Maximizing Your Dynamic Message Sign

Text, Color & Graphics

“A picture is worth a thousand words!”

Tom Becker
Daktronics
Brookings, SD

ITS Midwest Annual Meeting
Indianapolis, IN
October 7, 2009
Introduction

- Research Overview
- How to Implement Graphics
- Potential Hurdles
- Installations
- Potential Applications
- Wrap-Up
What Does the Research Say?

Texas Transportation Institute
DMS Message Design and Display Procedures

- To be effective, a DMS must communicate a meaningful message that can be read and comprehended by motorists within a very short period of time.
What Does the Research Say?

<table>
<thead>
<tr>
<th>Texas Transportation Institute</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DMS Message Design and Display Procedures</td>
<td></td>
</tr>
</tbody>
</table>

**Message Considerations**
- Content
- Length
- Load
- Format
## What Does the Research Say?

**University of Rhode Island**

Adding Graphics to DMS messages

- **Graphic-aided DMS messages**
  - preferred by most drivers
  - faster response (≈35%)

- **Left of text**
  - Preferred location of graphic

- **Use familiar graphic images**
  - MUTCD standards for shape
What Does the Research Say?

University of Rhode Island

Adding Graphics to DMS messages

- Older Drivers
  - slower and less accurate responses
  - improved by graphic-aided messages

- Non-native English Speaking Drivers
  - language background significant
  - Improved by graphic-aided DMS messages
## University of Rhode Island

Adding Graphics to DMS message

### Message Type

Q: Which of the following best displays an Accident?

| MAJOR ACCIDENT AT EXIT 9 EXPECT DELAYS | MAJOR ACCIDENT AT EXIT 9 EXPECT DELAYS |
University of Rhode Island

Adding Graphics to DMS message

Message Type

Q: Which of the following best displays an Accident?

MAJOR ACCIDENT AT EXIT 9 EXPECT DELAYS

MAJOR ACCIDENT AT EXIT 9 EXPECT DELAYS
Adding Graphics to DMS messages

Q: What of the following signs do you prefer most?

- Slippery Road 1 Mile Ahead Use Caution
- Slippery Road 1 Mile Ahead Use Caution
- Slippery Road 1 Mile Ahead Use Caution
Traveler Preferences

University of Rhode Island

Adding Graphics to DMS messages

Position of Graphic

Q: What of the following signs do you prefer most?

SLIPPERY ROAD
1 MILE AHEAD
USE CAUTION

SLIPPERY ROAD
1 MILE AHEAD
USE CAUTION

SLIPPERY ROAD
1 MILE AHEAD
USE CAUTION
## Traveler Preferences

**University of Rhode Island**

Adding Graphics to DMS messages

**Shape of Frame**

**Q:** What of the following signs do you prefer most?

<table>
<thead>
<tr>
<th>None</th>
<th>Circle</th>
<th>Diamond</th>
<th>Square</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="None" /></td>
<td><img src="image2.png" alt="Circle" /></td>
<td><img src="image3.png" alt="Diamond" /></td>
<td><img src="image4.png" alt="Square" /></td>
</tr>
</tbody>
</table>

**Road Work Ahead**

- Left Lane Closed
- Merge Right
## Traveler Preferences

### University of Rhode Island

Adding Graphics to DMS messages

#### Shape of Frame

Q: What of the following signs do you prefer most?

<table>
<thead>
<tr>
<th>Shape</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td><img src="image.png" alt="None Image" /></td>
</tr>
<tr>
<td>Circle</td>
<td><img src="image.png" alt="Circle Image" /></td>
</tr>
<tr>
<td>Diamond</td>
<td><img src="image.png" alt="Diamond Image" /></td>
</tr>
<tr>
<td>Square</td>
<td><img src="image.png" alt="Square Image" /></td>
</tr>
</tbody>
</table>
## Additional Research

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **Illinois Tollway / Univ. of Illinois-Chicago** | Open Road Tolling Signage Study  
  - Preferred “Diagramatic” over “Text” |
| **University of Rhode Island** | Additional study with more graphics options |
How to Implement Graphics

