

The Canadian  
Geotechnical Society



La Société Canadienne  
de Géotechnique

## CGS Cross-Canada Lecture Tour Dinner Presentation

### Innovative Solutions in Construction of the New San Francisco-Oakland Bay Bridge Self-Anchored Suspension Span

Presented by:

**Alex Sy, Ph.D., P.Eng., FEIC**

Vice President, Technical – Klohn Crippen Berger Ltd., Vancouver, BC

#### Presentation Abstract:

The new east span of the San Francisco-Oakland Bay Bridge features a single tower self-anchored suspension (SAS) bridge that became the largest of its kind in the world when completed in 2013. During construction of the SAS bridge, temporary towers and trusses were required to support the box girders until erection of the suspension cables was complete. Innovative geotechnical solutions were designed that included the use of micropiles for towers located on the steep slopes of Yerba Buena Island (YBI), rock socketed drilled shafts for towers on relatively flat ground at YBI, and large diameter steel pipe piles driven into marine sediments and bedrock for towers over water. In addition, the installation method used for the main cable of the asymmetrical suspension bridge required the 160 m high main tower to be displaced 500 mm to the west, which was accomplished by using 200 m long pull-back cables anchored to bedrock at YBI with micropiles, prior to the erection of the main cable. Furthermore, the bridge decks from the west approach connecting to the west pier of the SAS bridge needed to be pulled down 75 mm in order to make the hinge closure pour during construction, which required a tie-down system utilizing micropile foundations. This lecture presents the issues and challenges faced during the design and construction of the tower foundations, as well as the novel applications of micropiles for the main tower pull-back cables, and the west approach deck pull-down cables.

#### About the Presenter:

Alex Sy is Vice President, Technical at Klohn Crippen Berger Ltd. in Vancouver, BC. He has more than 40 years of experience in geotechnical and earthquake engineering for transportation, water and wastewater infrastructures, heavy industrial facilities, hydroelectric and water retention dams, and mine tailings dams. He has worked throughout Canada and internationally. Alex has provided forensic engineering and expert witness services for infrastructure failures involving dams, dykes, bridges, pipelines, buildings and landslides. He currently serves on Independent Technical Review Boards for several major water supply projects and tailings storage facilities in high seismic environments.

Alex has a Bachelor in Civil Engineering from the University of Queensland in Australia, and a Master and Ph.D. in Geotechnical Engineering from the University of British Columbia. He is also an Adjunct Professor in the Civil Engineering Department of the University of British Columbia. He has authored more than 50 technical papers in various aspects of geotechnical and geoseismic engineering.

Alex received the Canadian Geotechnical Colloquium award from the Canadian Geotechnical Society in 1996, and the VGS Award from the Vancouver Geotechnical Society in 2015. He is a Fellow of the Engineering Institute of Canada.

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**Date:** Tuesday, October 9, 2018

**Time:** Dinner at 6:00 PM, Presentation at 6:30 PM

**Location:** Holiday Inn South, 1330 Pembina Highway

**RSVP:** 12:00 PM, Thursday, October 4, 2018

#### Registration Fee (debit, credit, PayPal):

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