



**Project Requirements Form USDOT
CREATE UTC Contract Number 69A3552348330**

Center Lead: Texas State University; Uni of Puerto Rico, Mayaguez

Research Project Name: Capacity Building and Workforce Development for Coastal Transportation Infrastructure Exposed to Multi-hazards: Phase I
Improving the Durability and Extending the Life of Transportation Infrastructure
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Project Partners: Puerto Rico Department of Transportation and Public Works
Research Project Funding: Federal: \$200,000; Match: \$138,568 (UPRM)
Project Start Date: 8/15/2023 Project End Date: 5/30/2024
<p>Project Description: Coastal communities have been particularly affected due to the cascading effects of multi-hazard natural and technological events. Underserved coastal populations often face disparate impacts of transportation projects without receiving the same level of benefits as other population groups. Floods and storm surge, debris from extreme winds, corrosion and salinity, lack of alternative routes and services, and infrastructure failure are some of the effects of extreme events in coastal areas. Critical infrastructure, such as power plants, industrial parks, housing developments, communication hubs, water and wastewater treatment plants, industrial parks, shopping centers, maritime transportation facilities and terminals and essential supporting infrastructure in coastal areas need to cope with the recovery process after catastrophes. Achieving needed resources and sustaining the technical capacity to deal with emerging issues related to shifting population, transportation demand, technological and climate changes is one of the known challenges for local and state transportation agencies. This project will evaluate the diverse experiences of coastal contexts, recognize strategies for adaptation and change of transportation infrastructure, identify communication and information limitations of coastal communities, and study the challenges for attracting a diverse workforce that reflect the variety of perspectives of coastal communities and support equitable planning and decision making in transportation infrastructure. The project workplan is divided into three major tasks.</p> <p>The first task will develop a framework in education and capacity building to address coastal infrastructure design, construction, and maintenance issues as a pipeline for workforce development to reach a diverse audience of stakeholders, namely, government officials, policy makers, academia, and the community. Emphasis will be placed on the best practices in the application of resilience and sustainability of transportation infrastructure on coastal areas.</p> <p>The second task will review the state-of-the-art and the practice on hazards, exposure, vulnerability, risks, and resilience of the transportation infrastructure in mobility corridors through affected coastal communities and will assess opportunities for improving resilience and durability. A case study in Puerto Rico will be used to gather data to develop a decision support system that improve the decision-making process to assign operational decisions before, during and after an extreme event and help make recommendations to improve the operation and management of the transportation system in selected critical corridors.</p> <p>The third task will foster improved public involvement in the planning and execution of transportation projects in coastal areas, within the framework of equitable mobility. Activities include defining the factors and performance measures of equitable mobility from the</p>



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perspective of stakeholders of coastal communities, develop a methodology to collect community preferences at the inception of a transportation infrastructure project using visualizations technologies such as virtual reality and others, and develop case studies to validate the method with communities with cultural, language, and context differences.

US DOT Priorities: This project will develop practical, evidence-based frameworks to promote equity in all levels of blue economy transportation careers. It is anticipated that the research outcomes will be adaptable to other transportation sectors. Activities will support US DOT Challenges of Preserving the Existing Transportation System, Improving the Mobility of People and Goods, and Promoting Safety.

Outputs: An Interactive Learning Hub developed for hosting a broad scope learning platform for improving the education of resiliency for coastal infrastructure, will be the host of a Transportation Interactive Learning HUB. This HUB will capitalize on the foundations already developed at UPRM to focus on the capacity building and education outcomes from this project. The TIL-HUB will contain a repository of training and learning modules that will be of interest to a broad range of transportation stakeholders and will function as a vehicle to store, preserve, and disseminate the materials developed by this project and from other CREATE projects. Reports, case studies, presentations, webinars, and other materials will be classified based on their level of complexity and will indicate the target population (i.e., academics and researchers, professionals, community members, etc.). The interactive component will allow participants to answer questions throughout the presentations to be able to continue watching the webinar, increasing participant engagement. The TIL-HUB will contribute to institutionalizing the long-term permanence of operational activities and leadership on capacity building at CREATE and will contribute to position our Center as a leader in multi-hazard education, capacity building, and workforce development for the durability of coastal transportation infrastructure. The CREATE project will leverage efforts with the CRC IL-HUB to broaden and strengthen the audience that will be impacted by CREATE and UPRM-CRC (<https://www.uprm.edu/inci/crc/>).

A CREATE-UPRM Annual Symposium will expand on education, training, and capacity building through a hybrid format (remote and in-person) training and education activities on the phenomenology and impacts of multi-hazards on coastal transportation infrastructure; will allow researchers from the consortium to present the progress of their projects and present the state of knowledge, education and research on transportation infrastructure durability focusing on opportunities, new tools, and needs in the field, and encourage networking and collaboration among the CREATE researchers and stakeholders to foster open discussion and ideas development on the needs and opportunities on coastal infrastructure durability.

Case studies will be developed in collaboration with partners with knowledge and access to coastal communities. These case studies will be used for research and as teaching tools to build capacity on the state and durability of our transportation infrastructure.

Outcomes/Impacts: This project will provide the framework in education and capacity building to address equitable mobility as a pipeline for workforce development in transportation to reach diverse stakeholders, government officials, policy makers, academia, and the community.

Final Research Report: URL to final Report will be provided upon completion.