CITY OF BEVERLY HILLS
STAFF REPORT

Meeting Date: November 17, 2009

To: Honorable Mayor & City Council

From: Aaron Kunz, Deputy Director of Transportation AK

Subject: Uncontrolled Crosswalk on 300 block of South Robertson Boulevard at Chalmers Street

Attachments:
1. City of Los Angeles crosswalk study
2. ITS research chart based on 30 cities studies
3. Pedestrian crossing count
4. Accident history
5. Aerial photo

INTRODUCTION

This report forwards staff's proposal to initiate the process outlined in the California Vehicle Code to remove the "uncontrolled crosswalk" (without a stop sign or traffic signal) on the 300 block of S. Robertson Blvd. at Chalmers Street in the City of Los Angeles.

DISCUSSION

Studies at both the local and national levels conclude that uncontrolled crosswalks have a higher rate of auto-pedestrian accidents than crossings with no markings at all. Copies of reports from the City of Los Angeles and the Institute of Transportation Engineers are attached for reference. The City of Los Angeles and several other cities are removing uncontrolled crosswalks as streets are repaved. Since Robertson Blvd. in this area is being repaved (using American Recovery and Reinvestment Act funds), this is an opportune time to take this action.

The City currently has three uncontrolled crosswalks: 1) 300 block of S. Robertson Blvd. at Chalmers Street, which is completely within Beverly Hills jurisdiction, 2) on S. Santa Monica Blvd. just west of Wilshire Blvd., and 3) on Wilshire Blvd. at Palm Drive. Staff is proposing that the public process outlined in the California Vehicle Code (CVC) section 21950.5 be initiated to remove the Robertson Blvd. crosswalk. The CVC requires "notice and opportunity to be heard is provided not less than 30 days prior to the scheduled date of removal." Staff is recommending that this notice be provided at the beginning of January and placed on the City Council agenda in February for removal.

The City Attorney's Office has recommended that City Council formally act to remove the crosswalk.

The crosswalk on Robertson Drive was installed in the late 1980's due to the pedestrian activity associated from Jane Fonda's exercise studio. The amount of pedestrian crossings is too low to satisfy the established engineering warrants for installation of either a stop sign (facing Robertson Blvd.) or placement of a traffic signal. A study performed on June 3, 2009 identified 15 pedestrian per peak weekday hour, 85% below the minimum requirement of 100 crossing per hour for the four highest hours of the day.

During review of this item, the Traffic & Parking Commission and neighboring businesses, specifically Toppings Yogurt Shop, observed that the highest number of crossings is on Saturday evenings after Sundown. Staff conducted a four-hour survey on Saturday, June 27, 2009 between 6 pm and 10 pm and the average crossings was 35.5 per hour. Again, this is far below the minimum requirement of 100 crossings per hour for the four highest hours of the day.

Staff evaluated the accident history at this location for the past 19 years and found only two reported accidents at this location. That information does not include unreported "close calls" and data that could have been reported to the City of Los Angeles.

Crossings at the intersection would still legally be allowed with the removal of the crosswalk. Pedestrians would be more attentive to the traffic when crossing and would not assume vehicles would stop with the presence of a crosswalk. If the City Council decides to retain the crosswalk, staff would intend to remove the three parking spaces on the west side and two on the east side.

Staff presented the issue to the Traffic & Parking Commission as a study session item. The Commission expressed strong opinions on both sides of the argument, balancing safety and needs of businesses. The Commission concluded that the issue should be addressed by the City Council.

RECOMMENDATION

That staff proceed with the public process to remove the crosswalk on the 300 block of S. Robertson Blvd.

DG David Gustavson
Approved By

Pedestrian Accidents in Marked and Unmarked Crosswalks: A Quantitative Study

THE MAIN GOAL OF THE STUDY DISCUSSED BY THE AUTHORS WAS TO CONDUCT A QUANTITATIVE EXAMINATION OF A RANDOM GROUP OF PEDESTRIAN ACCIDENTS AT UNPROTECTED CROSSWALKS IN THE CITY OF LOS ANGELES AND TO DETERMINE THE VALIDITY OF THE CURRENT CITY PRACTICES.

BY THOMAS L. JONES AND PATRICK TOMCHECK

PEDESTRIAN SAFETY IS AN important concern to the City of Los Angeles Department of Transportation (LADOT). While pedestrian accidents account for 6.7 percent of all traffic-related accidents in the city (1998 data), they account for 42 percent of all traffic-related fatalities. Accordingly, LADOT has developed practices in an attempt to reduce such accidents.

