DRISI

Caltrans Division of Research, Innovation and System Information

Research Results

Managing Pedestrian and Car Interactions

This work studied the impact of crosswalk spacing on road traffic capacity. A variety of fixed and variable crosswalk spacings were considered and these were loaded with different pedestrian flows.

Planning/Policy & Programming

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Project Title:
UTC - Managing Pedestrian and Car Interactions, (UCCONNECT)

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WHAT WAS THE NEED?

This research was concerned with mobility and safety of the traveling public, walkers and vehicles alike. It showed the effect of improvements to pedestrian movement in crosswalks and car flows on unsignalized streets. The study considered the number and location of crosswalks per street block, and the operation of crosswalks serving bus passenger transfers. It should help encourage use of non-auto modes by facilitating pedestrian movements while smoothing vehicle traffic and reducing vehicle hours traveled (VHT).

WHAT WAS OUR GOAL?

To understand how pedestrians and traffic (including buses) interact. To find ways to benefit pedestrians that also enhance transit experiences. Can changes to the pedestrians' network be mutually beneficial to vehicles and pedestrians?

WHAT DID WE DO?

Personal observations in Berkeley, CA. show that when crosswalks are absent, pedestrians cross non-orthogonally. Dutch crosswalk designs were researched and earlier work by Daganzo and Knoop 2006, showed that a "cross anywhere" scenario, where any part of the road could be considered a crosswalk, would be the best for cars and pedestrians in terms of travel times.

First the pedestrian crosswalk versus car interaction problem was simplified so it could be described with fewer variables. Then

numerical simulations were done, testing the influence of these variable on a traffic stream, and then the results of these simulations were interpreted. Traffic capacity and speed as well as road and crosswalk configurations were considered.

WHAT WAS THE OUTCOME?

This paper has shown how pedestrians on crosswalks influence the road traffic. The paper showed how by coordinate transformation the problem is only dependent on few parameters. The relative capacity (i.e., relative to non-interrupted capacity) depends on the pedestrian flow, the inter-crosswalk distance, and the variability of the inter-crosswalk distance. All combinations within this parameter space have been simulated, and curves on capacity have been created.

The current study showed the effect of a homogeneous road, with equal pedestrian crossings (only different inter-crosswalk distance and variation thereof), and a homogeneous pedestrian crossing demand. Future research will examine the effect of variations of pedestrian demand, and limiting the area of pedestrian crossing, showing the effect of block and inter-block crossings and the effect of shared space sections on through traffic.

WHAT IS THE BENEFIT?

On unsignalized streets, decreasing crosswalk spacing is mutually beneficial: pedestrians can cross at a more convenient location, and vehicles benefit from higher street capacity. On a signalized street grid, pedestrian demand may be concentrated at intersections.

Pedestrians with longer, diagonal trips will benefit most from midblock crossings.

IMAGES

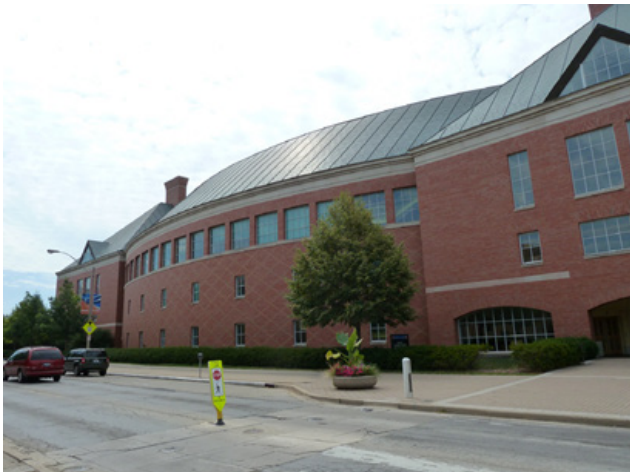

Image 1