

David Solans Roa

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Santiago, Chile & London, UK

Summary

After graduating from the University of Chile in 2010 as Civil Engineer, BSc and MSc, Mr. Solans worked in the industry for more than six years as a project engineer and geotechnical leader for different project related to geotechnical characterisation of soils and advanced numerical modelling for earth dams, tailings dams and underground structures. Mr. Solans moved to the Department of Civil Engineering at Imperial College London in 2016 obtaining a Master degree in Soil Mechanics and Engineering Seismology and afterwards undertaking

PhD research in Computational Geomechanics studying the seismic performance of tailings dams using finite element method with advanced constitutive models.

His professional experience comprehends geotechnical characterisation of soils, slope stability analyses, and design in mining and infrastructure projects. In numerical modelling, his experience is in tailings dams, heap leach pad, tunnels and underground civil works models under static and dynamic conditions.

Education

Imperial College London

LONDON, UK

PhD (c) in Geotechnics

2018 – 2021

Dissertation title: "*Seismic performance of tailings dams*". Supervisors: Dr. Stavroula Kontoe & Prof. Lidija Zdravković. This research project aims to investigate the static and seismic response of tailings dams by using advanced finite element method (FEM) analyses, where the behaviour of the tailings is rigorously modelled according to the Critical State Soil Mechanics (CSSM) framework. The tailings sands behaviour will be simulated with advanced constitutive models and calibrated against both monotonic and cyclic laboratory data from copper ore mines.

MSc in Soil Mechanics and Engineering Seismology

2016 – 2017

Dissertation title: "*Canyon topography effects on ground motion*". Supervisor: Dr. Stavroula Kontoe. This study is focused on the assessment of canyon topography effects on ground motion under parametric analyses considering a soil layer over rigid bedrock with different stiffness profiles. Additionally, the effect of water on the topographic amplification response is analysed.

University of Chile

SANTIAGO, CHILE

MSc in Geotechnical Engineering

2008 – 2010

Dissertation title: "*Monotonic and Cyclic Triaxial Equipment at High Pressures and its application in tailings sands*" (in Spanish). Supervisor: Dr. Ramón Verdugo. This study consisted in the design and the construction of high pressure triaxial equipment for monotonic and cyclic loading up to 6MPa of confining pressure for size samples of 5cm×10cm and 10cm×20cm.

Civil Engineer, BSc

2002 – 2008

Civil engineering degree with background in structures, construction and geotechnics.

Work Experience. FEATURED PROJECTS

Independent Consultant

LONDON, UK

Consultant

2018 – present

- Advanced 3D mesh generation in *Flac3D* for Slimes Storage "La Brea". Caserones Mine, Chile. (2018). for ARCADIS Chile S.A.

Arcadis Chile S.A.

SANTIAGO, CHILE

Geotechnical leader for projects

2011 – 2017

- Specialized support for Basic and Detail Engineering for Metro of Santiago (urban underground), Project Line 3. (2015 - 2016) This project included a field campaign, geotechnical characterisation, stability works for buildings, and numerical modellings for new station tunnels and their complex interaction with existent stations and buildings. All the numerical analyses were performed using *FLAC3D* & *Rhino - Kubrix*.

Project Engineer

- 3D time domain analysis of Slimes Storage "La Brea". Caserones Mine, Chile.(2018). Analysis performed using *FLAC3D* & *Griddle*.
- 2D time domain analysis of Talabre Tailings Dam, Chile.(2017). Analysis performed using *FLAC3D*
- 2D time domain analysis of Los Angeles Earth Dam, Chile.(2016). Analysis performed using *FLAC3D*
- 2D time domain analysis of Quebrada Honda Tailings Dam, Perú.(2016). Analysis performed using *FLAC3D*
- Regional field campaign and geotechnical characterisation of small dams. Chile (2015 - 2016). This campaign includes the assessment of different places for water storage dams considering in-situ and laboratory tests.
- 2D time domain analysis of Zaldivar Tailings Dam, Chile. (2014). Analysis performed using *FLAC3D*
- Geotechnical Characterisation of Tailings Sand of Quebrada Honda Mine, Peru. (2014). This study includes laboratory testing for mechanical properties at high confining pressures.
- 2D time domain analysis of San Esteban Tailings Dam, Chile.(2013). Analysis performed using *FLAC3D*
- Geotechnical Characterisation of Heap Leach Pad for Codelco Salvador Division (2012). This study includes laboratory testing for mechanical properties.
- 3D time domain analysis of Armazones Hill for The Extremely Large Telescope (ELT). Chile.(2011). Topographic amplification model using *FLAC3D* model.
- 3D time domain analysis of Quellaveco Tailings Dam, Perú. (2011). Update model for new production level. Analysis performed using *FLAC3D*

IDIEM

SANTIAGO, CHILE

Project Engineer

2010 – 2011

- Geotechnical vulnerability studies for 7 buildings that suffered structural damage after 2010 Chilean Earthquake. (2011)
- Seismic Slope stability study at Huella Tres Puntas Area in Tocopilla, II Region. This area suffered severe damage during 2007 Earthquake. (2011)
- Geotechnical Study for Alto Rio Building. This building suffered a total collapse during the 2010 Chilean Earthquake. (2010-2011)

