Innovative Devices for Implementing Short Term Work Zone Speed Limits (WZSLs)

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WZSL Issues in Texas

- Unrealistic reductions for conditions
- Posted 24/7 vs. when conditions warrant
- Posted for entire work zone vs. in vicinity of work
Potential Consequences

- Disregard for WZSLs
- Disregard for other work zone signing
- Greater difference among vehicle speeds
- Angry or aggressive drivers
- Negative public opinion of work zones
Texas House Bill 1925

“remove or cover…a sign that restricts the speed limit in a…work zone…during any period when no hazard exists that dictates the need for a restricted speed limit.”
What Are Short Term WZSLs?

- Reduced regulatory speed limits
- Work activity only hazard present
- Posted only when work is active
- Cover/remove signs when work not active
Implementation Issues

- Daily set-up/removal of signs
  - Additional task for contractor
  - Cumbersome & time consuming
  - Reduces overall work productivity
  - Forget or choose not to do

- Failure to cover/remove signs turns short term speed reductions into long term reductions
TxDOT Project 0-5561

- 2 year effort
- Completed in August 2008
- Objectives
  - Improve existing procedures on establishing & maintaining WZSLs
  - Evaluate new technologies that can be used to better manage WZSLs
Innovative Devices
Devices Evaluated
Long Term Evaluation

- Devices
  - Static SL signs
  - ESL signs

- Evaluations
  - Field study
  - Motorist surveys
  - Police discussions
Field Study Description

- 9 mile widening project
- 70 mph reduced to 60 mph
- Timeline
  - May – “before” data
  - July – installed ESL signs
  - August – 1st “after” data
  - December – 2nd “after” data
- Free flow vehicle speeds
Field Study Results

- No practical difference in
  - Mean speeds
  - % exceeding the speed limit
  - Speed variance
- ESL signs did not negatively impact operations
- ESL signs allowed inspector to more easily change speed limit for conditions
Motorist Surveys

- 100 participants
- 84% had seen ESL signs
- 98% thought SL changes
  - 56% workers present
  - 20% work conditions change
- 88% thought effective
- 100% thought could get speeding ticket
Police Discussions

- ESL Advantages
  - More visible
  - Easy to read
  - Log book
  - Auto day/night

- ESL Concerns
  - Numerals orange
  - Changing too often
  - Not same in both directions
  - Malfunctioning
  - Obtaining log book
  - Vandalism
Short Term Evaluation

- **Devices**
  - Static SL signs
  - ESL sign trailers
  - Roll-up SL signs

- **Field study**
  - 2 seal coat projects
  - 70 mph reduced to 60 mph
  - Free flow vehicle speeds
## Short Term Field Study Results

<table>
<thead>
<tr>
<th>Location</th>
<th>Treatment</th>
<th>Mean Speed (mph)</th>
<th>% Exceeding the Speed Limit Downstream of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Free Flow (SL=70)</td>
<td>Downstream of Treatment (SL=60)</td>
</tr>
<tr>
<td>I30</td>
<td>Standard</td>
<td>70.0</td>
<td>65.7</td>
</tr>
<tr>
<td></td>
<td>Roll-up</td>
<td>70.2</td>
<td>63.8</td>
</tr>
<tr>
<td></td>
<td>ESL</td>
<td>69.9</td>
<td>62.8</td>
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<tr>
<td>US59</td>
<td>Roll-up</td>
<td>68.4</td>
<td>60.3</td>
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<tr>
<td></td>
<td>ESL</td>
<td>69.1</td>
<td>59.7</td>
</tr>
</tbody>
</table>
Motorist Comprehension Surveys

- 792 Texas drivers
- 4 Texas cities
- 11 treatments
Comprehension Results

- > 95% understood WZSL
- 99% thought could get speeding ticket
- < 1% confused ESL signs with driver speed feedback signs
Color Comparison Results

- 89% signs have **same** meaning
- 10% signs have **different** meaning
  - 2% regulatory vs. advisory
  - 3% normal vs. work zone
  - 1% speed limit vs. driver’s speed
Sign Ratings

How well do you think the sign tells drivers that they are in a work zone & there is a reduced speed limit?

Excellent

1.8 2.0 2.2

1

Good

3.2

3

OK

Bad

Terrible

1 2 3 4 5
Recommendations

- Use of ESL & roll-up signs
- ESL signs should use white LEDs
- Need to develop standards
  - Meet state specifications
  - Meet NCHRP 350 criteria
Questions

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