

# DRIVER YIELD

## DATA COLLECTION METHOD

### Introduction

Pedestrian and bicyclist safety is important for livable communities and relies on the cooperation of drivers to look, legally stop, and yield to people using crosswalks. This protocol provides a standard method for measuring whether a project conducted at a location focused on improving pedestrian safety is achieving that goal by measuring driver yielding rates.

This document serves as a guide and in no way provides explicit training or safety protocols. Conditions may vary in the field and individual judgment and discretion must be applied for personal safety and liability.

### Staffing Requirements

- Data collection teams must consist of **2-3 people** who understand and have read through this data collection method. They will alternately serve as either the staged pedestrian or as recorders. The staged pedestrian will initiate the yield request to on-coming vehicles and cross the street once vehicles yield and the recorder will take note of driver behaviors on the data collection sheet.
- When collecting before and after data to evaluate a countermeasure or design change, try to maintain the same coding team for both data collection time frames.

### Overview

The staged pedestrian, also referenced as the “decoy,” establishes their intent to cross the street while the recorder collects information the number of cars that pass before a driver stops, the stopping distance of the yielding car, and the average time from initiating the crossing to being able to walk across the street. This study should be conducted for projects installing a marked crosswalk or other crossing enhancements in uncontrolled locations (without a traffic signal or stop sign control).

- The site will be prepared using the ***Preparing the Location*** instructions below.
- The team member first serving as staged pedestrian will read the ***Safe Crossing Protocol*** aloud to the recorder then proceed with first staged crossings using the ***Staged Pedestrian Crossing Instructions***. The recorder should be positioned to be, as much as possible, inconspicuous to both the pedestrians and drivers.

- If other pedestrians are attempting to cross, the staged pedestrian should avoid attempting to cross at the same time.
- After the first team member has made 20 crossings, the next team member will then assume the role of staged pedestrian by first reading the **Safe Crossing Protocol** aloud to the newly assigned recorder before proceeding with the final 20 staged crossings using the **Staged Pedestrian Crossing Instructions**.
- Recorders will follow **Recorder Instructions** as they observe the staged pedestrian crossings. They will collect data about the yielding behavior of drivers coming from midblock to the crosswalk, after the staged pedestrian has stepped off the curb and safely taken the right of way.
- Data sample size should be at least 40 staged crossings. <sup>1</sup>

## Materials and Scheduling

This section outlines the data collection methods for conducting a driver yield study in the field and provides guidance on what materials are needed, a preparation checklist, and general instructions for data collection.

### Materials

Both team members should wear ordinary, weather appropriate clothing and comfortable shoes.

Each member should have multiple data collection forms, a pencil to take notes and easily correct entry errors, and a clipboard with the **Safe Crossing Protocol** (below) taped to the back of the clipboard to easily reference and read aloud.

### Scheduling

Select a day and time with clear weather conditions (i.e., not during rain or wet surface conditions) and during daylight hours (i.e., not during dawn, dusk, or dark conditions). Data collection should occur between the hours of 9:00 am and 3:30 pm to avoid rush hour traffic conditions. If the crossing location is near a school, consider including school arrival or dismissal times within the coding session time frame. Be sure to receive proper approval from supervisors before entering the field.

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<sup>1</sup> From National Highway Traffic Safety Administration (NHTSA), [High Visibility Enforcement on Driver Compliance with Pedestrian Right-of-Way Laws](#).

### MATERIALS NEEDED

- ❖ Data collection forms and clip board with safety protocol taped on the back
- ❖ Pencils with erasers
- ❖ Stopwatch
- ❖ 3 Safety Cones or Chalk
- ❖ 50 – 250 ft. of measuring tape or a measuring wheel

## Preparing the Location

Data collection shall only take place at **locations that allow adequate time for vehicles to see and respond to pedestrians.**

### Site Assessment

Bring aerial print outs from Google Maps or other source information showing the crossing location with noted signs/markings/characteristics to compare against field conditions. The team members should take pictures of the crossing location and note any differences between the aerial and the real-world geometric configuration of the site, including presence of crosswalk signs, by type. If aerials are not available, use the data collection sheet to sketch the existing conditions.

