ENGEO VIEW

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ENGEO CELEBRATES TWO INNOVATION AWARDS

Also inside:

DIRECT POWER COMPACTION IMPROVES LIQUEFACTION-INDUCED SETTLEMENT

ENGEO PRESENTS AT PBDIII 2017

CHANGE IN NEW ZEALAND LAW STIMULATES INNOVATION

GREAT PLACE TO WORK®

October 2017

DIRECT POWER COMPACTION IMPROVES LIQUEFACTION-INDUCED SETTLEMENT

by Jeffrey Fippin, GE
Oakland, California

Design/build efforts are under way at the Water Emergency Transportation Authority (operators of the ferry boats around the San Francisco Bay). The project is a combination of a maintenance dock, an administration building, a shop, and a yard, located at the former U.S. Naval Air Station, Alameda.

The Air Station (Base) was built primarily on reclaimed land that was a former marsh. The land was reclaimed by hydraulically placing sand behind a rock dike and seawall. The Base experienced moderate to severe liquefaction during the Loma Prieta earthquake in 1989.

The site is a critical facility and subject to liquefiable soil, so all of the improvements are designed to the Maximum Considered Earthquake Peak Ground Acceleration (PGA), which is 0.46g. Estimated site settlement would be around 5 inches without ground improvement, with a large differential settlement and large pressures applied to the adjacent seawall.

Because of the critical nature of the facility (all ferries will operate out of this site in the event of a large earthquake), this settlement was deemed to be excessive.

The preliminary design called for deep soil mixing (DSM). We reviewed the site conditions and recommended an alternative solution of Direct Power Compaction. The project ownership approved our value engineering idea, and in late 2016 the contractor began improving the ground. It took a little over a month to complete.

During ground improvement, we installed instrumentation equipment in order to perform continuous vibration monitoring to verify that vibrations were lower than levels that would damage the adjacent pier and two nearby City of Alameda buildings. Based on CPTs performed before and after ground improvement, the process stabilized nearly all of the sand within the treatment zone (with the exception of a layer of sand sandwiched between two thin layers of clay).

Our estimates of liquefaction-induced settlement after ground improvement are approximately ½ to 1 inch, and most of that settlement comes from a layer of sand below the depth of treatment. The owner has accepted the results and now the site is undergoing other phases of construction.

Based on our estimate, this approach saved the project approximately $2 Million (USD), several months of construction and will result in more uniform site performance compared to the owner's engineer's recommendation.

ENGEO CELEBRATES WITH TWO PROJECTS RECOGNIZED AT 2017 INNOVATE NZ AWARDS

by Joanne Lynch
Christchurch, New Zealand


Christchurch Adventure Park


Southern Response
Global Consent - NES

ENGEO celebrated being recognized with two Merit achievements at the 2017 ACENZ Innovate Awards of Excellence Gala Dinner. This was the first year ENGEO entered the esteemed event, and we submitted two projects: Southern Response Global Consent and the Christchurch Adventure Park, both of which received awards.

The 2017 INNOVATE NZ awards are the premier awards for projects in the professional engineering industry. Unique and highly regarded, the awards celebrate outstanding projects demonstrating a high level of technical expertise, innovation, complexity, and excellence in consulting work. Projects are evaluated by at least four judges who make up a panel of very experienced assessors. Award categories include Merit, Silver and Gold.

ENGEO's Greg Martin said, "With over 45 submissions and this being the very first time we've entered, we're really proud to be recognized alongside other top New Zealand companies with their outstanding projects and showcasing their ability to deliver superb innovation."

Over 300 people from around New Zealand attended the prestigious event.

Visit www.acenz.org.nz/2017_innovate_projects to view project award recipients.

ENGEO PRESENTS TWO PAPERS AT PBDIII 2017

ENGEO presented two technical papers at the 3rd International Conference on Performance-Based Design in Earthquake Geotechnical Engineering (PBD-III) in Vancouver, BC, Canada. The PBD-III Conference is organized under the auspices of the International Society of Soil Mechanics and Geotechnical Engineering Technical Committee TC203 on Geotechnical Earthquake Engineering and Associated Problems (ISSMGE-TC203).

