RESEARCH SUMMARY

COMPREHENSIVE HIGHWAY CORRIDOR PLANNING WITH SUSTAINABILITY INDICATORS

Problem

The Maryland State Highway Administration (SHA) has initiated major planning efforts to improve transportation efficiency, safety and sustainability on critical highway corridors through its Comprehensive Highway Corridor (CHC) program. It is important for planners to be able to compare various types of highway improvement options during the needs analysis and long-range planning processes to select the best program-level plans for the corridor. SHA funded a research project titled "Comprehensive Highway Corridor Planning with Sustainability Indicators" to support the CHC and Sustainability Initiatives and to develop a Model Of Sustainability and Integrated Corridors (MOSAIC), which will help SHA estimate the sustainability impact of multimodal highway improvement options early in the transportation planning and environmental screening processes. The results from this research project can also help SHA achieve its mobility, safety, socio-economic and environmental stewardship objectives.

Objective

This research project had three specific objectives:
1. Define sustainability indicators that are relevant to SHA's CHC program.
2. Develop a high-level planning model that helps SHA integrate the identified sustainability indicators into the CHC program at the project/corridor level.
3. Provide analysis tools for integrating safety, mobility, environmental stewardship, and socio-economic objectives into SHA's corridor planning process with consideration for multimodal corridor improvement options.

Description

Phase One of the project focused on defining a comprehensive set of sustainability indicators that could be quantitatively evaluated for major geometric improvement options, such as: adding general purpose lanes and converting at grade intersections to grade separated interchanges.

This project, which is Phase Two, focused on extending this quantitative evaluation of sustainability indicators to additional multimodal corridor improvement options, including high occupancy vehicle (HOV) lane, high occupancy toll (HOT) lane, bus rapid transit/bus-only lane, light rail transit, truck-only lane, express toll lane, and road diet (i.e. lane removal).

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Results

After completing the model development, MOSAIC was applied to the US 29 corridor within Maryland, thus demonstrating the feasibility and usefulness of this comprehensive tool for sustainable highway corridor planning. When the same weights are given to all six categories of sustainability indicators, the final evaluation results suggest several improvement options would be effective in enhancing sustainability throughout the US 29 corridor.

Overall, various enhancements were made to MOSAIC through this project. The current version of MOSAIC runs using a Microsoft Excel spreadsheet and includes: (1) a user input module where users can select a corridor and the candidate highway improvement options for that corridor, (2) several analysis modules that quantitatively estimate the impact of user-specified improvement options on all sustainability indicators, and (3) an output module that provides both numerical and graphical outputs.

Next Steps

SHA's next steps include continuing to train employees and integrate the MOSAIC tool into statewide planning processes. Also, there will be further research to enhance this tool. Planned future research will integrate the existing MOSAIC tool into the SHA Enterprise GIS (eGIS) environment, which will further streamline MOSAIC input and output procedures for state-wide planning applications in Maryland.

Report Information

Dr. Lei Zhang
Assistant Professor
Dept. of Civil and Environmental Engineering
University of Maryland
College Park, Maryland 20742
lei@umd.edu

Link to Full Report

http://www.roads.maryland.gov/OPR_Research/MD-13-SP109B4Q-Comprehensive-Highway-Corridor-Planning-with-Sustainability-Indicators_Report.pdf