For over 25 years, LADOT's crosswalk installation practice has been greatly influenced by a study published in August 1970 by Bruce Herms of the City of San Diego titled *Pedestrian Crosswalk Study: Accidents in Painted and Unpainted Crosswalks*. In the San Diego study, pedestrian accidents were investigated at 400 intersections over five years. Each of these intersections had two unprotected crosswalks—one marked and one unmarked—crossing an arterial roadway. Both of these crosswalks were legal crossings by definition in the California Vehicle Code. An "unmarked" crosswalk is a legal crossing approximately perpendicular to the roadway that does not have painted lines or special surface material to designate the prolongation of the sidewalks of an intersecting cross street. The San Diego study concluded "in terms of use, that approximately twice as many pedestrian accidents occur in marked crosswalks as in unmarked crosswalks." Recognizing that there are both advantages and disadvantages to marking crosswalks, the San Diego study recommended, in part, that "Existing crosswalk warrants should be reviewed and updated. Special consideration should be given to pedestrian channelization needs, nighttime illumination, vehicle approach speed, and motorist inability to see pedestrians or the crosswalk at the critical safe stopping distance." The study further suggested that "Existing crosswalks should be re-evaluated to see whether they meet the revised warrants."

LADOT has often referred to the San Diego study to justify the removal or denial of the installation of marked crosswalks at unprotected locations. For purposes of this report, the term "unprotected" refers to a legal crossing at an intersection where stop signs or a traffic signal are not in place to control vehicles on the street that the pedestrian is crossing. By removing marked crosswalks at locations where they were not deemed appropriate, LADOT was seeking to reduce pedestrian-related accidents. However, citizens and the media have challenged this practice and questioned whether the removal of crosswalks was improving safety or creating an unfriendly pedestrian environment. In recent years, opponents of this practice have become more vocal. They view the San Diego study as antiquated, since the data is from a report completed a generation ago. Although more recent studies appear to support the findings of the San Diego study, they may not be as well researched or are conducted in cities that the critics view as not representative of Los Angeles.

CURRENT PRACTICE

For a number of years, it has been the practice of LADOT to install marked crosswalks at unprotected locations in special situations. Generally, the circumstances include locations where there is a need to identify a preferred crossing point or where there is frequent pedestrian usage, such as at bus stops, institutional buildings, or active retail areas. Where these circumstances are not present, painted crosswalks are not installed nor reinstalled when they are removed due to a street resurfacing.

The LADOT follows the policies of the State of California Traffic Manual, which states:

"Crosswalk markings serve primarily to guide pedestrians into the proper path. Pedestrian crosswalk markings should not be used indiscriminately. Pedestrian crosswalk markings may be installed where they are advisable to channelize pedestrians into the preferred path at intersections when the intended course is not readily apparent or when in the opinion of the engineer, their presence would minimize pedestrian-auto conflicts. In general, crosswalks should not be marked at intersections unless they are intended to channelize pedestrians."

Where marked, unprotected crosswalks are installed or reinstalled following street resurfacing, a full complement of traffic controls is also included to advise motorists to be alert for pedestrians. Advance pedestrian warning signs and pavement markings, double-posted pedestrian warning signs at the crosswalk itself and a "no stopping" zone in advance of the painted crosswalk are all installed. The length of the parking prohibition is based on the safe stopping distance required for a motorist approaching the crosswalk to see a pedestrian at the curb line. Ladder-style markings are now being included at uncontrolled locations to enhance the visibility of the crosswalk.

STUDY GOALS

This study is not intended to be an updated version of the San Diego crosswalk study. Rather, the main goal of this study is to conduct a quantitative examination of a random group of pedestrian accidents at unprotected crosswalks in the City of Los Angeles and to determine the validity of the current city practices. A further goal of the study is to address an issue that often arises when pedestrian safety is discussed. Some critics contend that when a marked crosswalk is removed, the pedestrian-accident rate at that location may improve at the expense of increasing the accident frequency at adjacent intersections. To investigate whether this argument has merit, pedestrian-accident histories were examined at intersections that were adjacent to an intersection where a painted crosswalk was removed. Unlike the San Diego study, pedestrian volumes and exposure rates were not evaluated. The study also did not evaluate the adequacy of street lighting and other variables that may impact pedestrian safety.

STUDY PARAMETERS

LADOT investigated 104 intersections throughout the City of Los Angeles where marked crosswalks had been removed on arterial streets due to street resurfacing from February 1982 through December 1991.

The intersections selected for this study were not chosen for their pedestrian-accident histories, but solely because they were on streets resurfaced during the years investigated. When a street is to be resurfaced, a plan is prepared to update the roadway striping to current needs and design practices. As part of this design process, unprotected marked crosswalks are analyzed to see whether they should be retained. If retained, traffic controls are installed as previously described. If the marked crosswalk is not reinstalled, all related pedestrian warning signs and pavement messages are also removed. The marked crosswalks that were removed consisted of two parallel 12-inch (292 millimeter) white lines, typically 12 feet (ft.) or 15 ft. [3.7 meters (m) or 4.6 m] on center. Although LADOT now installs "ladder-style" designs for marked, unprotected crosswalks, none of the crosswalks studied included this treatment. Furthermore, no school crosswalks were removed. The marked school crosswalks and related warning signs and pavement markings were retained after the street resurfacings because school crossing guards are stationed at these crosswalks during certain hours of the day to assist children crossing the street. It is believed that by retaining the traffic control devices at these locations, drivers are more respectful of the authority of the crossing guard.

