

Lessons Learned from Hurricane Katrina – With Emphasis on Cost Effective Retrofitting Techniques

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Hurricane Katrina flooded the New Orleans area in August 2005. Property damage was over \$81B, and the number of lost lives was over 1,000 – it was recorded as one of the most disastrous hurricanes in the modern history of the USA. Several organizations such as IPET, NSF and ASCE published authoritative but expedited reports regarding failure mechanisms of levees and floodwalls. Four years of in-depth research conducted by the authors through field and lab tests, numerical simulations, model tests and state-of-the-art centrifuge tests provided detailed evaluation of the levees and floodwalls. Engineers and researchers, also learned valuable insights which may be applied to design more resilient and sustainable flood protection system.

Thanks to DHS research program, the author of this paper could conduct research, investigating cost effective but resilient retrofitting techniques for levees and dams. Author's research included field and lab tests, numerical simulations, model tests and state-of-the-art centrifuge tests for the levees and floodwalls. Author's research, different from other research, was focused on blocking the triggering mechanism of the failure of levees rather than completely redesigning levees. Background idea was that levee system in New Orleans composed of earthen levees, I-walls and T-walls, and they withstood the test of time for decades before they failed during Hurricane Katrina. Therefore, slight creative retrofitting techniques might make these flood protection system resilient enough to fight future critical condition.

This paper presents new findings for cost effective but resilient retrofitting techniques. Some examples include placing a bentonite apron to prevent gap formation in the river side of the floodwall, erosion resistant materials at the levee crest, and reinforcing caps to prevent localized floodwall failure.