NCHRP 17-56: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments

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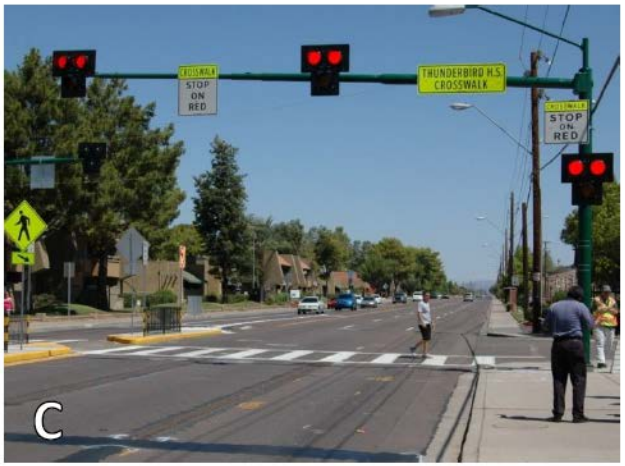
Research objective

Develop CMFs for four types of pedestrian treatments at unsignalized pedestrian crossings:

A. Advance yield or stop signs and pavement markings
B. Pedestrian refuge islands
C. Pedestrian hybrid beacons (PHBs)
D. Rectangular rapid flashing beacons (RRFBs)



Data and methods

- A total of ~500 treatment and ~500 comparison sites from 14 U.S. cities
  - Many treated sites had more than one treatment
- Site data collected regarding the treatment characteristics, volumes, geometric features, roadway variables, and crashes
  - Collected in-field and through Google Earth
- Data analysis involved the development of cross-sectional regression models and before/after empirical Bayesian analysis techniques

Key findings

Treatment	Recommended Pedestrian CMF	
	Estimate	Standard error
PHB + Advanced Stop	0.432	0.134
PHB	0.453	0.167
RRFB	0.526	0.377
Refuge Island	0.685	0.183
Advance Stop	0.750	0.230

Study limitations and implications for future research needs

- Not applicable to all types of sites
  - Study focused on urban/suburban multilane roads
  - Some treatments only in a small subset of cities
- Larger samples needed to develop:
  - CMFs for different pedestrian crash severities
  - CMFs for other treatments and combinations of treatments
  - Crash Modification Functions for practitioners
- Improved pedestrian exposure data collected by agencies would provide more reliable results

Implications for practice

- Potential venues for integrating research results:
  - AASHTO's Highway Safety Manual (HSM);
  - AASHTO's Guide for the Planning, Design, and Operation of Pedestrian Facilities;
  - FHWA's Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE);
  - FHWA's CMF Clearinghouse;
  - FHWA's Proven Safety Countermeasures website;
  - NCHRP Report 600 Human Factors Guidelines for Road Systems, Second Edition;
  - Manual on Uniform Traffic Control Device (MUTCD); and
  - Design guidance for uncontrolled pedestrian crossings.