FULL-SCALE DENSIFICATION TESTING PROGRAM

by Uri Eliahu, Stefanos Papadopulos - ENGEO, San Ramon, California

ENGEO conducted a full-scale vibro-compaction field tests using Direct Power Compaction (DPC) at Treasure Island. Treasure Island is located in the central San Francisco Bay, immediately north of Yerba Buena Island, between the active San Andreas and Hayward faults. Treasure Island was constructed by placing hydraulic sand fill over natural shoal deposits within perimeter rock dikes. The field test was performed to evaluate the improvement potential of sandy soils susceptible to liquefaction, and to develop a site-specific DPC vibro-compaction method specification for the desired level of densification.

SEISMIC DEFORMATION ANALYSES OF WATERFRONT SHORELINE

by Pedro Espinosa, Bahareh Heidarzadeh - ENGEO, San Ramon, California
Juan Pestana, Jonathan Bray - University of California, Berkeley
Shahriar Vahdani - Applied GeoDynamics Incorporated, El Cerrito, California

ENGEO collaborated to undertake a study to evaluate the seismic deformation of the existing shoreline at Treasure Island through a nonlinear dynamic deformation analysis. The scope of the study included seismic site response analyses, lateral deformation analyses using two-dimensional finite-element models in PLAXIS, pseudo-static hybrid deformation analyses, and comparisons with observed seismic performance of similar sites during past earthquakes. The natural shoal deposit beneath the island fill was modeled using the UBC Sand model, with input parameters carefully selected to capture material behavior obtained through cyclic simple shear tests. Examination of PLAXIS analysis results indicated that the magnitude of lateral deformations at the location of the proposed development (greater than 300 feet from the shoreline) was negligible.

KAIKOURA EARTHQUAKE RESPONSE IN WELLINGTON

by Karen Jones, CEnvP
Wellington, New Zealand

As a result of The Kaikoura earthquake on November 14, 2016, and the 1 in 20 year storm event on November 14, 2016, a number of slope failures occurred in the Wellington region.

ENGEO has been working for Porirua City Council (PCC) to assess several landslides in the Porirua region. Our Geotechnical Engineers and Geologists carried out emergency assessments on approximately 15 slopes on November 16, which included making decisions to evacuate residents at risk. Subsequently, these slopes were reassessed after the storm event had subsided, and we performed an initial assessment of an additional 45 landslide locations.

From the results of the assessments, PCC were able to prioritize sites that required emergency remediation prior to Winter 2017 and identify slopes to be remediated in the Spring of 2017.

So far, 15 slope remediation solutions have been designed by our staff in the Wellington, Christchurch and San Ramon offices. Construction of one of these solutions, including retaining walls, is nearing completion and the remainder will be constructed from early August onwards. A number of additional slope remedies will be designed and constructed by ENGEO from September onwards.

CHANGE IN NEW ZEALAND LAW STIMULATES INNOVATION

BMIS IS AN EASY-TO-USE ASBESTOS MANAGEMENT SOFTWARE SOLUTION

by Tom Davies
Christchurch, New Zealand

When changes to New Zealand's Health & Safety at Work (asbestos) Regulations came about in 2016, it prompted a conversation. How would this change affect our clients and the greater community?

In 2016 the new Health and Safety at Work Act came into force increasing companies' responsibility for workplace safety, paying particular attention to asbestos in work environments. The regulation requires that occupants of all workplaces develop and maintain an Asbestos Management Plan in accordance with the Health and Safety at Work (Asbestos) regulations 2016.

To address the new requirements, Building Materials Information System (BMIS) was developed, providing an easy way to manage asbestos in buildings.

BMIS is an online software solution that allows creation of an asbestos management plan for the workplace. This powerful yet intuitive system manages the steps required for the management of asbestos in thousands of workplaces throughout New Zealand.

The team behind BMIS are asbestos industry experts made up of environmental practitioners, occupational hygienists, BOHS IP402 trained consultants and asbestos assessors. With a leading team of developers, we have brought BMIS to life as a user-friendly package for all tenants or building owners.

Because asbestos is a common product used in buildings constructed prior to 2000, there is an ever-increasing demand for asbestos management. BMIS is the leading service for asbestos management in New Zealand workplaces.

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It is the responsibility of the workplace Person Conducting a Business or Undertaking (PCBU) to:

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3. Identify ways to control the risks
4. Label asbestos in the workplace
5. Develop processes for accidents, incidents and emergencies
6. Review asbestos management plan effectiveness

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