Some of the arterials in this study had multiple unprotected crosswalks removed when the street was resurfaced. On other streets, only one or two unprotected crosswalks were removed. However, not all unprotected, marked crosswalks were removed. An evaluation of the pedestrian-accident histories at those locations where unprotected, marked crosswalks were retained is included in this report.

BEFORE AND AFTER STUDY

To compare the number of accidents before and after a painted crosswalk was removed, a study period for each intersection was established that contained the equivalent number of "before" months and "after" months. The LADOT database for reported traffic accidents extends back to Jan. 1, 1979, so that date was a limiting factor in establishing the study period for each intersection. For instance, for a crosswalk that was removed in January 1984, a 120-month study period was used (60 "before" months from Jan. 1, 1979, to Jan. 1, 1984, and 60 "after" months from Jan. 1, 1984, to Jan. 1, 1989).

The study period varied from location to location, depending on the range of time for which accident data were available or whether a significant operational change occurred at the intersection under study. If a traffic signal was installed at an intersection, for example, the "after" study period terminated with the activation of that signal. The shortest study period for any location was 36 "before" months and 36 "after" months; the longest study period was 111 "before" months and 111 "after" months. The average study period was 87.4 "before" months and 87.4 "after" months. All together, 9,109 months (759 years) each of "before" accident data and "after" accident data was evaluated for the 104 intersections.

The compiled accident summaries contain information from accident reports written by police officers who responded to the scene of the accidents. This information includes the date and time of the accident, the location of the collision, the ages of the persons

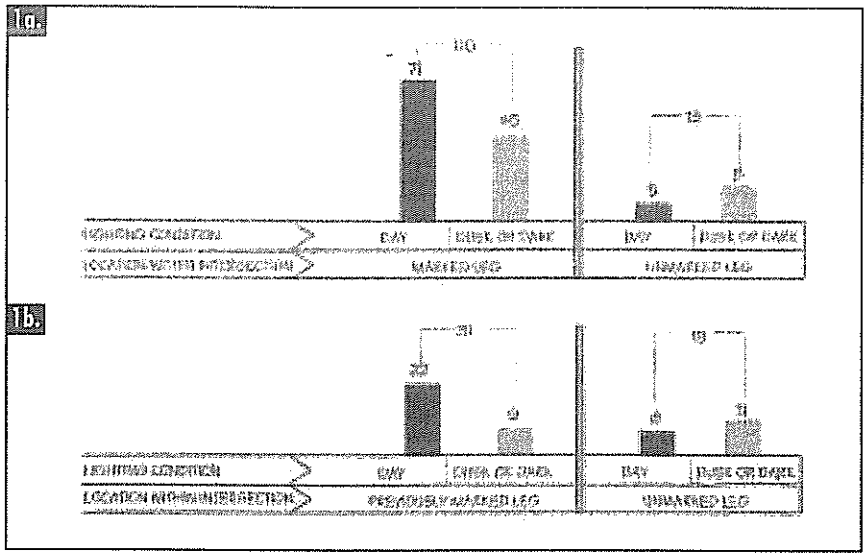
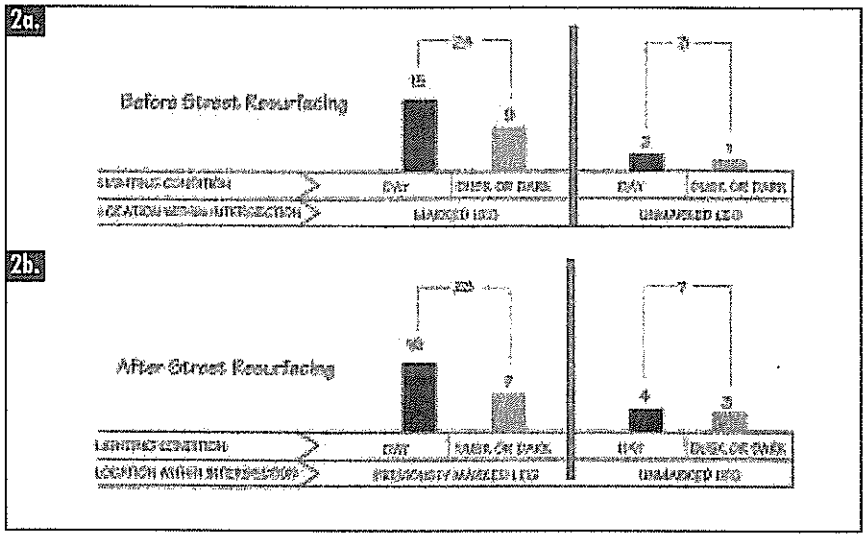


Figure 1a. Number of pedestrian accidents at study locations with a marked crosswalk in place.
Figure 1b. Number of pedestrian accidents at study locations after removal of marked crosswalk.



Figures 2a and 2b. Number of pedestrian accidents at nearby locations with a marked crosswalk continuously in place.

involved, the seriousness of their injuries, the directions the vehicles and/or pedestrians were traveling at the time of the collision, and the weather (sunny, cloudy, rain) and lighting (day, dusk, or night) conditions.

