

Project Title: Evaluating the resilience of port operations to local and regional transportation infrastructure
Project Abstract (Brief Description): This project will develop a quantitative model of the local and regional road and rail network that serves a port, and the flow of goods to and from the port. The goal of the project is to develop a reusable quantitative framework to assess questions relating to the port-road transportation system. The framework will be used in a specific single port case study to investigate two research questions relevant to this goal: 1) The resilience of (a specified) port operations to transportation related disruptions and 2) The resilience of transportation infrastructure and operations to port expansion or development. The goal and objectives will be achieved by developing a spatially and temporarily explicit model of routes and travel times between a selected case-study port and local and regional (i.e., statewide) commodity sources/destinations (the case study will be selected during the project and following a review). Once developed, the model will be used to evaluate the aforementioned port-ground transportation resilience questions in line with recent Army Corps of Engineers guidance on assessing resilience (“Maritime Transportation System Resilience Assessment Guide”). Specifically, this will be achieved by perturbing the base model to simulate disturbances such as changes in ground transport operations (e.g., road closures, policy) or changes in port operations. The quantitative results of these disturbance simulations will then be combined with qualitative experiential knowledge to develop a complete picture of the vulnerabilities of the port-hinterland system (both local and regional). In line with the goal of the project, the research team will document the challenges and resources required to develop the model and provide a commentary on the utility of the framework for evaluating the resilience of other port-ground transportation systems.
Describe Implementation of Research Outcomes: This project will provide a modeling framework and specific case study of the resilience of a port operation to transportation infrastructure, and vice versa. The case study will be of specific value to local port authorities, state departments of transportation, and regional planners. The project will also develop a modeling framework that could be used to evaluate similar questions for other ports, border crossings, or point source/destinations (e.g., rail yards, airports), and that will therefore have broader appeal to state and national planners.
Impacts/Benefits of Implementation: The case study will provide regional planners with novel quantitative and actionable information on the activities of the selected port and the vulnerability of infrastructure within the port-ground transportation interface. The case-study will also demonstrate the ability of the framework to be adapted for other port systems. Over the long- to medium- term the quantitative, scenario driven nature of the model will allow planners and researchers to investigate a broad range of questions relating to port-land transportation systems.
Web Links: martrec.uark.edu
Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): MarTREC: \$92,000, Matching: \$46,000 Total \$138,000.
Project Start and End Dates: Start: 12/01/21 to 08/31/23 complete
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Principal Investigator Institution (University): Texas A&M Transportation Institute