

Research Problem Statement

Date: 10/19/2021	Project Area: Special Projects
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Title: Daily impacts of a bridge closure: A case study of the 2021 I-40 bridge in Arkansas

Problem Statement:

The purpose of this project is to quantify the multi-modal traffic impacts resulting from the I-40 Mississippi River bridge closure that occurred from May 11 to August 2, 2021. Impacts will be measured and reported in terms of traffic volume, delay, and detour volumes, each disaggregated by passenger vehicle traffic, highway freight traffic, and waterway freight traffic. Current studies in progress examine the impacts of each transport mode separately and primarily for delay associated costs while this study will perform a comprehensive multi-modal analysis that considers delay costs from detours as well as the monetized impacts stemming from secondary effects (accidents and fatalities). For example, the AR Trucking Association reported \$2.4 million added costs resulting from detouring 26,500 trucks per day and the UofA Division of Agriculture reported delays to 1,058 barges and 62 vessels but has not provided a monetary cost impact. These initial cost estimates are based on delays due to detours and may not reflect the full scope of impacts to safety, infrastructure, operations, and maintenance. The results of this study can be used to support future investment planning and prioritization for maintenance programs, especially those that include cost-benefit analyses. The study will provide a historical documentation and data capture to a major transportation disruption.

Potential Solution to Problem:

The following data will be used: stationary traffic sensor data; fatality and accident reports, marine data tracking platforms, and third-party data providers. Note that some historical traffic data from third parties may already be available to ARDOT through existing data sharing agreements. The study will capture the number of vehicles, trucks, and marine vessels/barges disrupted due to the bridge closure and apply detailed cost conversions to monetize direct (delays) and indirect (safety, infrastructure, operations) impacts. Uniquely and importantly, the study will develop a model for "what-if" analyses that will explore how investments and innovative strategies in operations, maintenance, and planning activities could reduce impacts of transportation infrastructure disruptions such as that caused by the I-40 bridge closure. The model will be developed into an Excel (Spreadsheet) tool that will provide ARDOT a resource to evaluate what-if scenarios for corresponding impacts.

Estimated Project Duration: 18 Months

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Standing
Subcommittee Ranking

1/4

Advisory
Council Ranking

3/14

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