“Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations”

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Summary Outline

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Introduction

- This FHWA Study, published in February 2002, evaluates marked and unmarked crosswalks at uncontrolled intersections, and offers guidelines for their use.
- The authors are careful to say that pedestrians should be “design users” of all streets.
- “Failure of one particular treatment is not a license to give up and do nothing”

How to Use this Study

- Regardless of whether marked crosswalks are provided, pedestrians must be able to cross the street.
- Crosswalks can be used in combination with other treatments to improve safety.
- Refuge islands, raised medians, raised crossings, curb extensions, and lighting are examples.
- If a marked crosswalk alone is inadequate, add another design treatment. Do not give up and do nothing.

Background

- A 1972 Study by Bruce Herms evaluated 400 uncontrolled pedestrian crossings in San Diego
- It found a higher incidence of pedestrian crashes in marked than in unmarked crosswalks.
- No breakdown by road type or traffic volume.
- Sometimes used to justify not marking crosswalks.
- “Crosswalks induce a false sense of security in the pedestrian” - a theory often used to explain the higher incidence of pedestrian crashes in crosswalks.

The Sample

- 2000 crossing locations, 1000 marked and 1000 unmarked, all uncontrolled or mid-block.
- 29 cities across the country
- Simultaneous pedestrian counts taken for one hour.
- A sample of the sites got full-day counts, used to estimate daily volumes on the rest.
- Crashes from police records over a five-year period.

Significant Variables

- High pedestrian volumes, high traffic volumes, and high number of lanes all led to increased pedestrian crashes.
- No correlation of pedestrian crash volume with speed limit, but 93% of sites were 25 to 35 mph.
- 35 mph sites had more serious injuries than the 25 mph sites, 43% serious vs. 23% serious at the 25 mph sites.
- A raised median or pedestrian refuge cut pedestrian crashes by half on multilane roads.

No Significant Effect on Pedestrian Crash Rates:

- Location (at an intersection versus mid-block)
- Area (residential or CBD)
- Traffic Operation (one-way or two-way)
- Speed limit
- Crosswalk marking pattern

Marked Versus Unmarked Crossings

- No difference in crash rates on two-lane roads
- Multi-lane roads < 12,000 ADT had no difference.
- Multi-lane roads > 15,000 ADT and no median had higher crash rates if the crossing was marked.
- Multi-lane roads > 15,000 ADT and a raised median had half the crash rate at a marked crosswalk of the same road type without a median. But still significantly higher than an unmarked crossing.
- Ped crash rates climbed rapidly with traffic volume at marked crosswalks

Why?

- Children under 12 and persons 64 and older are significantly more likely to cross at a marked crosswalk.
- “Multiple-threat” crashes, in which a car in one lane yields to the pedestrian, who walks in front of another car who does not, accounted for 17% of crashes at marked crosswalks on multilane roads. Unmarked crossings on multi-lane roads had no such crashes in this sample.
- A study by Knoblauch indicates that pedestrians do not have a “false sense of security” at marked crossings.

Fault

- 41% of crashes resulted from motorist failure to yield in marked crosswalk
- Another 19% resulted from motorist turning or merging movement into marked crosswalks
- Multilane roads had more severe pedestrian injuries at marked than at unmarked crossings, probably due to the presence of seniors at marked crossings.

Bottom Line

- A marked crosswalk was never associated with a lower crash rate than an unmarked crosswalk at an uncontrolled intersection
- Guidelines for crosswalk use are provided. Crosswalks may be used to direct pedestrians to locations where it is safer to cross
- Marked crosswalks are inadequate on high-speed, high-volume, multilane roads.
- Such locations need additional design treatments