Western States Rural Transportation Consortium (WSRTC)

Development of Radar Speed Sign Warrants

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Presentation

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Development of Radar Speed Sign Warrants

David Veneziano, Jared Ye and Larry Hayden
Western Transportation Institute – Montana State University

Ian Turnbull
Chief, Office of ITS Engineering and Support, Caltrans District 2

Kristi Westoby
Chief, Office of Traffic Investigations, Caltrans District 2

Sean Campbell
Caltrans Division of Research and Innovation
Overview

• Introduction
• Objectives
• Past work
• Existing direction
• Development of guidance
• Guidance
• Conclusion(s)
Introduction

• Radar speed signs have seen increased application in recent years
  – Mobile (trailer), permanent (pole) or portable (smaller pole mount)

• Used to reduce traffic speeds
  – Used in school and work zones, residential areas, high-to-low speed transition areas

• Deployment typically driven by subjective judgment rather than engineering studies
Examples

Image source: Veneziano

Image source: Turnbull

Image source: Veneziano
Objectives

• Establish criteria regarding when/how signage can be deployed and operated to address safety and speed issues
  – Establish applicable situations for radar speed sign use (ex. speeding issues)
  – Determine whether signs have been effective in similar applications
  – Provide guidance on where signs should be located (settings)
  – Develop physical and functional specifications for signage (not discussed here)
Past Work

• Past research/evaluations consulted in developing new guidance
  – Work focused on effectiveness on speeds, negligible safety evaluation

• Speed studies identified a number of specific applications of signage
  – Work zones
  – School zones
  – Other locations – residential, commercial, speed transition zones
Past Work

• Work zone effectiveness
  – Trailer: 2-9 mph reduction
  – CMS/Radar: 2-10 mph reduction
  – Post-mounted: 3 mph reduction

• School zone effectiveness
  – Trailer: 1-5 mph reduction
  – Permanent sign: 1-9 mph reduction

• Other location effectiveness
  – Trailer: 1-5 mph reduction
  – Permanent sign: 2-8 mph reduction
Existing Direction

- **California MUTCD**
  - **Option**
    - A Vehicle Speed Feedback sign that displays to approaching drivers the speed at which they are traveling may be installed in conjunction with a Speed Limit (R2-1) sign
    - When used, the Vehicle Speed Feedback sign may be mounted on either a separate support or on the same support as the Speed Limit (R2-1) sign
  - **Standard**
    - If a Vehicle Speed Feedback sign displaying approach speeds is installed, the legend shall be YOUR SPEED XX
    - Vehicle Speed Feedback signs shall not alternatively be operated as variable speed limit signs
  - **Guidance**
    - To the degree practical, numerals for displaying approach speeds should be similar font and size as numerals on the corresponding Speed Limit (R2-1) sign
  - **Support**:
    - Driver comprehension may improve when the Vehicle Speed Feedback Sign is mounted on the same support below the Speed Limit (R2-1) sign
    - Vehicle Speed Feedback Signs are appropriate for use with advisory speed signs and with temporary signs in temporary traffic control zones
Existing Direction

• Enterprise Program warrants transition zones, posted speed adherence and intelligent work zones
• Employed series of questions related to application of interest to determine use
• If responses to more than one question were yes, sign was justified
  – Of interest – specification of 5 miles between signs
• Limitation – no documentation on how guidance was developed
Development of Guidance

- Developed based on past results and existing CA MUTCD information
- Review of past evaluation identified different application types
  - Excessive mean and 85\textsuperscript{th}% speeds
  - School and work zones
  - Safety concerns
  - Transition zones
  - Posed speed noncompliance
  - Pedestrian presence
  - Etc.
Development of Guidance

• Two levels of guidance developed: General and Location-specific
  – Based on past uses identified in literature and through survey of CA practitioners
• General guidance – direct use in addressing general concerns (ex. mean and 85\textsuperscript{th}% speeds, ADT, etc.)
• Location-Specific – direct use in addressing site concerns (ex. school and park zones, work zones, etc.)
General Guidance

• 85th percentile speed - A sign may be considered when the observed 85th percentile speeds at a site exceed the posted speed limit by 5 mph or more

• Mean speed – A sign may be considered when the observed mean speeds at a site exceed the posted speed limit by 5 mph or more

• Average daily traffic – A sign may be considered when ADT exceeds 500 vehicles

• Accidents – A sign may be considered at sites exhibiting a correctable speed-related accident history within a recent time period

• Pedestrians – A sign may be used at sites with a pedestrian-related accident history

• Posted speed limit – A sign may be considered in conjunction with other guidance when the posted speed limit at a site is 25 mph or greater
Location-Specific Guidance

• Schools and parks
  – A sign may be considered for use within one half mile of a school zone or park, and
  – A sign may be considered when the posted speed limit in a school zone or park area is 15 mph or greater, and
    • A sign may be considered when the 85th percentile speeds in a school zone or park area exceed the posted speed limit by 5 mph or more, or
    • A sign may be considered when the observed mean speeds in a school zone or park area exceed the posted speed limit by 5 mph or more, or
    • A sign may be considered when ADT exceeds 500 vehicles, or
    • A sign may be considered to supplement a conditional speed limit already in place (e.g., a sign stating: Speed Limit 25 when Children Present)
Location-Specific Guidance

• Work zones
  – A sign may be considered when the posted speed limit in a work zone is 35 mph or greater, and
    • A sign may be considered when the observed mean speeds in a work zone exceed the posted speed limit by 10 mph or more
    • A sign may be considered when the observed 85th percentile speeds in a work zone exceed the posted speed limit by 10 mph or more
    • A sign may be considered when there have been speed-related accidents in a work zone
Location-Specific Guidance

• Street conditions
  – Transition zones—A sign may be considered in conjunction with other guidance where a speed transition zone exists (high to low speed limits).
  – Curve warning – A sign may be considered in conjunction with other guidance where a curve speed warning advisory sign exists (high to low speed).
  – Signal approach – A sign may be considered in conjunction with other guidance for high-speed signalized intersection approaches where the speed limit exceeds 45 mph
Conclusions

• Primary purpose of work was to develop guidance for deployment in a systematic manner

• Past results indicated signs were used in a number of common applications
  – Achieved reductions in speeds

• Two levels of guidance developed: General and Location-specific
Conclusions

• General guidance – direct use in addressing general concerns
• Location-Specific – direct use in addressing site concerns
• Systematic deployment based on guidance could lead to better compliance with posted speeds
  – More uniform application – avoidance of “sign saturation”
Disclaimer

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Questions