MarTREC
Maritime Transportation Research & Education Center

MarTREC UTC Project Information Form
USDOT Tier 1 University Transportation Center
Agency ID or Contract Number 69A3551747130

Project Title: Prediction of Port Recovery Time after a Severe Storm Project
Project Abstract (Brief Description): The abundant oil and gas deposit and the convenience of shipping have made Gulf Coast the center of a major center of economic activity and the petrochemical industry in the United States. The port of Houston solely contributes to the local economy of about 330 billion dollars and employment of about 3.2 million. However, adverse storm events, such as hurricanes and tropical cyclones, significantly impact regional economies and port operations. For example, Hurricane Ike in 2008 caused more than 25 million dollars in damage along the coast and made hundreds of thousands of people homeless. Many ports on Gulf Coast have closed part or all operations to withstand Hurricane Laura in 2020. The impact or closure period of a port operation mainly depends on weather prediction from National Oceanic and Atmospheric Administration (NOAA), but the port recovery period may relate to multiple factors, including but not limited to weather conditions, port infrastructure, and road connectivity. Existing studies have been focused on performance evaluation and resilience measurement of the port under different hazard events. However, the relationship between the aforementioned factors and port recovery is not well investigated yet. Moreover, recovery prediction of the port under extreme weather is also critical for stakeholders to ensure the port's resilient and sustainable operations. This study aims to explore the relationship of potential influencing factors on port recovery under adverse storm events. Besides, by using multi-source data and applying machine learning algorithms, a model is built up to predict the port recovery after adverse storm events. This study intends to benefit transportation agencies and port administrators by enhancing the resilience, safety, and efficiency of maritime transportation. Project Objective(s): The objective of the proposed research project is to develop a stochastic integer programming model and algorithms aimed for exact optimal solution to the dredging project optimization problem. The model and algorithms will be tested on select waterway system with historical data about their optimality and computational efficiency.
Describe Implementation of Research Outcomes (or why not implemented) - Place any photos here *To be determined upon conclusion of the project*:
Impacts/Benefits of Implementation: The project will develop models and algorithms in order to better manage the port operations and better schedule vessel shipping for special situations such as natural disasters and supply chain disruption and to maximize waterway system benefits, and will enhance the durability, service performance, and resilience of maritime infrastructure. The project will also support one graduate student towards dissertation.
Web Links: martrec.uark.edu
Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): USDOT $70,000 + Matching funds $35,000=Total $105,000.
Project Start and End Dates: 09/1/2022 – 08/31/23 complete
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Principal Investigator Institution (University): Texas A&M University