- Meet Industry Requirements
- Full Matrix
- Higher Resolution
- Full Color

Daktronics®
I-94 WEST
TO DOWNTOWN
16 MINUTES
# Full Matrix

## Line-Matrix

<table>
<thead>
<tr>
<th>I-94 WEST</th>
<th>TO DOWNTOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 MINUTES</td>
<td></td>
</tr>
</tbody>
</table>

## Full-Matrix

<table>
<thead>
<tr>
<th>16 MINUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO DOWNTOWN</td>
</tr>
</tbody>
</table>
Higher Resolution

Full-Matrix, Standard Resolution

[Image of a display showing "16 MINUTES TO DOWNTOWN"]

Full-Matrix, High Resolution (x4)

[Image of a display showing "INTERSTATE 94 WEST 16 MINUTES TO DOWNTOWN"]
Full Color

Full-Matrix, High Resolution

Full-Matrix, Full Color, High Resolution
Full Color

Full-Matrix, High Resolution
Piecing It All Together
## Potential Hurdles

- **MUTCD Updates**
- **TMC Software**
- **Industry Acceptance**
  - Current standard message procedures
  - Develop new message sets
- **Larger Signs**
  - Graphics & Text
- **Higher Cost**
Current Installations (using graphics)

Ohio DOT
Current Installations (using graphics)

Rhode Island DOT
Current Installations (using graphics)

Burbank, CA
<table>
<thead>
<tr>
<th>Current Installations (using graphics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas, TX</td>
</tr>
</tbody>
</table>
Current Installations (using graphics)

Roseville, CA
Current Installations (using graphics)

Pennsylvania Turnpike Authority
Current Installations (using graphics)

Florida Turnpike Enterprise
Current Installations (using graphics)

New Jersey

Save Lives
CLICK IT OR TICKET
Current Installations (using graphics)

Harris County Toll Road Authority

MAJOR ACCIDENT
610 & W. PARK DR.
EXIT P. OAK
Future Installations (using graphics)

- Ohio Turnpike
- West Virginia
## Potential Applications

<table>
<thead>
<tr>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUTCD Images &amp; Messages</td>
</tr>
<tr>
<td>Toll Systems</td>
</tr>
<tr>
<td>Active Traffic Management (ATM)</td>
</tr>
<tr>
<td>Amber Alerts</td>
</tr>
<tr>
<td>Incident Management</td>
</tr>
<tr>
<td>Travel Times</td>
</tr>
<tr>
<td>- Different Appearance</td>
</tr>
<tr>
<td>- Alternate Images</td>
</tr>
</tbody>
</table>

- ![Amber Alert Image]
- ![Toll System Image]
- ![Active Traffic Management Image]
- ![Incident Management Image]
- ![Travel Times Image]
# Summary

- Need for Improved DMS Messages
- DMS Technology Exists

"A picture is worth ...... a couple dozen words!!"
Indianapolis Colts
Lucas Oil Stadium

Video and Scoring System

Installed Summer 2008
Indianapolis Colts  
Lucas Oil Stadium

<table>
<thead>
<tr>
<th>Video Board Stats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 2 units / ProStar HD-16</td>
</tr>
<tr>
<td>• LED technology</td>
</tr>
<tr>
<td>• 53’ H x 97’ W (per video board)</td>
</tr>
<tr>
<td>• 700 rows X 1,848 columns</td>
</tr>
<tr>
<td>• 1,293,600 pixel</td>
</tr>
<tr>
<td>• 4.4 Trillion Colors (14 bit)</td>
</tr>
<tr>
<td>• 2,400 Hz LED refresh rate</td>
</tr>
</tbody>
</table>
Indianapolis Colts  
Lucas Oil Stadium

<table>
<thead>
<tr>
<th>Ribbon Board Stats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 360 degree / ProAd PS-23</td>
</tr>
<tr>
<td>• LED technology</td>
</tr>
<tr>
<td>• 4’ H x 1,550’ W</td>
</tr>
<tr>
<td>• 40 rows X 10,320 columns</td>
</tr>
<tr>
<td>• 412,800 pixels</td>
</tr>
<tr>
<td>• 4.4 Trillion Colors (14 bit)</td>
</tr>
<tr>
<td>• 2,400 Hz LED refresh rate</td>
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Questions!

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www.daktronics.com/its
888-DAKTRAN