### Choosing the Crossing

To minimize complexity, data collection will focus on only the first half of the crossing in one direction of travel for both the pedestrian and the driver. Choose the crosswalk and direction of travel where drivers coming from the left will be expected to yield on the street segment, and not in the intersection. See diagram below.

### Mark the Dilemma Zone

The **dilemma zone** is a concept used in pedestrian law enforcement operations across the country and is the location to demarcate a point on the street after which a driver would not have sufficient time to safely yield the right of way. The dilemma zone takes into account driver reaction time, safe deceleration rate, the posted speed, and the grade.

From the edge of the crosswalk, use the measuring wheel or tape, measure to the far edge of the dilemma zone according to the road's speed limit (see Table 1). Place a cone at the far edge of the dilemma zone so the recorder and the staged pedestrian can easily see when a car will cross into the dilemma zone.

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Measuring from the edge of the crosswalk again, mark 10' and 40' distances with additional cones or chalk on the curbside so that the recorder can see the distance where drivers wait while the decoy crosses the street.

**Table 1 Visibility Parameters**

Speed limit	Distance for cone placement from edge of crosswalk (e.g., far edge of Dilemma Zone <sup>2</sup> )	Spray paint or additional cones placement from edge of crosswalk
25 mph	110'	10', 40'
30 mph	140'	10', 40'
35 mph	183'	10', 40'
40 mph	234'	10', 40'

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<sup>2</sup> From NHTSA, [High Visibility Enforcement on Driver Compliance with Pedestrian Right-of-Way Laws](#), and Morris, Nichole (July 2019) Evaluation of Sustained Enforcement, Education, and Engineering Measures on Pedestrian Crossings, Human FIRST Program Department of Mechanical Engineering, University of Minnesota, Project Summary Report Final Report 2019-29.

