Rectangular Rapid Flashing Beacons (RRFB) for Pedestrian Crossings

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Texas A&M Transportation Institute

TexITE August 31, 2012

History

- Idea: use beacon from emergency flashers on police vehicles
- Eye catching
- First installed in Florida in early 2000s
- FHWA Interim Approval – July 16, 2008
  - http://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/fhwamemo.htm

Flash Pattern

- “Stutter flash” effect
- Wig-wag sequence (was)
  - Left / “slow”: 2 X [124 ms on / 76 ms off]
  - Right / “rapid”: 4 X [25 ms on / 25 ms off]
- June 13, 2012 FHWA interpretation clarifies flash pattern
  - 70 to 80 flashing periods per minute
  - Left / “slow”: 2 X [124 ms on / 76 ms off]
  - Right / “rapid” + “long”: 4 X [25 ms on / 25 ms off] + 200 ms

Results from FHWA Study

Ron Van Houten & Jim Shurbutt

Western Michigan University

Motorist Yielding

Study Locations

- Collected data at 22 sites:
  - 19 St. Petersburg, Florida
  - 2 Mundelein, Illinois (school crossings)
  - 1 Washington, DC
- For 18 of the 22 sites:
  - 2-year after data

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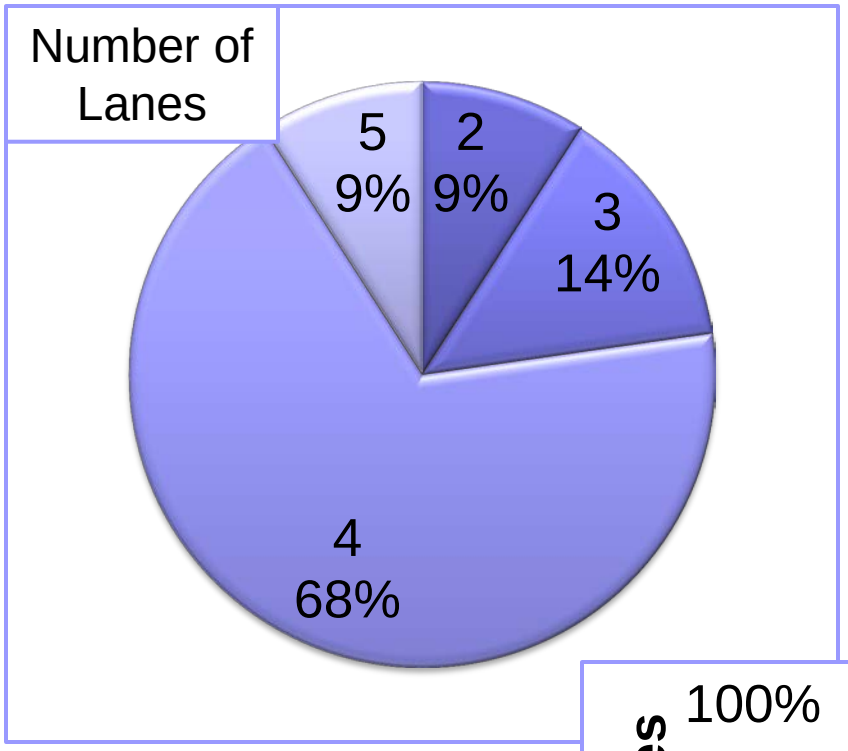
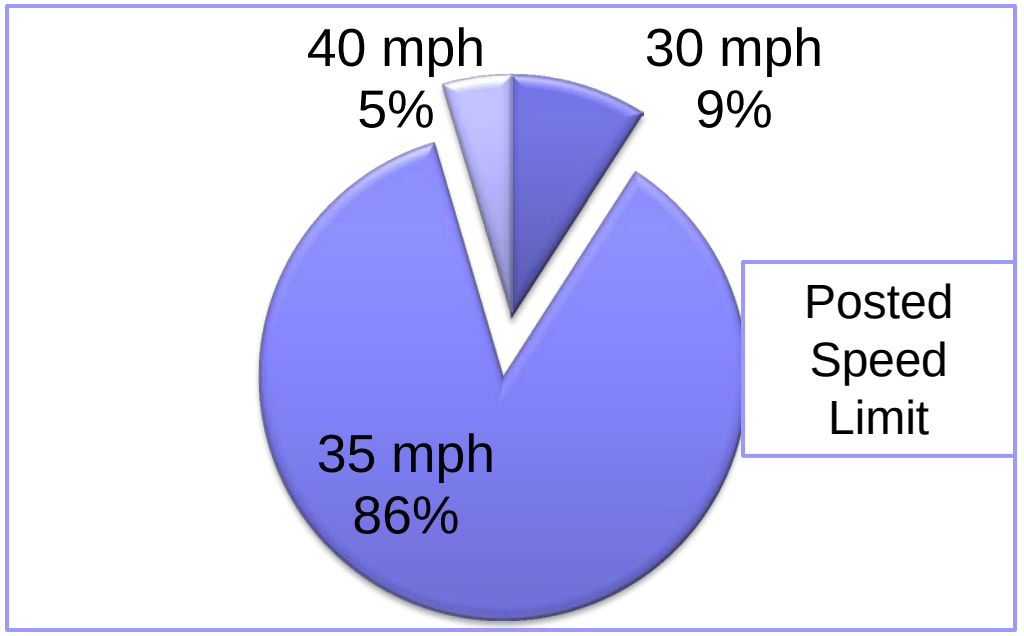
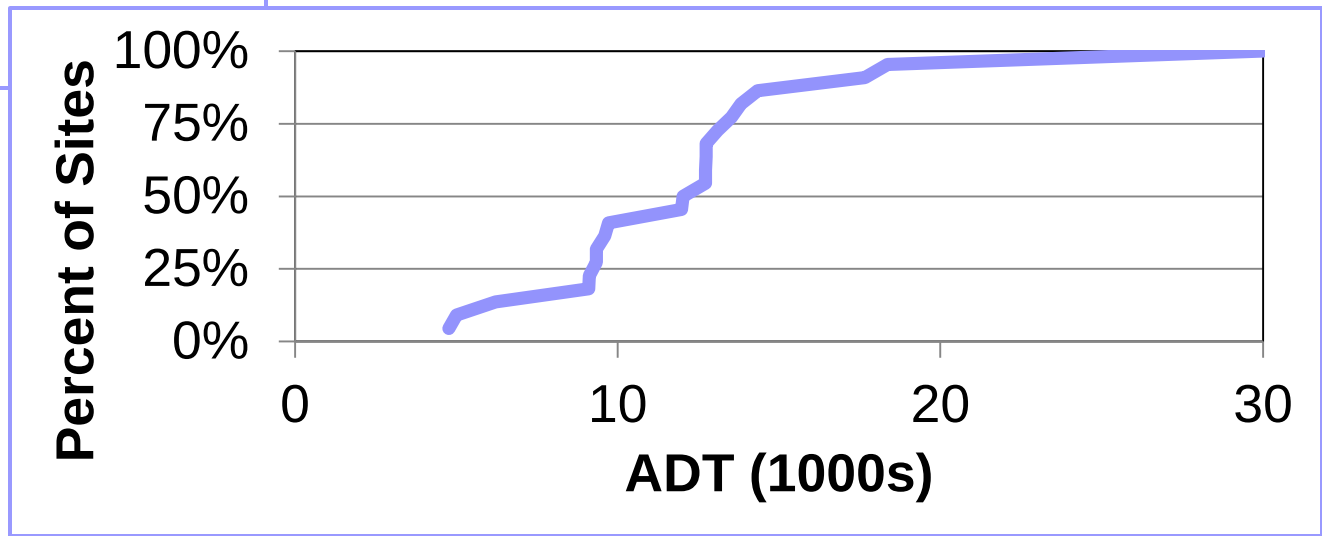
RRFB Site Characteristics





