



AGS (HK) Webinar

An Automatic Back Analysis Methodology to Better Predict the Real Ground Behavior – The Girona High-Speed Train Station (SPAIN)

by

Cristian de Santos, PhD.

- Date** : 17 December 2020
- Time** : 7:00 pm – 8:00 pm (after the AGM)
- Venue** : Zoom Webinar
- Enquiry** : Haydn Chan (email: haydn.chan@arup.com)
- Fee** : Free of charge
- Registration** : <https://forms.gle/DU7dzAHmJfqH53Es5>
- Book Prize** : Book prize is open to all young attendants under 35 years old for the submission of a good quality report (max. 500 words) on this event. Book Prize reward comprises a book "Geology of Site Investigation Boreholes in Hong Kong" by Chris Fletcher and book coupon HK\$300 from Joint Publishing HK 三聯書店.
- The book report shall be sent to haydn.chan@arup.com.

Synopsis:

Over the centuries, engineers and architects have faced many challenges on how to build more efficient and sustainable buildings and infrastructures around the world. They have overcome many of them, however, numerous projects have suffered large cost overruns.

How is this possible, in a world with such advanced technology and highly skilled professionals?

Clearly, everything is built on or under the ground. Unfortunately, the ground is not a man-made material and its behavior is uncertain. This might cause unforeseen events during construction, such as delays, malfunctioning and even failure, jeopardizing people's safety, and reducing profits.

Currently, the industry tackles these problems with two different approaches. The first one, by using sophisticated numerical models to predict how the ground behaves, and the second one, by using sensors to monitor the real ground behavior. Unfortunately, the majority of predictions done in design do not match the reality since sophisticated numerical tools don't take into account monitoring data.

Based on the PhD thesis "*Backanalysis Methodology Based on Multiple Optimization Techniques for Geotechnical Problems*", Dr de Santos will present a case study where an automatic backanalysis methodology was implemented to better understand and predict the real ground behavior of a large underground excavation.



The case study represents the High-Speed Train Station of Girona where it was pointed out the potential of combining and enriching numerical models with monitoring data during construction.

About the Speaker

Dr de Santos is Master's in Geotechnical Engineer, PhD in Soil Mechanics at the Polytechnical University of Catalonia 2015 (UPC) and CEO and Co-founder at SAALG Geomechanics. He was 3 years junior researcher and consultant for the Polytechnical University of Catalonia (2007-2010), and senior researcher and consultant for six years (2010-2016) at the same university before he decided to create SAALG Geomechanics, an engineering firm specialized in advanced numerical solutions, numerical models calibrations and soil & rock parameters characterization by backanalysis. He also spent part of his PhD time as a visitor researcher at the California Institute of Technology (Caltech) in the USA. He is an expert on Finite Elements software's (mainly Plaxis 2D&3D) and geotechnical backanalysis. During his carrier he has been involved in multiple projects around the world such as Metro Lines , High-Speed Trains, Deep Shafts, Hydraulic Tunnels, Land Reclamation projects, and Large Buildings with underground levels among others.