

Title: Construction Cost Variations After a Natural Disaster

Student Name: Ivelisse M. Ramos López, PhD Candidate

Faculty/Mentor Name: Francisco Maldonado Fortunet, Ismael Pagán Trinidad, Alberto Figueroa, Ricardo López, Raúl Zapata

Department of Civil Engineering and Surveying, The University of Puerto Rico, DHS Coastal Resilience Center (CRC)

Abstract:

A team of faculty and students participated in the Expert Analysis of FEMA Cost Estimate Development Process and Validation as part of a post hurricane cost estimate research project. Undergraduate and graduate students joined a team effort led by multidisciplinary faculty to evaluate the impact of Hurricanes Irma and Maria on the costs and prices of materials, equipment and labor required for the reconstruction of Puerto Rico. The recovery and reconstruction processes after a disaster present great uncertainty challenge. The construction costs tend to increase caused by the increase in demand and the scarcity of supply. Reconstruction projects require to establish projected construction budgets and the distribution of funds for emergency projects and permanent resilient reconstruction. This project focused on developing the mechanisms to monitor costs variations which can help FEMA establish reliable and accurate cost estimates and allocate project funding, a process highly affected by multiple sources of uncertainties.

The team with our sponsor collected costs of materials from different sources. This database helped identify trends and variations in costs throughout different periods of the year caused by various not only by the hurricanes but also by other natural events that impacted the Island during the past three years, namely, the seismic sequence of January 2020, a drought, and the COVID-19 pandemic. Cost tendencies could identify differences in costs by geographic regions and periods of time.

Construction cost databases created by well recognized companies, such as the GORDIAN, have reported an increase in costs of construction materials in the order 50% by 2020. In their most recent publication, they indicated that 90% of construction materials, as well as equipment and labor have experienced change in costs. They also report that 82% of equipment costs and 98% of salaries have increased. COVID-19 has also significantly impacted the cost increase.