IMPACT ON PEDESTRIAN ACCIDENTS

All of the accidents in this report involve a pedestrian traversing the arterial roadway at an unprotected intersection crossing (painted or unpainted) who was struck by a motorist traveling on the arterial street. Although accidents involving motorists turning right or left from the cross street and striking a pedestrian crossing the arterial roadway were also examined, they are not included in this summary.

The pedestrian accidents that occurred at the 104 study locations were divided into those accidents that took place at the intersection prior to the removal of the unprotected marked crosswalk and those accidents that took place after the marked crosswalk was removed. The accidents were further categorized as those that occurred as a pedestrian was crossing the leg of the intersection in which the marked crosswalk existed (or previously existed) as opposed to those accidents that occurred as the pedestrian was crossing the leg of the intersection where no marked crosswalk had existed. Finally, the accidents were divided into those that occurred during daylight hours vs. those that happened during periods of dusk and dark. Street lighting was present at 103 of the 104 intersections studied.

The pedestrian-accident summaries are shown in Figures 1a and 1b. In the before condition shown in Figure 1a, a total of 116 pedestrian accidents took place in the marked crosswalks across the arterial roadway as compared to 13 accidents in the unmarked crossings during the same time period. After the marked crosswalk was removed, 31 accidents took place during an equivalent period of time in the legs of the intersections where the marked crosswalks had previously been located. The number of pedestrian accidents that occurred in the legs that never had the marked crosswalks increased to 19 accidents. When both legs of the intersections (previously marked and unmarked) are considered, pedestrian accidents declined from 129 to 50, an overall reduction of 61.2 percent.

STATISTICAL SIGNIFICANCE TESTING

An analysis was conducted to see whether this pedestrian-accident reduction was statistically significant or due to random chance. To determine the statistical significance of changes, Dietz's curve,[1] based on a 95 percent confidence level (95 percent certainty that the reduction was not due to random chance occurrence) was used. Based on Dietz's curve, for the 129 accidents that occurred before the marked crosswalks were removed, any reduction greater than 20 percent is considered not to be due to random chance. Since the actual overall pedestrian number of accidents fell by over 61 percent, this reduction is indeed considered significant. The result shows that the selective removal of marked crosswalks, as practiced by LADOT, produces significant safety benefits.

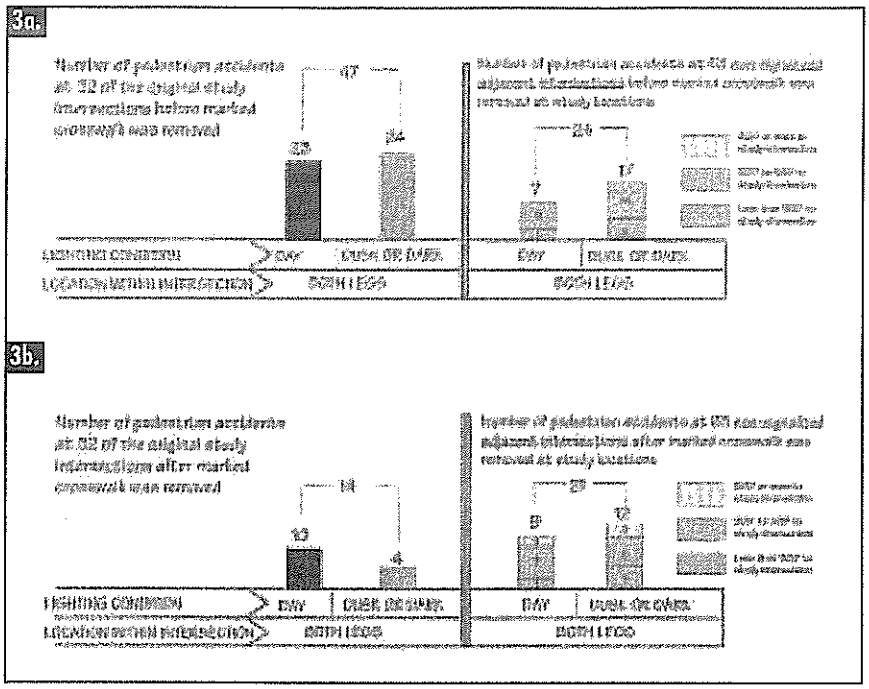
COMPARISON OF PEDESTRIAN ACCIDENTS AT THOSE INTERSECTIONS WHERE MARKED CROSSWALKS REMAINED

When the arterial streets in the study were resurfaced, not all of the unprotected, marked crosswalks were removed. Fifteen unprotected, marked crosswalks that were in place before the street resurfacing and then reinstalled after the street was repaved were investigated. Eight of these crosswalks were on the same street; the remaining seven locations were located on six other arterial streets in various parts of the city.