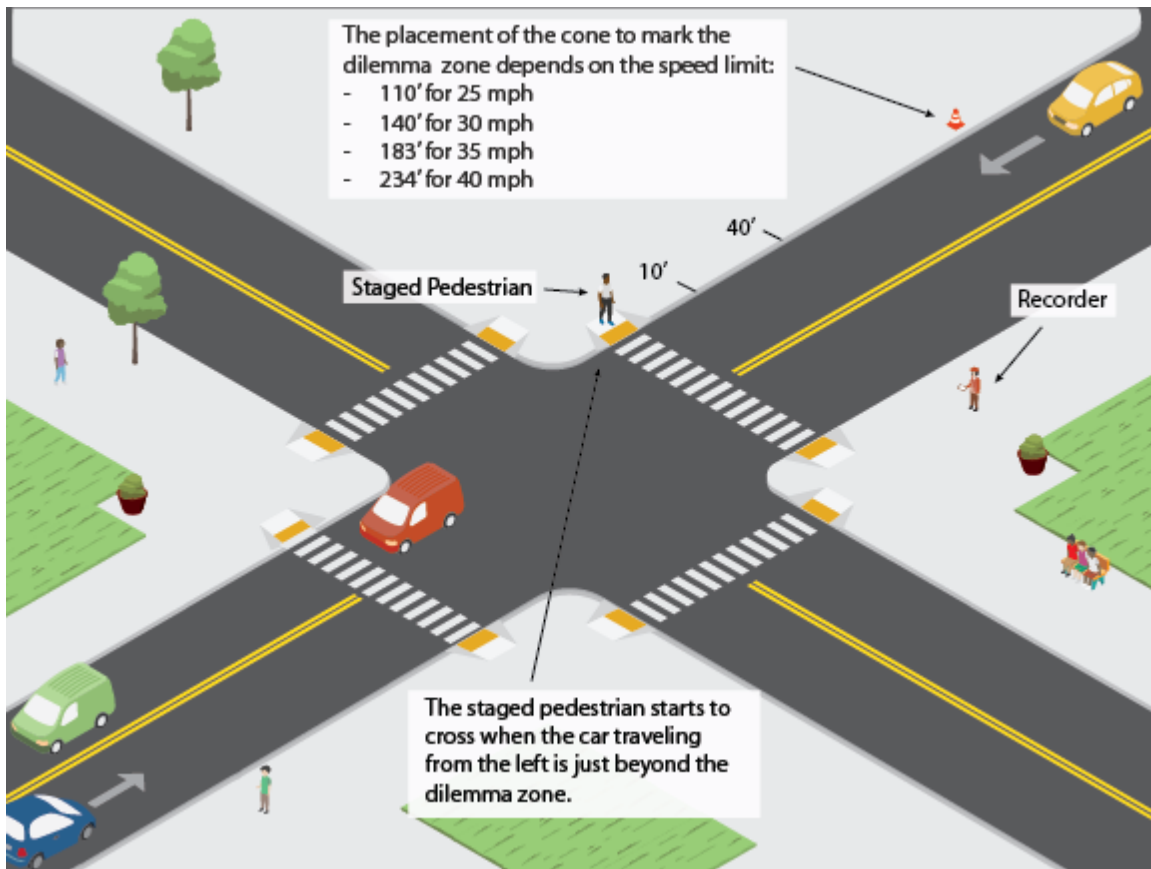


Figure 1 Example data collection set up: Use chalk or cones to mark the 10' and 40' distance from the crosswalk and a cone to mark the start of the dilemma zone.

## Staged Pedestrian Crossing Instructions

All crossings should follow the **Safe Crossing Protocol**. The crossing instructions includes the following procedure:

1. When a vehicle is approaching the far edge of the dilemma zone from the same side of the street you are on, place one foot off the curb and into the crosswalk. If there is on-street parking close to the crosswalk, you will need to step out to the edge of parked cars.

**Important:** The dilemma zone is marked to ensure a safe stopping distance for vehicles traveling at the posted speed. Ensure no cars are within the dilemma zone before initiating a staged crossing.

**Important:** Do not take additional steps until a vehicle yields or a sufficient gap presents itself.

**Important:** If the vehicle is traveling at an excessive speed or too close to the curb face or parking lane, the staged pedestrian should step back as the vehicle approaches.

2. If the vehicle makes no attempt to stop, do **not** proceed to cross. The recorder will count the number of vehicles passing until you can proceed.
3. If the vehicle clearly begins to yield and the next lane is free, begin lane crossing. You may wave to the first yielding vehicle to indicate your intention to cross.

**Important:** If you see a vehicle rapidly approaching the stopped vehicle in the same lane ensure it comes to a safe stop before proceeding into the lane of the stopped vehicle.

4. On roads with more than one lane in each direction, always stop at the lane line outside of the path of coming vehicles. Make sure the next lane is clear to begin crossing.

**Important:** Stopping at the lane line is essential to prevent the possibility of being involved in a Multiple Threat crash. Simply looking without stopping is not enough because you have a limited reaction time and if crossing at a normal speed, you will not be able to react in time. Get into the habit of making a brief stop even if the car yields further back.

5. If the vehicle yields in the next lane, wave to the vehicle and proceed to the centerline or median. If that vehicle is inside the dilemma zone, the recorder will score that driver as yielding. If they do not yield, mark them as not yielding.
6. Wait for a gap in traffic from the opposite direction and continue the crossing when it is safe to do so.
7. When a gap appears in traffic (all cars are outside of the dilemma zone and traveling at normal speeds), return to the starting location.

**Important:** Continue to use judgment to cross safely and ensure no vehicles approaching the crosswalk are speeding (which requires more distance to stop) before stepping out into the lanes.

## Recorder Instructions

If there are two recorders, one can mark the data collection sheet while the other starts and stops the stopwatch. Recorders can help each other by calling out the distance yielding and pedestrian delay time.


Using the 'Staged Crossing Form,' record the following:

- Number of cars failing to stop (by lane where the road has multiple lanes)

- Number of cars stopping (by lane where the crossing includes multiple lanes and by stopping distance)
- Time elapsed from the time the decoy steps into the crosswalk to when the decoy continues crossing the street.

Place yourself in a position away from the crosswalk as to not give false indication of intention to cross, but where you are able to view the movements of the staged pedestrian, the "dilemma zone" cones, and the yield distance markings.

