Project Summary

Texas Department of Transportation

0-5256: Use of Symbols and Graphics on Dynamic Message Signs

Background

Dynamic message signs (DMSs) have gained widespread acceptance as an effective means of relaying unexpected conditions to the motoring public. However, all of the existing message design and display guidance has focused on information that is presented in an alphanumeric format. As technology advances and the use of color and full-matrix image creation on these signs is more viable, the need to identify and define elements for graphic displays is becoming critical.

What the Researchers Did

This project has taken a step toward defining how graphic and symbol displays can improve or assist communication with motorists. Through three human factors evaluations of alternative designs, researchers identified specific design elements that should or should not be used in graphic displays.

What They Found

Graphic display formats range from all-encompassing regional map displays that are able to provide an overview of the roadway system in an entire metropolitan area (sometimes referred to as a graphic route information panel, or GRIP) down to individual symbols that are used to identify a specific problem immediately downstream of the motorist's current location. Data collected in this project suggest that motorist-desired viewing times for a GRIP format display are significantly higher than for text or other graphic displays evaluated during this project. Therefore, researchers have a significant concern that the amount of information presented through this display format could overload drivers.

The other major format type that was evaluated through this project was the use of DMSs to portray a localized portion of a roadway. Overall, this type of display appears to be interpreted fairly well by drivers and does not appear to result in higher information loading than text-based DMS messages conveying similar types and amounts of information. However, the research suggests that these types of graphic displays may provide additional information benefits as compared to equivalent text messages.

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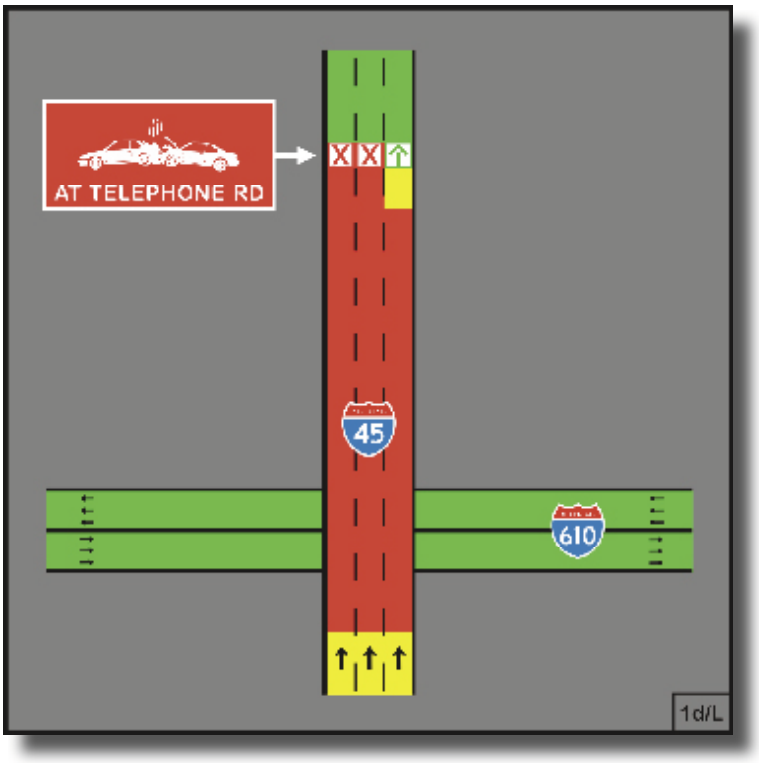
Benefits include the following key points:

- A graphic display appears to improve the ability of drivers to identify available lanes in a problem area.
- The delivery of incident descriptor information (e.g., accidents or work zones) through the use of graphic symbols improves comprehension levels of non-native-language drivers (e.g., a driver whose primary language is Spanish).
- The viewing time required for comprehension by a non-native speaker may be shortened as a result of the use of graphics and symbols.
- The use of graphics makes it possible to effectively illustrate unusual operational scenarios, such as high-occupancy vehicle lanes or adjacent toll lanes, through graphic representation of roadway geometry, logos, shields, etc.

What This Means

Based on this research, graphic DMS displays such as those illustrated in the figure appear capable of providing an effective means of communicating with the motoring public. If used, graphic displays should follow some basic design guidelines identified in this research. Key points of these guidelines are:



Graphic DMS Display Example

- Highway shields and signs should use standard formats (as defined in the *Manual on Uniform Traffic Control Devices*) and should be displayed when necessary to identify a roadway. This recommendation also holds true for using familiar toll facility logos and signing where appropriate.
- Highway shields or road names should be placed on the roadway and not above or beside its graphic representation (correct placement shown in the figure).
- When displaying traffic condition information using colors, the following coding is recommended: red = stop and go conditions, yellow = slow conditions, green = normal operating speed.
- Arrows should be shown in all open lanes to reinforce which lanes are available for use past a problem area.
- Only one cross street or highway should be represented graphically on a given display. All other critical points, such as incident location or exit information, should be given as text.
- If a toll facility is shown on the graphic display, drivers will assume they will need to pay a toll to use that road unless otherwise specifically stated.

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