As Figures 2a and 2b show, 27 pedestrian accidents occurred at these 15 intersections during the "before" period. Of this total, 24 pedestrians were struck while crossing in the marked crosswalk; 3 were hit while crossing the intersection in the unmarked leg. During the equivalent "after" period, 30 pedestrians were struck while crossing the arterial street (23 in the leg with the marked crosswalk, 7 in the unmarked leg). Applying Dietz's curve to these totals, it can be shown that the actual change to the number of pedestrian accidents from the "before" period to the "after" period is not statistically significant; however, it is interesting that these locations did not experience the dramatic reductions in pedestrian accidents as did those locations where the marked crosswalks were removed.

INFLUENCE OF CROSSWALK REMOVAL ON PEDESTRIAN ACCIDENTS AT ADJACENT, UNSIGNALIZED INTERSECTIONS

Some citizens who have challenged the crosswalk removal practices suggest that when marked crosswalks are removed, some pedestrians instead cross at adjacent intersections, thus making them susceptible to accidents at these locations. Although this study did not quantify the number of pedestrians who chose to cross at an alternative location once the marked crosswalk was removed, an accident analysis was conducted to determine the validity of this theory.



Figures 3a and 3b. Pedestrian accidents at study locations and non-signalized adjacent intersections.

At 72 of the 104 locations (69 percent), at least one of the two intersections adjacent to the study intersection along the arterial highway was signalized. The unprotected, marked crosswalk may have been removed to encourage pedestrians to cross the arterial roadway at these nearby signalized locations, where maximum positive control is provided. This may account for a portion of the reduction in pedestrian accidents at the study locations, since some pedestrians may indeed have decided to walk down the street and cross with the protection of a signal. As for the 32 other study locations, neither adjacent intersection along the arterial was signalized. Pedestrian-accident histories for these adjacent intersections were further analyzed.

Figures 3a and 3b show summaries of the pedestrian accidents at the 32 study locations that were not adjacent to a signalized intersection, as well as the pedestrian accidents at the adjacent non-signalized intersections themselves. These adjacent intersections are divided by their proximity to each of the 32 study locations [less than 300 ft. (91.4 m) between the two intersections, 300 ft. to 599 ft. and 600 ft. or over].

Forty-seven pedestrian accidents occurred at the 32 study locations while the marked crosswalk was in place. During this same "before" period, there were 24 pedestrian accidents at the 63[2] non-signalized, adjacent intersections. After the crosswalk was removed at the 32 original study locations, 14 pedestrian accidents occurred during the same number of months at these intersections, a statistically significant 72 percent reduction. During this same "after" period, the number of pedestrian accidents that occurred at the 63 adjacent intersections did not increase, but actually decreased from 24 to 21, a non-significant 13 percent reduction. This result indicates that selective marked crosswalk removal does not result in an increase in pedestrian accidents at adjacent unsignalized intersections.

INFLUENCE OF WET PAVEMENT

Of the 179 total pedestrian accidents studied, only 15 occurred during wet weather conditions. This number was not large enough to support a conclusion that would be statistically relevant.

CONCLUSIONS

This quantitative analysis concerning the number of pedestrian accidents in

marked, unprotected crosswalks supports a policy of caution before installing these markings. The results of this study revealed that:

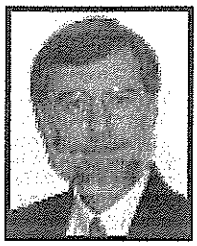
- When only the legs of the intersections that previously had marked crosswalks are considered, pedestrian accidents declined from 116 to 31 after the marked crosswalk was removed; this was a 73 percent reduction.
- When both legs (previously marked and unmarked) of the intersections are considered, pedestrian accidents declined from 129 to 50 after the marked crosswalk was removed; this was a 61 percent reduction.
- These accident reductions were accomplished without increasing the number of pedestrian accidents at non-signalized, adjacent intersections.
- At 15 intersections where marked crosswalks were retained, the number of overall pedestrian accidents did not decrease.

Based on Dietz's curve of significance testing, the reduction in pedestrian accidents after the removal of marked crosswalks is statistically significant and not due to random chance. Even taking into account that pedestrian exposure rates and possible street lighting improvements may have been factors in these pedestrian accident-rate reductions, the numbers are significant enough to support a policy of selectively installing or reinstalling marked, unprotected crosswalks only after careful consideration. ■

References

1. Dietz, S.K. "Significance Tests for Accident Reduction Based on Classical Statistics and Economic Consequences." *Transportation Science*. August 1967.

2. Since one adjacent intersection was thought to be too far away to be a practical alternative for pedestrians, it was not included as part of the study.



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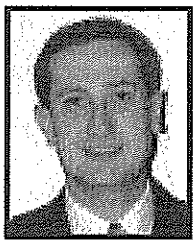


PATRICK TOMCHECK, *P.E., received a B.S. degree from Northwestern University before joining the City of Los Angeles Department of Transportation. He has been involved in many areas of the department during his 16 years with the city. He is currently the Transportation Engineer for the Geometric Design section. Tomcheck is an Associate Member of ITE.*

Safety Analysis of Marked Versus Unmarked Crosswalks in 30 Cities

DECIDING WHERE TO MARK CROSSWALKS IS ONLY ONE CONSIDERATION IN SELECTING APPROPRIATE SOLUTIONS TO IMPROVE PEDESTRIAN SAFETY AND ACCESS. THE STUDY DESCRIBED IN THIS FEATURE ANALYZED FIVE YEARS OF PEDESTRIAN CRASHES AT 1,000 MARKED CROSSWALKS AND 1,000 MATCHED UNMARKED COMPARISON SITES. MORE SUBSTANTIAL IMPROVEMENTS WERE RECOMMENDED TO PROVIDE FOR SAFER PEDESTRIAN CROSSINGS.

