

Report On “Yield To Pedestrian” Sign Treatments

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January 2009



Introduction

Communities nationwide carry-out experimental strategies to reduce pedestrian-vehicle collisions. Currently, the following tools are used in the Iowa City Urbanized Area to improve pedestrian safety:

- Painted Crosswalks / Stop Bars
- Pedestrian Activated Signals
- Pedestrian-Crossing Ahead Signs
- Pedestrian Lighting
- Audible Pedestrian Signals
- Curb Ramps
- Curb Extensions
- Speed Humps / Speed Tables

In 2004, the Iowa State University Center for Transportation Research and Education (CTRE) and City of Cedar Rapids conducted a small scale study to evaluate the effectiveness of in-street STATE LAW YIELD TO PED signs. Before the in-street signs were installed, the first vehicles to approach pedestrians at the crosswalks yielded 70 percent of the time; after installation, the first vehicle stopped 84 percent and the second vehicle stopped 100% of the time. Many other communities have experienced similar results.

In 2008, based upon the positive outcomes in Cedar Rapids and other cities, JCCOG implemented a pilot project to evaluate the effectiveness of in-street and side-mounted “Yield to Pedestrian” signs at uncontrolled intersections and crosswalks.

Methodology

The methodology for this study was designed to help answer the question: Are drivers more likely to yield to pedestrians when there is an in-street STATE LAW YIELD TO PEDESTRIAN or YIELD HERE TO PED sign in place (Figure 1)?



Figure 1: Yield to pedestrian sign treatments

The sign treatments used for this study are not regulatory; they remind motorists that state law mandates yielding for pedestrians at road intersections and marked crosswalks. JCCOG staff studied how drivers

reacted to pedestrians near these signs, including whether the driver slowed down or stopped to allow pedestrians to cross, or whether they forced the pedestrian to wait, step back, or hurry by not yielding to the pedestrian. Only pedestrian-vehicle interactions were recorded. If a pedestrian crossed at a study location with no vehicle present, the observation was not counted.

The following intersections/crosswalks were included in the pilot project (Figures 2-5):

- 1500-block 8th Street (Northwest Junior High), mid-block crosswalk, Coralville
- 300-block 5th Street, trail crosswalk, Coralville
- 10-block Market St., Cleary Walkway crosswalk, Iowa City
- Court Street/Fourth Ave (City High School), Iowa City

All observations occurred during the academic school year between November 2007 and November 2008. Each observation lasted 1.5 hours – two during morning peak and two during afternoon peak periods. All four locations were monitored four times during peak pedestrian use – twice prior to and twice following installation of the signs.

In addition to signage, the three locations with YIELD HERE TO PED signs (Figures 2-4) also included triangle (a.k.a, shark’s tooth) yield lines across the roadway, per MUTCD design specifications (see Attachment). The side-mounted signs and triangle yield lines were located 20 feet in advance of each crosswalk, per MUTCD guidelines.