## Staged Crossings

1. When the staged pedestrian steps into the crosswalk, start the stopwatch. You will stop the stopwatch when the staged pedestrian commences the walk across the street after the first vehicle yields (in Step 3). There is no need to watch the stopwatch.
  - Stop the stopwatch when the decoy proceeds to walk across the street, not when the vehicles stop or come to their slowest speed. Vehicles rarely come to a full stop and this can lead to confusion for the recorder.
2. Observe vehicles approaching from the lanes of travel on the pedestrian's side of the street.
3. After Step 1, any vehicle approaching should be coded. If the vehicle makes no attempt to stop, count it as "**Cars Not Yielding**". Any subsequent vehicles that do not stop should also be counted as "**Cars Not Yielding**". Count the car using tic marks (e.g., ). For multilane roads, the lane closest to the median is Lane 1 and the lane closest to the decoy is Lane 2 or 3 (depending on number of lanes).
4. When the first car yields, code the yielded vehicles as follows in one of the "**Distance of First Yielding Car from Crosswalk by Lane**" bins:
  - If the 10' from crosswalk mark (or cone) is not visible because the vehicle has passed it (i.e., they are stopped very close to the crosswalk), score them in the "**Less than 10ft**" yielding bin.
  - If the 10' mark (or cone) is visible because the vehicle has not passed it (i.e., stopped slightly further back from the crosswalk), score them in the "**10-40ft**" yielding bin.
  - If both the 10' and 40' marks (or cones) are visible because the vehicle has not passed either of them (i.e., stopped at a distance back from the crosswalk), score them in the "**More than 40ft**" yielding bin.

5. On multilane roads, if a vehicle yields in the lane closest to the decoy but other vehicles in the same direction of travel do not stop, score them as “**Cars Not Yielding**” and make note of each one in the “**Pass**” bin under the Multiple Threat Conflicts.
6. Record the time elapsed (including 100<sup>th</sup> of seconds) in the “**Ped Delay**” column. **Zero stopwatch.**
7. If one of the vehicles brakes hard (e.g., audible tires screech or visible downward vehicle nose) then score it as “**Hard Brake**” under the Multiple Threat Conflicts section.
8. If the pedestrian must move themselves out of harm’s way to avoid a vehicle (e.g., step back out of the road, or move quickly forward to avoid the vehicle), then code it as an “**Evasive Action: Ped**”, if a vehicle must quickly swerve to avoid the pedestrian or another yielding vehicle, then code it as an “**Evasive Action: Veh.**”
9. Watch the remainder of the crossing after the pedestrian reaches the centerline.
10. If the vehicles in the opposite lane of travel do not yield so that the pedestrian is forced to stand on the centerline with vehicles moving in both lanes of travel, code this event as “**Trap**” with an X.

Importantly, you serve as extra eyes to help keep your partner safe. If the staged pedestrian fails to follow protocol (e.g., does not stop at lane’s edge or check for Multiple Threat Conflicts), code the crossing under “Protocol Failure”. Give real-time feedback to your partner and review protocol with them. Alert supervisors for any safety concerns you have about safety training of you or your partners or of specific crosswalks.

## Reporting

After data collection, record the total numbers of each field into the Excel version of the Crossing Forms. Totals for each column are summed in the “Data Summary” tab. When completed, submit the Excel sheets and scanned copies of your hand-recorded data forms via the Active Transportation Resource Center website.

## **Safe Crossing Protocol**

This protocol should be taped to the clipboard and read aloud before each staff member serves as the staged pedestrian for 20 staged crossings.

- Always stay alert and be aware of traffic from all sides and all lanes.
- Follow the Crossing Instructions closely.
- Do not put yourself in an unsafe situation. If a vehicle is traveling too fast or too close, step back to a safe position.
- Always ensure that the oncoming vehicle is clearly yielding and has come to a stop before proceeding.
- Watch the tires to be sure the car is not moving, even if you have obtained eye contact or a wave.
- Use clear body language to continue the crossing that signals to drivers that you intend to cross in front of them.
- Always pause when passing from one lane into another to make sure the next lane is clear. On roads with more than one lane in each direction, always stop at the lane line to check for oncoming vehicles before proceeding.
- Above all, do not attempt to cross if it cannot be done safely!