BY CHARLES V. ZEGEER, P.E., CAROL TAN ESSE, J. RICHARD STEWART, HERMAN F. HUANG, PH.D. AND PETER LAGERWEY

BACKGROUND AND INTRODUCTION

Streets should be designed with the premise that there will be pedestrians—that pedestrians are going to cross streets and that they should be able to do so safely. Simply put, pedestrians should be included as "design users" for all streets. Therefore, planners and engineers have a professional responsibility to plan, design and install safe crossing facilities. The design question is, "How can this best be accomplished?"

Providing marked crosswalks at uncontrolled locations traditionally has been one measure in an attempt to facilitate crossings. However, there have been conflicting studies and much controversy regarding the safety effects of marked crosswalks. The study described in this feature evaluated marked crosswalks at uncontrolled locations and offers guidelines for their use.

How Is a Crosswalk Defined and Designated?

According to the *Uniform Vehicle Code* Section 1-112, legal crosswalks exist at all public intersections where there is a sidewalk on at least one side of the street and/or where crosswalk markings exist.[1] Therefore, the only way a legal crosswalk can exist at a midblock location is if it is marked. Furthermore, according to the *Manual on Uniform Traffic Control Devices* (MUTCD) Section 3B-18, a crosswalk may be marked with paint, thermoplastic materials and plastic tape, among other materials.[2]

Specifically, crosswalks serve as the pedestrian right-of-way across a street. The level of connectivity between pedestrian facilities is directly related to the placement and consistency of street crossings.

Why Are Marked Crosswalks Controversial?

There has been considerable controversy in the United States about whether providing marked crosswalks increases or decreases pedestrian safety at crossing locations that are not controlled by a traffic signal or stop sign. When citizens request the installation of marked crosswalks, some engineers and planners still refer to the 1972 study by Herms as justification for not installing marked crosswalks at uncontrolled locations.[3]

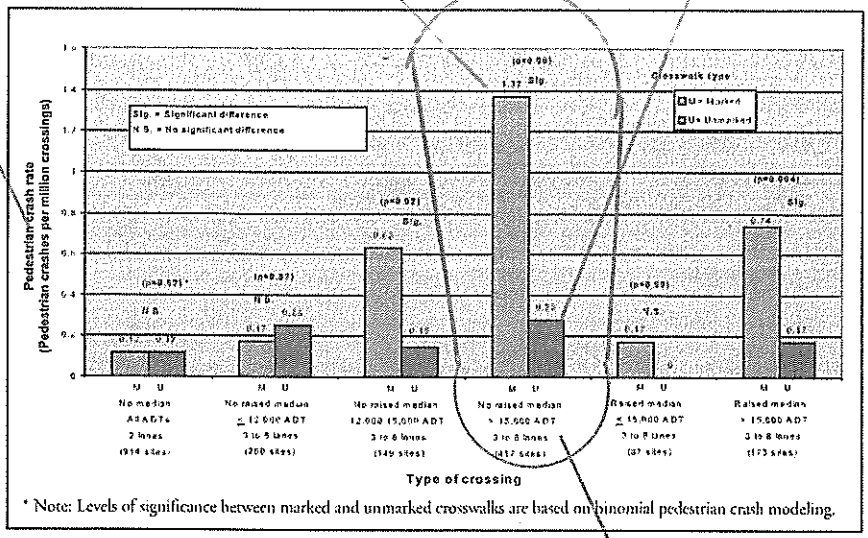
The Herms study found an increased incidence of pedestrian collisions at marked crosswalks compared to unmarked crosswalks in San Diego, CA, USA. Questions have been raised about the validity of that study, and some have misinterpreted the results, which did not conclude that all marked crosswalks are "unsafe" and did not include school crosswalks.

A few other studies tried to address this issue after Herms but were not conclusive because of methodology or sample size problems. They also did not investigate the effects for various numbers of lanes, traffic volumes, or other roadway features. Like other traffic control devices, crosswalks should not be expected to be equally effective or appropriate under all roadway conditions.

STUDY PURPOSE AND OBJECTIVE

Many transportation agencies routinely mark crosswalks at school crossings and signalized intersections. While questions have been raised concerning marking criteria at these sites, most of the controversy about whether to mark crosswalks has pertained to uncontrolled locations. Some towns and cities also have chosen to supplement selected crosswalks with pedestrian warning signs or flashing lights.[4] See www.walkinginfo.org for evaluation crosswalk signs.

The purpose of the study described in this feature was twofold: to determine whether marked crosswalks at uncontrolled locations were safer than unmarked crosswalks under various traf-



* Note: Levels of significance between marked and unmarked crosswalks are based on binomial pedestrian crash modeling.