Figure 2: Trail crossing at the 300 block of 5th Street, Coralville

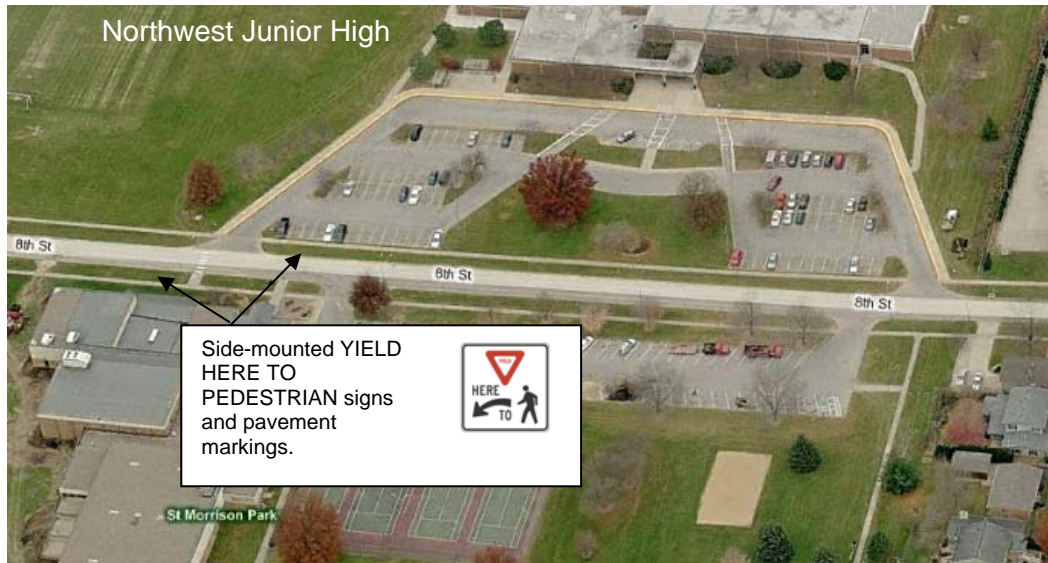


Figure 3: Northwest Junior High mid-block, 1508 8th Street, Coralville



Figure 4: Court Street/Fourth Ave (City High School), Iowa City

The in-street sign in this study was placed on the centerline of Market Street (a two-lane, one-way street), 20 feet before the crosswalk (Figure 5).

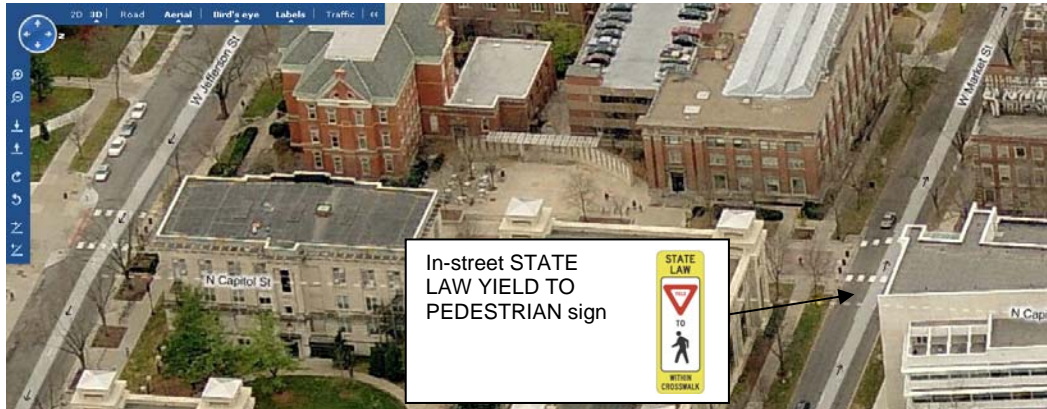


Figure 5: 10-block Market St., Cleary Walkway Crosswalk, Iowa City

Findings

The observations of motorists approaching the in-street STATE LAW YIELD TO PED sign show that vehicles yielded or stopped for pedestrians 30 percent before and 93 percent of the time after the sign was installed (Table 1). This three-fold increase indicates that the sign was an effective tool to increase compliance rates.

The observations of the side-mounted YIELD HERE TO PED signs showed mixed results in increasing motorists' yielding and stopping rates for pedestrians. The red bordered signs on Court Street in Iowa City led to a three-fold increase in compliance, while yielding and stopping increased 12 percent with the plain bordered signs on 5th Street in Coralville.

Table 1. Vehicle Response to Pedestrians at Crosswalk

	Site Treatment	Cleary In-Street Sign	Court St. Yield Here Plus Red Border	5th St. Yield Here No Red Border	8th St. Yield Here No Red Border
Vehicles Yield/Stop	Before	209/691 (30%)	22/144 (15%)	27/124 (22%)	48/65 (74%)
	After	197/211 (93%)	43/88 (49%)	50/149 (34%)	19/37 (51%)

Source: JCCOG, 2008

The 8th Street application with the plain bordered signs appears to have decreased compliance rates. However, the small sample size (37 vehicles) may not be large enough to accurately reflect the population as a whole. More research could provide a more reliable conclusion about

this location, but the positive outcomes at other locations in this study and in other communities suggest the signs are effective.

Pedestrian behavior was generally unchanged after the signs were installed – not surprising given that the signs are directed at motorists, not pedestrians. However, the observations suggest that pedestrians experience improved access at crosswalks with either of the signs and pavement marking treatments (Table 2).

