

Testing levee slope resiliency at the new Colorado State University wave overtopping test facility

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Abstract. During Hurricane Katrina in 2005, the most common cause of earthen levee failure was attributed to severe wave overtopping and erosion of the landward/protected side. Task Force Hope, New Orleans District Corps of Engineers, commissioned Colorado State University (CSU) to design and build a unique facility capable of simulating full-scale wave overtopping tests having maximum average overtopping discharges between 200 and 300 l/s per m (depending on wave period). This required design and construction of a large wave overtopping simulator styled after the successful Dutch design. Total simulator water capacity is 31 m³, and the volume of the largest overtopping wave that can be simulated is 17 m³/m. The CSU wave overtopping test facility was constructed as a fixed-in-place machine due to its large size necessitating a “*take the levee to the simulator*” approach. The facility design features two side-by-side 1.8-m-wide channels supporting four, 10 ton removable trays configured similarly to field levee conditions. Instrumentation included two pitot tube velocity meters, three “surf board” platforms measuring instantaneous flow thickness and velocity at the flow surface, and five bed-mounted pressure sensors to document flow thickness. A detailed description of facility design, tray preparation, facility calibration, and operation of the overtopping facility will be provided. Also, summary hydraulic data will be presented, correlations to steady state overtopping stresses and preliminary analyses of results will be presented.

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