Figure 1. Pedestrian crash rates by type of crossing.

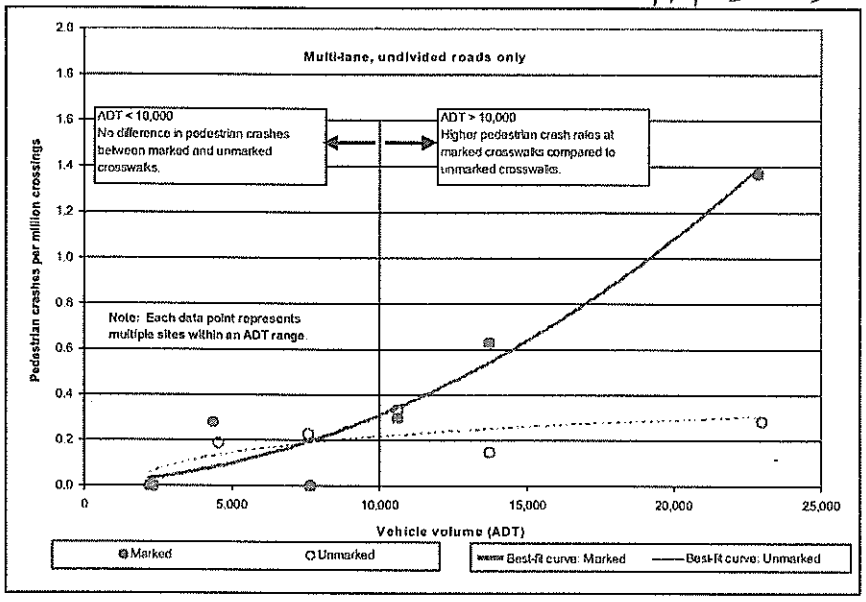


Figure 2. Pedestrian crash rates by traffic volume for multi-lane crossings with no raised medians.

account traffic volume, pedestrian exposure and other roadway features (such as number of lanes and median type). To supplement the pedestrian crash analysis, a corresponding study by Knoblauch, Nitzburg and Seifert was conducted on pedestrian and driver behavior before and after marked crosswalks were installed at selected sites in California, Minnesota, New York and Virginia, as discussed later in this feature.[9]

STUDY RESULTS

Significant Variables

Poisson and negative binomial regression models were fit to pedestrian crash data at marked and unmarked crosswalks. These analyses showed that traffic and roadway factors related to a greater frequency of pedestrian crashes included higher pedestrian volumes, higher ADT and a greater number of lanes. For example, multi-lane roads with three or more lanes had higher pedestrian crash rates than two-lane roads. For this study, a center two-way left-turn lane was considered a travel lane and not a median.

The presence of a raised median (or raised crossing island) was associated with a significantly lower pedestrian crash rate at multi-lane sites with both marked and unmarked crosswalks. Furthermore, on multi-lane roads, medians that were painted (but not raised) and center two-way left-turn lanes did not offer significant safety benefits to pedestrians compared to multi-lane roads with no median at all. These results were in basic agreement with a major study by Bowman and Vecellio as well as a study by Garder.[10, 11]

Non-Significant Variables

Factors having no significant effect on pedestrian crash rate included area type (such as residential or downtown), location type (intersection versus midblock), speed limit, traffic operation (one-way or two-way), condition of crosswalk marking (excellent, good, fair, or poor) and crosswalk marking pattern (such as parallel lines, ladder type, or zebra stripes).

Surprisingly, after controlling for other factors (such as pedestrian volume, traffic volume, number of lanes and median type), speed limit was not related significantly to pedestrian crash frequency. Certainly, one might expect higher vehicle speeds to be associated with the increased probability of pedestrian crashes (all else being equal).

However, the lack of association found in this analysis between speed limit and pedestrian crashes may be due to the fact that there was not much variation in the range of vehicle speeds or speed limits at the study sites. For example, 93 percent of the study sites had speed limits of 40.2 to 56.3 kilometers per hour (km/h), or 25 to 35 miles per hour (mph). Another possible explanation, as hypothesized by Garder, is that pedestrians may be more careful when crossing streets with higher speeds.[12]

In terms of speed and crash severity, the analysis showed that speed limits of 56.3 km/h (35 mph) and greater were associated with a higher percentage of fatal and A-type injuries than sites having lower speed limits (43 percent versus 23 percent, respectively).

Marked Versus Unmarked Crosswalk Comparisons

Binomial comparisons of pedestrian crash rates were produced for marked versus unmarked crosswalks within subsets by ADT, median type and number of lanes. The results are revealed in Figure 1.

