Geocomp

Technologies to manage risk for infrastructure

Project Brief

Expert Witness Testimony
Floodwall Breaches in New Orleans

Client:

United States Department of Justice

Location:

New Orleans, LA

Services Provided:

- Numerical Modeling and Failure Analysis
- Advanced Laboratory Testing
- Expert Witness Testimony

Value Provided:

- Convincing expert testimony as to the cause of failure
- Field testing
- Advanced automated soil testing to better define soil properties
- Clear, comprehensive compilation of extensive data

Significant Discoveries:

- Determination that the two failures of the EBIA levee actually occurred at the lowest points of the 4,000 long section of levee. Previous work had assumed that the top of the floodwall was at a constant elevation of +12.5 ft.
- Determination that the North failure involved a structural failure of the I-wall caused by a difference in geometry of the floodwall and a low factor of safety against global stability.
- Pictorial evidence that both failures were primarily caused by scour of the landside embankment due to overtopping of the floodwall.

Background & Project Challenges

Failures of the levee protection system and flooding

Hurricane Katrina struck New Orleans during the morning of August 29, 2005. It caused numerous failures of the levee protection system and flooding of New Orleans. Two breaches of the East Bank Industrial Area (EBIA) levees resulted in the inundation and destruction of the Lower Ninth Ward and parts of Chalmette. Claims filed in US District Court contended that the US Army Corps of Engineers were negligent in maintaining and protecting the integrity of the levee and floodwall system along the EBIA. Plaintiffs asserted that environmental remediation work performed on the floodside of the levee system provided preferential pathways for water pressure to transmit beneath the floodwall and cause the landside embankment to fail by shear sliding. The USACE was defended by the US Department of Justice who retained Dr. W. Allen Marr, founder and CEO of Geocomp, as one of its expert witnesses. Prof. Thomas Brandon of Virginia Tech, Prof. Timothy Stark of the University of Illinois at Champaign-Urbana and Dr. Pat Lucia of Geosyntec also served as geotechnical experts in the case.

Geocomp Role & Accomplishments

The work involved an extensive, collaborative site investigation and testing program to define the physical and mechanical characteristics of the soils in the EBIA. Geocomp personnel were involved in the oversight of continuous undisturbed sampling with 5-inch diameter tubes, cone penetration testing, field vane testing and in situ permeability testing. Geocomp also provided laboratory testing services including direct simple shear strength testing, constant rate of strain consolidation testing and permeability testing to help characterize the strength, compressibility and permeability of the natural soils in the levee's foundation.

Geocomp engineers assisted Dr. Marr in his evaluation with extensive analyses of global stability groundwater flow and deformations caused by the hydraulic loading of the flood wall. These analyses included 3-D finite element analyses to examine the stresses developed in the structural elements of the wall due to differential deformations of the soil foundation and transient seepage analyses to evaluate the time required for pore pressures to increase in the levee embankment.

Judge Stanwood R. Duval, Jr. ruled in favor of the United States on April 12, 2013. In his written opinion he concluded that the Plaintiff's calculations of factor of safety were wrong, that their models did not reflect actual conditions, that their parameters were unscientific, and that their theories were invalid.

Go to http://goo.gl/ifFxL for the complete ruling by Judge Duval.