Median	RRFB
Yes	32%
No	68%



Study Method

- Staged pedestrian
- Recorded data for 20 to 40 crossings
- Count of drivers who:
  - Stopped or slowed and allowed pedestrian to cross
  - Did not yield = passed in front of pedestrian but would have been able to stop

Motorist Yielding Results

Time	Range	Mean
Baseline	0 to 26%	4%
One week	64 to 97%	79%
One month	62 to 96%	84%
Two years	72 to 96%	84%

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Results from Garland Study

Marcus Brewer & Kay Fitzpatrick

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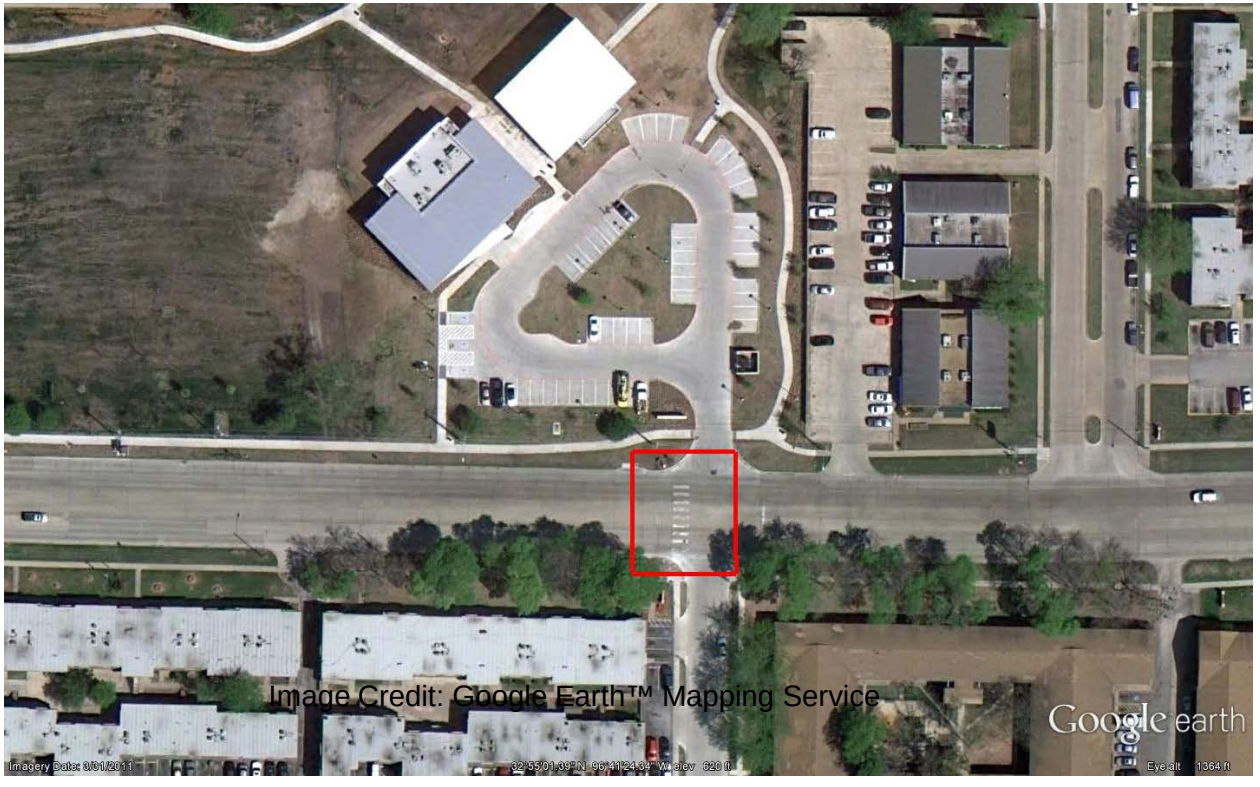
Motorist Yielding

Study Site

- Walnut at Bullock, Garland, TX
- Crossing 4 lanes with TWLTL, 35 mph
- 20 mph school zone w/ crossing guard



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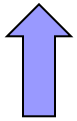
Treatment

- RRFB activated May 27, 2011
- Bi-directional assembly on each curb and on mast arm above TWLTL

Motorist Yielding Findings

Time	Before			After Results		
	Date	# Cross	%	Date	# Cross	%
w/ Crossing Guard						
PM School Zone	5/17/11	15	91%	10/6/11	13	92%
AM School Zone	5/18/11	6	100%	10/7/11	7	81%
PM School Zone	5/18/11	12	79%	10/7/11	11	98%
Staged						
PM Peak	5/17/11	40	< 1%	10/6/11	40	81%
Mid-afternoon	5/18/11	40	< 1%	10/7/11	40	78%



FHWA Study (Current)

Questions Being Asked

- Several devices w/lights
  - Overhead beacons (yellow or red), roadside beacons, LED embedded signs, etc.
- Several combinations
  - Flash rate, flash pattern, brightness, shape and size of beacons/LEDs, placement (within, top, bottom, etc.)
- **What is optimal?**
- **What about glare?**

FHWA Study Design

- Focus on:
  - Beacon shape and size (circular 12 inch, circular 8 inch, rectangular)
  - Placement (above, below, both)
- Driver detection of:
  - (1) Light, (2) sign, (3) read symbol, (4) object
- Select devices for on-road study
- **Looking for agencies willing to test devices**

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Closed-Course Study @ TAMU Riverside Campus

C-A12

C-B12

C-B8

C-V12

R-B

R-A

LED

No Beacon

Closed-Course Study @ TAMU Riverside Campus

C-A12

C-B12

C-B8

C-V12

R-B

R-A

LED

No Beacon

TxDOT Study (current)

TxDOT Study

- Looking for sites!
- Want to examine yielding for a range of:
  - Posted speed limits
  - Crossing distance
- **Please let us know where you are considering RRFB, Pedestrian Hybrid Beacons, or other pedestrian treatments**

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Wrap Up

Status for RRFB

- Interim approval (national)
- Desired = crash reduction factor
- Desired = guidance on speed limits, crossing distance, ADTs appropriate for device
- Desired = better understanding of what affects effectiveness

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References on RRFB

- *Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks*
  - TechBrief, FHWA-HRT-10-046
    - http://www.fhwa.dot.gov/publications/research/safety/pedbike/10046/10046.pdf
  - Research Report, FHWA-HRT-10-043
    - http://www.fhwa.dot.gov/publications/research/safety/pedbike/10043/10043.pdf
- Tech Memo on Garland Study (request via email to Kay, Marcus, or Robert)

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QUESTIONS

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