applications. Also, it could potentially be combined with models used for pedestrian level of service for walking along a roadway segment and for crossing at intersections to determine the overall pedestrian level of service for an entire roadway segment. In addition, the overall level of service at the segment-level could then be used as a direct input into the transit level of service methodology.

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