Yellow LED Border on Pedestrian Signal

Pedestrian signals modified with actuated yellow LED borders provide notification to motorists and pedestrians that the traffic signal has received a call to serve a specific crosswalk.

WHAT IS THE NEED?

The conflict between pedestrians using crosswalk and turning traffic at intersections poses a safety risk to pedestrians. To mitigate the risk, Caltrans engineers conceived a new safety feature for pedestrian signal – Yellow Pedestrian Border (YPB). YPB is a new feature that a yellow LED light border is added around the pedestrian signal (See Picture 1). YPB is a supplement to the existing standard pedestrian signal display, which provides a direct feedback to pedestrians who push the crosswalk button. Furthermore, YPB also makes the pedestrian signal more visible, which alerts drivers that the pedestrian signal is about to serve a crosswalk.

A preliminary study conducted in Redding, CA, demonstrated the benefits of YPB and its impact on pedestrian safety. This research is an extension to the preliminary study, which aims at testing and assessing the YPB safety benefits at different locations and traffic conditions.

WHAT ARE WE DOING?

The Principal Investigator will collect data before and after the YPB installation, about pedestrian and vehicle movements, and pedestrian and driver feedback. Data will be analyzed in a laboratory, to evaluate the effect of YPB on pedestrian safety and compliance. Unlike the preliminary study, which has all the studied intersections in one city, the intersections selected for this study are distributed statewide, such that the regional difference in vehicle-pedestrian interactions can be captured. The selected sites are located from Orange County in the south, to Humboldt County in the north; representing different traffic, geometric and environmental conditions.
Data Collection
The study requires the collection of the vehicle volumes (in the conflicting movement, such as right or left turn), pedestrian-vehicle conflicts, driver and pedestrian awareness of YPB, repeated pushes of call button, and driver and pedestrian compliance.

On-site Observation
For the sites without video cameras, on-site observations will be made. Due to budget and time constrains, two site visits are planned for each intersection: one visit before the YPB activation, and one visit after the YPB activation.

On-site Survey
Additionally, an on-site survey, instead of an on-line survey, will be conducted in the after study; since the research team received a low response rate for the internet survey from the preliminary study.

Data Analysis
The data collected on-site will be tallied, and screened for errors at a laboratory. Video footage recorded at one or more study sites will be processed, to extract relevant statistics that include vehicle-pedestrian conflicts and signal violations.

WHAT IS OUR GOAL?
The main anticipated result of this study is to find out whether the YPB’s safety benefits observed in the preliminary study, hold at other sites across the state. These benefits are measured by three indicators:

1) Frequency of vehicle-pedestrian conflicts
2) Pedestrian compliance
3) Extra button pushes

WHAT IS THE BENEFIT?
The following data was collected from the preliminary study, which clearly indicated that YPB is improving pedestrian safety and awareness at signalized intersections:

- Pedestrian-vehicle conflicts reduced by 17.1%,
- Pedestrian violations significantly decreased by 28.4%,
- Extra button pushes drastically decreased by 60.2%.

Five intersections across California are selected for further testing, to determine if the benefits of YPB hold under various intersection settings and traffic conditions.

WHAT IS THE PROGRESS TO DATE?
YPB modules and cameras were successfully installed at four locations listed below:

- SR-1 / Broadway Street in Laguna Beach, CA
- SR-29 / Adams Street in St. Helena, CA
- SR-101 / W. 14 Street in Eureka, CA
- SR-1 / E. Redwood Avenue in Fort Bragg, CA

The sites were monitored regularly using a remote smart phone application. Districts staff assisted with the logistics and installations.

IMAGE

Picture 1: Pedestrian Signal with Yellow LED Border