Summary of Final Report, BC137-33
September 2002

WHY PEOPLE CROSS WHERE THEY DO

PROBLEM STATEMENT

Within the State of Florida and around the country, transportation agencies are attempting to improve the overall transportation system by effectively leveraging a multitude of transportation modes (e.g., air, auto, rail). This effort is better known as the Multi-Modal Level of Service (MMLOS) process, of which pedestrian travel is one of the modes. In Florida, however, only the Transit section of the Multi-Modal Level of Service addresses pedestrian crossing issues in its level of service (LOS) methodologies.

In order to provide a safer and more attractive pedestrian environment, more reliable tools are required to evaluate current environments and to create standards for improvement. That is, a Pedestrian Level of Service methodology needs to be established. Such a methodology would not only improve design of the pedestrian environment but streamline the MMLOS process by replacing the street-crossing difficulty factor in the transit LOS methodologies.

To develop this LOS, two particular aspects of pedestrian crossing require investigation: mid-block crossing and intersection crossing. The difficulty in addressing these factors is that designers have no data regarding why people cross a road where they do.

OBJECTIVES

The primary objective of this study was to survey a sample of pedestrians to better understand the potential determinants of pedestrian street-crossing behavior. Researchers will subject the survey results to a statistical calibration and validation process that will take into account the site characteristics of the various sites at which the surveys were conducted.

FINDINGS AND CONCLUSIONS

Each of 86 participants was placed in actual traffic conditions at the curbsides of 6 of 48 tested street blocks in the Tampa Bay area for a three-minute observation of the street environment. Without crossing the street, participants provided their crossing preferences at each of the blocks. The origin and destination for each crossing were hypothetically set and varied across the blocks. So were the options available: two options for crossing at an intersection and up to four options for crossing at mid-block locations. In addition to the preference data, researchers also collected data on traffic conditions, roadway characteristics, and signal-control characteristics for all of the survey sites. All three components of the street environment were considered: intersection, mid-block, and roadside.

Researchers developed a nested logit model of how pedestrians cross roads. The model was consistent with theoretical expectations and fitted the data well. The model contains a number of variables descriptive of the street environment. Three of these are ***continuous variables***, including roadside walking distance, crossing distance, and traffic volume. Three are ***discrete characteristics*** that indicate the presence of marked crosswalks, traffic signals, and pedestrian signals, respectively. The different block settings allowed the researchers to observe which crossing options (jaywalking

or crossing at an intersection or mid-block crosswalk) the participants would choose with regard to the presence of selected variables (e.g., between the choice of walking a quarter mile to cross at a signalized intersection versus crossing through traffic at a mid-block crossing). The model has implications for pedestrian planning, engineering solutions to pedestrian crossing safety, and research methods.

Researchers found that people are more like to cross at an intersection with a traffic signal or a pedestrian signal head (Walk/Don't Walk signs). Also, people are more like to cross at any location with a marked crosswalk than at those without. As reflected by their coefficients in the model, the relative influence of these discrete characteristics vary among themselves and across options. Specifically, the presence of a marked crosswalk is more influential at an intersection than at a mid-block location. For crossing at an intersection, the most influential factors in descending order are (1) pedestrian signals, (2) marked crosswalks, and (3) traffic signals.

An increase in any continuous variable for a given option will result in a decrease in the probability of that option being chosen; i.e., the further a pedestrian has to walk to utilize a particular crossing option (e.g., marked crosswalk, signalized intersection), the less likely it is that the pedestrian will choose that option. The magnitude of the decrease varies across these continuous variables and across options.

Utilizing survey data, researchers calculated the probability of the options being chosen in relation to each of the variables. The following are among the conclusions reached:

- Increases in roadside walking distance (to an intersection) significantly affect a pedestrian's selection of the option to cross at an intersection. The decision to cross at an intersection is little affected, however, by increases in the crossing distance at that intersection.
- Increases in crossing distance are twice as likely to affect jaywalking than are increases in traffic volume.
- Crossing at a mid-block location is little affected by any of the continuous variables.
- Increases in crossing distance impact jaywalking most and crossing at a mid-block location least.
- Increases in roadside walking impact crossing at an intersection many times more than crossing at a mid-block location.
- Increases in traffic volume impact jaywalking more than crossing at a mid-block location.

BENEFITS

Accidents occurring between vehicles and pedestrians most often occur during pedestrian attempts to cross a road. This in itself is a reason to investigate the conditions that induce pedestrians to cross roads where they do. Such information would allow planning and design of pedestrian facilities to better accommodate normative pedestrian behavior and so create a safer walking environment. Creating an effective Pedestrian Level of Service will also further overall Multi-Modal Level of Service, improving the planning and design processes to optimize the overall transportation system.

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