

ROADWAY DATA REPRESENTATION AND APPLICATION DEVELOPMENT

PROBLEM STATEMENT

The Straight Line Diagram (SLD) is a roadway mapping and data presentation methodology that has been used by the Florida Department of Transportation (DOT) for more than 25 years. It is utilized by technicians and engineers to verify field Roadway Characteristics Inventory (RCI) data, to prepare for field surveys, and for other related applications. The basic structure of the current programs and methodologies used to produce SLDs has become somewhat dated. Recent developments in Geographic Information System (GIS) technology provide flexibility and efficiency in presenting/mapping data. This technology, as well as the proliferation of various new alternatives based on aerial photography or roadway Videolog applications, makes it possible to leverage technologies that are capable of producing a more customized product.

OBJECTIVES

This research project focused on the development of a more contemporary, versatile, and user-friendly SLD application for the Florida DOT, based on output products that incorporate technological advances in GIS, automated mapping, data processing, and reporting. The objectives included the following:

- Assess and evaluate current SLD methodologies.
- Develop recommendations for a versatile and user-friendly SLD application.
- Develop a prototype web-based SLD application.

FINDINGS AND CONCLUSIONS

This project was conducted in two phases: (1) survey the state-of-the-practice of SLD methodologies, and (2) design and develop a prototype application. The results from the first phase of the project can be summarized as follows:

- Only six State DOTs (Colorado, Iowa, Ohio, New Hampshire, Vermont, and New Jersey) are currently relying on commercially available SLD products or GIS processes to generate SLDs. Additionally, several SLD tools and products used in these states (e.g., Colorado, Vermont, New Jersey) contain functionalities and features desirable in a contemporary and versatile SLD, such as dynamic web-enabled data access, visually appealing SLDs, and standardized symbology.
- The results of the project surveys suggest that although a majority of respondents are satisfied with several aspects of the current SLD methodology, SLD producers are least satisfied with the mapping capabilities and SLD end-users are least satisfied with their ability

to read/understand the SLD. Specific enhancements that were ranked to be of the highest priority included the software program and updating procedure for SLD producers, and the increased use of aerial photography and traffic data for SLD end-users.

- The survey results led to the recommendation that two separate SLD applications be developed for meeting the needs of SLD producers and end-users and addressing their key concerns. The first of these two applications would focus specifically on the enhancements that were ranked as highest priority and that address only those characteristics that SLD users are least satisfied with, and also incorporate other related suggestions (e.g., automatic link to RCI data). The second application would emphasize modifications and improvements that are of medium or lower importance and that address aspects of SLD, such as the automated development of enhanced graphics, developed on-top of the first application.

The findings and recommendations from the first phase of the project were used to inform and guide the second phase, which focused on developing two prototypes for a re-designed and contemporary SLD application for the Florida DOT. Both prototypes incorporate a dynamic web-based visualization tool that assembles and represents the user selected data in a graphical and text environment. In response to expressed end-user preferences, the first prototype presents the majority of the data as text in a comparatively easy-to-read document. The user can select various attributes of interest and generate an SLD type of document very easily.

The second prototype extends the graphics component of the first prototype by adding enhanced roadway characteristic inventory graphics of up to 20 variables. This prototype requires further refinement in order to be a potential replacement of current SLD production procedures.

BENEFITS

The new and dynamic web-based roadway data visualization tool (RCI Data Graphing) prototypes developed through this project are expected to provide a number of important benefits, such as the following:

- increased utilization and exchange of roadway data for all users (the web-based and dynamic data access components of the prototypes open up the SLDs to a whole new group of end users and make them more accessible throughout the Department)
- better integration and exploitation of RCI data through increased usage of GIS technology
- improved usefulness of the SLD as a tool for reviewing inventory information on all roadways through a more intuitive and user-friendly format
- an alternative and potential future replacement of the current semi-automated SLD application with a more contemporary and user-friendly application
- greater flexibility and reduction of time burden associated with roadway and mapping exhibits by integrating the use of GIS-based mapping systems.

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