Robertson @ Chalmers – Crosswalk Survey

Saturday, June 27, 2009

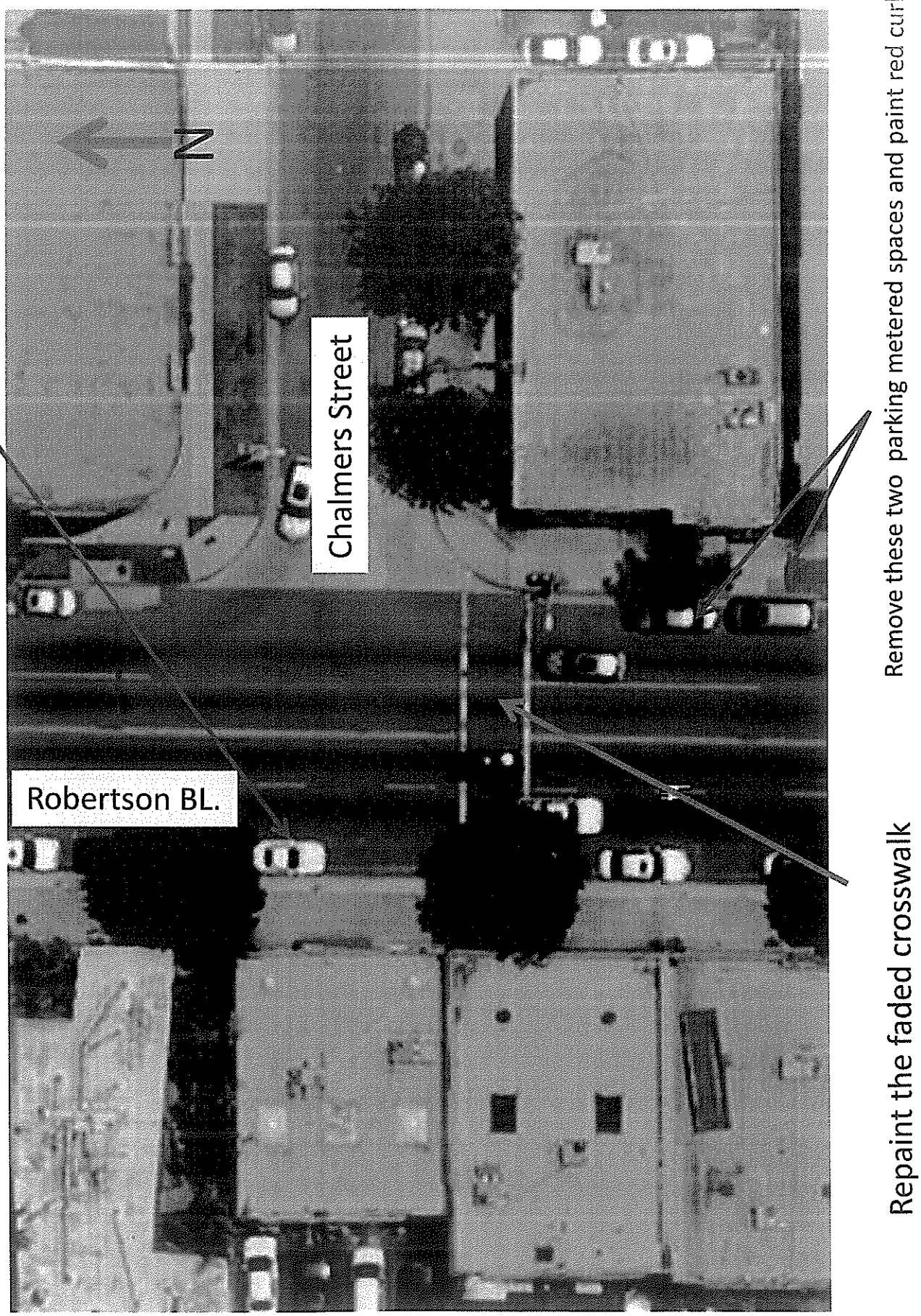
Pedestrian Crossing Count

Period (PM)	Pedestrians (both directions)	Hourly	# visiting Toppings	Hourly
6:00	4	36	2	22
6:15	9		7	
6:30	12		10	
6:45	11		3	
7:00	16	37	7	15
7:15	9		2	
7:30	5		2	
7:45	7		4	
8:00	10	35	8	19
8:15	5		5	
8:30	7		2	
8:45	13		4	
9:00	9	34	6	27
9:15	12		8	
9:30	4		4	
9:45	9		9	

Robertson Blvd. Auto/Pedestrian Accident Data

At Chalmers Drive

DATE	TIME	COLTYPE	DISTANCE	INJURED	MPC
1990	-	-	-	-	-
1991	-	-	-	-	-
1992	-	-	-	-	-
1993	-	-	-	-	-
1994	-	-	-	-	-
4/8/1995	1306	AUTO/PED	13 S	1	STRAIGHT
1996	-	-	-	-	-
4/4/1997	0941	AUTO/PED	12 S	1	STRAIGHT
1998	-	-	-	-	-
1999	-	-	-	-	-
2000	-	-	-	-	-
2001	-	-	-	-	-
2002	-	-	-	-	-
2003	-	-	-	-	-
2004	-	-	-	-	-
2005	-	-	-	-	-
2006	-	-	-	-	-
2007	-	-	-	-	-
2008	-	-	-	-	-



Attachment 5