Table 2. Pedestrian Crossing Behavior

	Site Treatment	Cleary In-Street Sign	Court St. Yield Here Plus Red Border	5th St. Yield Here No Red Border	8th St. Yield Here No Red Border
Pedestrians Walk (not run)	Before	649/673 (96%)	52/70 (74%)	86/86 (100%)	133/244 (55%)
	After	458/466 (98%)	52/68 (76%)	85/85 (100%)	61/92 (66%)

Source: JCCOG, 2008

Too few trail users crossed 5th Street at the mid-block crosswalk, so JCCOG staff simulated pedestrian crossings and only entered the crosswalk when it was clear that vehicles were yielding or not.

Reaction of Drivers

According to motorists, the in-street sign and the red-bordered YIELD HERE TO PED were more visible than the others. Several residents called staff to share that the YIELD HERE TO PED signs without a red border are difficult to see while the red border helps draw attention without being distracting.

The in-street sign has been especially effective at increasing yielding rates. Motorists mentioned three reasons they yield when the in-street sign is posted: 1) they are reminded that yielding for pedestrians is required by law; 2) they are reminded to look for pedestrians; and 3) they slow down to avoid scratching their vehicles on the sign. In fact, the sign has not been struck by a vehicle since installation two months ago.

Other Observations

JCCOG staff also noted the following observations that may have influenced the results summarized above:

- The Coralville Transit bus stop on 8th Street was located mid-block, across the street from NW Junior High. As a result, most students riding the city bus crossed the street away from the crosswalk. However, the City recently moved the bus stop to the intersection of 8th Street and 14th Avenue.
- The observations were difficult at 4th Avenue/Court Street because many vehicles slowed down to enter City High on 4th Avenue. The

pedestrians often waited until they saw a car slowing down with a turn signal, then they would run/hurry across the street.

- Many students wait for Iowa City Transit at the bus stop located at Fourth Avenue/Court Street. Some motorists likely assume youth at the intersection are waiting for the bus, not waiting to cross the street. Iowa City Transit staff plan to combine this stop with another stop one half-block west of the intersection.
- Pedestrians tend to wait at the curb for a safe gap in traffic, then walk or hurry across the street; almost no pedestrians stopped/aborted their crossing in the middle of the street.
- The Cleary Walkway is a common drop-off for university students and faculty, and these vehicles often back-up traffic as much as pedestrians crossing the street.

Conclusions and Recommendations

The “Yield to Ped” crosswalk treatments tested in Iowa City and Coralville were generally effective in raising yielding rates. The in-street STATE LAW YIELD TO PED sign appears to have successfully increased the number of motorists who notice and yield to pedestrians at uncontrolled crosswalks. The side-mounted YIELD HERE TO PED signs and yield line pavement markings had mixed results, although the application with the red border was more effective than without the border.

Staff developed the following recommendations and evaluation form (attached) based on local results of this study, as well as experience from other communities:

- Evaluate future applications of the in-street and side-mounted signs using the attached form to provide objective criteria prior to approval. If the criteria are not met, the City may approve the installation of these treatments if there are other unique circumstances, such as a City-approved school route crossing, channelization of pedestrians to a single crosswalk, or to clarify the appropriate crossing location.
- Limit application of these treatments to crosswalks with 40 pedestrians per peak hours. This threshold of pedestrians is based on local observations and input from other communities that use these treatments.
- Prevent mixed signals to motorists by using these treatments at locations where jay-walking (i.e., crossing outside of the marked crosswalk) is limited.
- Use the side-mounted YIELD HERE TO PED sign and triangle yield line for uncontrolled mid-block crosswalks, per MUTCD guidance.
- Use the red-bordered design of the YIELD HERE TO PED sign rather than the white-bordered design to increase visibility.

