

SHRP 2: Project R11 Strategic Approaches at the Corridor and Network Level to Minimize Disruption from the Renewal Process

Overview

As our highway infrastructure continues to age, there is the imperative need to renew the entire network while keeping it operational. Moreover, many highway corridors and regional networks are becoming ever more congested. As a result there is an increasing need to (1) examine various construction alternatives within those corridors and networks to determine the potential disruption and/or benefit that alternative renewal activities may have over time, and (2) examine the effect of constructing multiple corridors concurrently or in sequence. Without an evaluation of the various construction alternatives during the program and project development process, negative impacts on the traveling public and the local communities may increase dramatically.

The research on Project R11 focused on answering the following related questions:

- How should highway reconstruction projects be set in space and time to minimize disruption to the traveling public, businesses, and adjacent communities?
- What is the traffic impact on the regional network when multiple corridors are being considered for renewal?
- Are there strategies that may minimize impacts on the corridor and/or regional network?

Project R11 was conducted in several phases. Phase I consisted of gathering the requirements, identifying the current practices among various agencies, and developing the performance measures. Based on the existing needs and current gaps in modeling tools for highway networks, under Phases II and III of Project R11, the research team developed a modeling tool that would sequence programs of renewal projects in ways that maximize available resources, minimize disruptions to the traveling public and to adjacent land uses, and recognize political priorities. The tool first looked at top-level analysis (sketch planning and macro-level analyses), but also has the capability to go down to the mesoscopic scale in order to provide a more detailed assessment of various construction strategies on the network.

The primary product of this research was the Work Zone Impact and Strategy Estimator (WISE), which was developed as an open-source software, along with a user guide. WISE evaluates the impacts of various highway renewal strategies on a given network— strategies using such means as day–night operations, innovative contracting, advanced maintenance of traffic plans, and public information programs. WISE aids decision making by assessing reconstruction activity sequencing, given limited resources and other constraints. During the course of the project, the team held several focus group workshops with stakeholders to assess the intended capabilities and limitations of WISE. As a part of the final Phase IV, WISE was tested in Iowa and Arizona using historical data to validate its parameters and pilot tests in New York and Florida used the software to analyze projects in the planning phase.

Data Sets

- **WISE Sample Static Import Input:** (STATIC_IMPORT.csv) This dataset contains the vehicular flow inputs--both for daytime and nighttime-- used in the beta testing of the Project R11 WISE software. Please see the Related Artifacts section for the full set of inputs and outputs of the

Phoenix, Des Moines, Worcester, and Orlando test networks. This file was taken from the Phoenix network files.

- **WISE Des Moines Static Import Input:** (STATIC_IMPORT1.csv) This dataset contains the vehicular flow inputs--both for daytime and nighttime-- used in the beta testing of the Project R11 WISE software. Please see the Related Artifacts section for the full set of inputs and outputs of the Phoenix, Des Moines, Worcester, and Orlando test networks. This file was taken from the Des Moines network files.
- **WISE Orlando Static Import Input:** (STATIC_IMPORT2.csv) This dataset contains the vehicular flow inputs--both for daytime and nighttime-- used in the beta testing of the Project R11 WISE software. Please see the Related Artifacts section for the full set of inputs and outputs of the Phoenix, Des Moines, Worcester, and Orlando test networks. This file was taken from the Orlando network files.
- **WISE Worcester Static Import Input:** (STATIC_IMPORT3.csv) This dataset contains the vehicular flow inputs--both for daytime and nighttime-- used in the beta testing of the Project R11 WISE software. Please see the Related Artifacts section for the full set of inputs and outputs of the Phoenix, Des Moines, Worcester, and Orlando test networks. This file was taken from the Worcester network files.