Accommodating Pedestrians with Visual Impairments In and Around Work Zones

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Study Overview

- Sponsored by Texas Department of Transportation

- Objectives
  - Determine Reactions to Messages
  - Identify Critical Information
Audio Message Design

- What information is needed?
- When is the information needed?
- What format should that information take?
Focus Group Key Issues

- Noise
- Identification of Work Area
- Audio Information
MUTCD Guidance

- MUTCD 6D.01
  "The most desirable way to provide information to pedestrians with visual disabilities that is equivalent to visual signage for notification of sidewalk closures is a speech message provided by an audible information device."

- MUTCD 6F.13
  "An audible information device is needed when the detectable barricade or barrier for an alternate channelized route is not continuous."
Highway Advisory Radio (HAR) Guidelines

- Should Hear Twice
- Concise Language
- Message Content
  - Attention Statement
  - Problem Statement
  - Reason to Follow Directions
  - Action to Take
  - Location to Take Action
Example Messages

- Alternate Route
- Warning
Audio Message Study – 2 Phases

- Lab Studies
- Field Validation
Phase 1: Study Design

- 9 Messages
  - 5 Alternate Route Opposite Sidewalk
  - 1 Alternate Route in Roadway
  - 3 Warning

- Questions
  - Action
  - Recall of Components
  - Change
Phase 1: Study Design (con’t)

- General Information
  - Wording
  - Specific Elements

- Participants
  - 50
  - Visually Impaired Education Center
## Alternate Route Comprehension

<table>
<thead>
<tr>
<th>Message</th>
<th>Units of Information</th>
<th>Distance Indicator</th>
<th>Path Guidance</th>
<th>Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2</td>
<td>5</td>
<td>Miles</td>
<td>Opposite sidewalk</td>
<td>58%</td>
</tr>
<tr>
<td>M1</td>
<td>7</td>
<td>Blocks</td>
<td>Opposite sidewalk</td>
<td>72%</td>
</tr>
<tr>
<td>M6</td>
<td>8</td>
<td>Blocks</td>
<td>Opposite sidewalk</td>
<td>50%</td>
</tr>
<tr>
<td>M5</td>
<td>9</td>
<td>Blocks</td>
<td>Turn-by-turn</td>
<td>36%</td>
</tr>
<tr>
<td>M4</td>
<td>10</td>
<td>Intersection</td>
<td>Turn-by-turn</td>
<td>38%</td>
</tr>
</tbody>
</table>
## Alternate Route Path Comprehension

<table>
<thead>
<tr>
<th>Message Element</th>
<th>% Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M1</td>
</tr>
<tr>
<td>Overall Path Comprehension</td>
<td>72</td>
</tr>
<tr>
<td>Initial Direction (Cross/Turn)</td>
<td>74</td>
</tr>
<tr>
<td>Where to Cross</td>
<td>24</td>
</tr>
<tr>
<td>Turn after Crossing</td>
<td>30</td>
</tr>
<tr>
<td>Continue on Opposite Sidewalk</td>
<td>18</td>
</tr>
<tr>
<td>Distance to Travel</td>
<td>82</td>
</tr>
<tr>
<td>Return to Original</td>
<td>68</td>
</tr>
<tr>
<td>Street Name – End Of Route</td>
<td>10</td>
</tr>
</tbody>
</table>
**Alternate Route In Roadway**

*Attention Southbound Maple Ave. pedestrians. Work area ahead.*  *Alternate path in roadway to left begins in 200 feet. Edge of pathway has construction barrels. Alternate path ends after 300 feet.*

<table>
<thead>
<tr>
<th>Message Element</th>
<th>% Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Comprehension</td>
<td>10</td>
</tr>
<tr>
<td>In Roadway</td>
<td>4</td>
</tr>
<tr>
<td>Begins 200 ft</td>
<td>36</td>
</tr>
<tr>
<td>Edge of Path Delineation</td>
<td>36</td>
</tr>
<tr>
<td>Path Ends</td>
<td>30</td>
</tr>
<tr>
<td>End Distance</td>
<td>40</td>
</tr>
</tbody>
</table>
## Warning Messages

<table>
<thead>
<tr>
<th>Message Element</th>
<th>M7</th>
<th>M8</th>
<th>M9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Comprehension</td>
<td>66%</td>
<td>72%</td>
<td>82%</td>
</tr>
<tr>
<td>Situation (Construction)</td>
<td>98%</td>
<td>90%</td>
<td>84%</td>
</tr>
<tr>
<td>Use Caution</td>
<td>64%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loud Noises</td>
<td></td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td>Uneven Path</td>
<td></td>
<td></td>
<td>70%</td>
</tr>
<tr>
<td>Step Down</td>
<td></td>
<td></td>
<td>64%</td>
</tr>
<tr>
<td>Separation provided (barrels or fence)</td>
<td></td>
<td>54%</td>
<td>56%</td>
</tr>
<tr>
<td>Construction Location</td>
<td>30%</td>
<td>32%</td>
<td>22%</td>
</tr>
<tr>
<td>Street Names:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Street Name</td>
<td>50%</td>
<td>20%</td>
<td>18%</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Street Name</td>
<td>50%</td>
<td>12%</td>
<td></td>
</tr>
</tbody>
</table>
Audio Message Study – Phase 2

- **Wayfinding Validation**
  - **Attention westbound University Dr. pedestrians. Sidewalk closed. Alternate path on opposite side of road. Cross at next intersection, Spence St., and continue 2 blocks to Asbury St.**
  - **Cross at next intersection and continue 2 blocks.**
Audio Message Study – Phase 2 (Con’t)

- Message Evaluations
  - Limit Participant Travel
  - Evaluate Alternate Scenarios
    - Path in Roadway
    - Warning Message

- 7 Participants
Phase 2 Wayfinding Results

- All – Sidewalk Closed
- Majority – Correct Alternate Path
- Driveways Add Difficulty
- Street Names Not Critical
- Ambient Street Noise
Phase 2: Message Evaluation

- Path In Roadway  "Protected Path In Street"
  - Better Understood (4 of 7 participants)
  - Confusion – Protected

- Warning
  - All – Could Continue "Sidewalk is Open"
  - Key Element – Path descriptors
Recommendations Summary

- Clearly State Intended Path
  - “Use Opposite Side of the Street”
  - “Sidewalk Is Open”
  - “In Street”

- Use Blocks or Landmarks to Identify Travel Distance

- Critical Elements
  - Initial Turning or Crossing Instruction
  - Distance to Follow Alternate Path
Recommendations Summary (con’t)

- Street Names Not Critical
- Driveways Influence Navigation Ability
- Path Details are Reassuring
Questions?

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