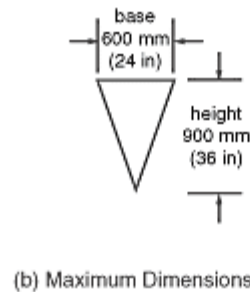
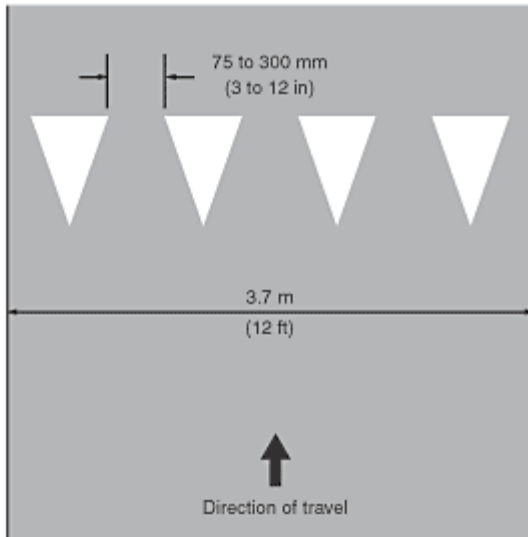
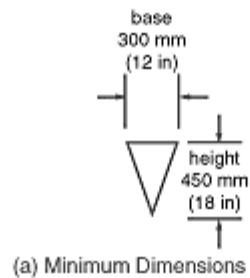
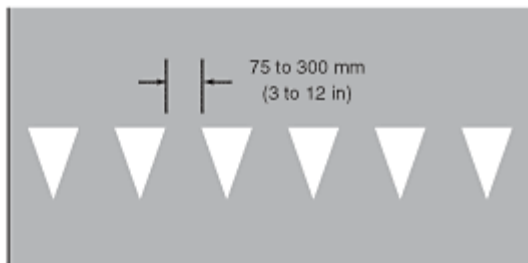
- Use the in-street STATE LAW YIELD TO PED sign on only streets with less than five lanes and 11-foot wide, or wider, travel lanes. Use one sign for two lane roads and two signs on three and four lane roads, unless the signs are mounted on both noses of a pedestrian refuge island.
- Aid snow plowing by removing in-street signs between November 15th and April 15th.

Attachment

Triangle Yield Lines at Court Street/Fourth Ave, Iowa City (photo taken before the red border was added to the sign).



Design for Pavement Markings - Triangle Yield Lines



Notes:
Triangle height is equal to
1.5 times the base dimension.

Yield lines may be smaller than
suggested when installed on much
narrower, slow-speed facilities such
as shared-use paths.

Source: Manual of Uniform Traffic Control Devices, 2003

**In-Street STATE LAW YIELD TO PED Sign &
YIELD HERE TO PED Sign
Location Evaluation**
Adapted from the *City of Madison*

Location: _____ Study Date: _____

Criteria		Observations / Comments	Criteria Met	Criteria Not Met
<i>Required³</i>				
Pedestrian Volume	40 during peak hour plus evidence of significant ped activity throughout the day.			
Speed Limit	≤ 35 mph			
Traffic signal or stop sign	If yes, no sign installed			
General Area Characteristics	Area w/ significant ped generators such as trail, retail, office, hospitals, etc. that generate ped traffic throughout the day			
<i>Not Required</i>				
Gap Availability	< 50%, or less than one every 30 seconds			
Avg. Wait Time	> 10 seconds			
Crosswalks ¹	Marked crosswalk (XW) or street intersection (if XW not painted, but other conditions met, then you may paint crosswalk and install sign)			
Street Cross-Section	Indicate number of lanes, lane widths, parking, etc.	Drawing on back.		
Median/Ped refuge Island	Not required, but indicate if present and width			
Collision History	If yes, describe			
Minimum Required Stopping Sight Distance ²	25 mph 155 ft 30 mph 200 ft 35 mph 250 ft			
Other Restrictions and Observations	Consider turning radii and driveway conflicts			
	County, State, or Federal highway would need approval of Johnson Co. or Iowa DOT			

1. Only mid-block crosswalks may have the curbside YIELD HERE TO PED sign as alternative.
2. Stopping sight distance from *A Policy on Geometric Design of Highways and Streets*, 2001 (AASHTO Green Book) page 112.
3. Signs may be considered for locations that do not meet criteria, only if additional road improvements are made to either reduce the speed of traffic and/or to reduce the number of conflict points the pedestrian encounters (e.g., speed table, bulb-outs, refuge island).

Recommendation:

By: _____ Date: _____