CMGI

SANTIAGO, CHILE

Project Engineer

May '2008 – Oct '2008

- 3D time domain analysis of Quellaveco Tailings Dam, Perú. (2008). Analysis performed with *FLAC3D*
- 3D time domain analysis of Caserones Sands Stock, Chile. (2008). Analysis performed with *FLAC3D*
- 3D time domain analysis of Los Leones Tailings Dam, Chile. (2008). Analysis performed with *FLAC3D*

Publications

Peer-reviewed Journals

- **Solans, D.**, Skiada, E., Kontoe, S. and Potts, D. (2019). *Canyon topography effects on ground motion: Assessment of different soil stiffness profiles*. *Obras y Proyectos* 25, pp. 51-58
- Figuroa, A., **Solans, D.**, Gonzalez, C., Campaña, J. (2017): *Seismic behaviour of tailings dams constructed centerline and downstream methods*. *Obras y Proyectos* 21, pp. 30-37
- **Solans, D.**, Hormazabal, C., Rojas, B. y León. R. (2015): *Comparison of three methodologies of seismic analysis of NATM tunnel in fine soils of Santiago*. (In Spanish). *Obras y Proyectos* 17, pp. 14-21.

Conferences

- **Solans D.**, Kontoe S. & Zdravkovic L., (2019): *Monotonic and cyclic response of tailings sands*. SECED 2019 Conference: Earthquake risk and engineering towards a resilient world, Publisher: www.seced.org.uk
- **Solans, D.**, Skiada, E. Kontoe, S. Potts, D. M. (2018): *Canyon topography effects on ground motion: Assessment of different soil stiffness profiles*. X Chilean Geotechnical Conference. Universidad Técnica Federico Santa María Pontifical Catholic University of Valparaíso . In Spanish.

- Leal, F., Pozo, J. & **Solans, D.** (2016): *Benchmarking study between geotechnical monitoring and numerical analysis for tunnels build in fine soils of Santiago*. IX Chilean Geotechnical Conference. Universidad Austral de Chile. In Spanish.
- Gonzalez, C., Figueroa, A., **Solans, D.** & Campaña, J. (2016): *Valley shape effects in the seismic response of tailings sand dams*. IX Chilean Geotechnical Conference. Universidad Austral de Chile. In Spanish.
- Figueroa, A., **Solans, D.**, Gonzalez, C. & Campaña, J. (2016): *Seismic behaviour of tailings dams constructed centerline and downstream methods*. IX Chilean Geotechnical Conference. Universidad Austral de Chile. In Spanish.
- **Solans, D.**, Rojas, B., Sotomayor, J. & León. R. (2016): *Line 3 of Santiago's Subway (Metro de Santiago): Application of Cap Yield constitutive model in tunnels and underground works*. 4th ITASCA Symposium on Applied Numerical Modeling. March 2016. Lima, Perú. pp. 385 - 392.
- **Solans, D.**, Hormazabal, C., Rojas, B. & León. R. (2014): *Seismic Analysis of NATM Tunnel in fine soils. Response comparison through 3 methodologies*. VIII Chilean Geotechnical Conference. Pontificia Universidad Católica de Chile. In Spanish.
- **Solans, D.**, Gonzalez, C. y León. R. (2014): *Línea 3 Metro de Santiago: Important aspect to numerical modeling of complex underground works*. VIII Chilean Geotechnical Conference. Pontificia Universidad Católica de Chile. In Spanish.
- **Solans, D.** & Verdugo, R. (2012): *Monotonic and Cyclic Triaxial Equipment at High Pressures*. VII Chilean Geotechnical Conference Universidad de Concepción. In Spanish.
- **Solans, D.**, Pollak, D. & Campaña, J. (2012): *Considerations to assess topographic amplification in three dimensions*. VII Chilean Geotechnical Conference. Universidad de Concepción. In Spanish.

Talks

- **Nueva Línea 3 de Metro: Desafíos de Ingeniería Geotécnica en Santiago** (2014) Talk given at Pontifical Catholic University of Chile
- **Proyecto: Nuevas Líneas 3 y 6 del Metro de Santiago** (2013) Talk given at Universidad Diego Portales

Awards

- **Doctorate Scholarship Award 2017**. Becas Chile - Conicyt.
- **Master Scholarship Award 2015**. Becas Chile - Conicyt.
- **Outstanding student award year 2007**. School of Engineering. University of Chile.

Teaching Experience

Imperial College London	LONDON, UK
GTA Slope Stability <i>Spring 2019, 2020</i>	
UGTA Structures and Geotechnics Projects <i>Spring 2019, 2020</i> .	
University of Chile	SANTIAGO, CHILE
GTA Soil Dynamics <i>Spring 2019</i> and Constitutive Laws in Soils <i>Spring 2019</i>	
UGTA Geotechnics <i>Spring 2019</i> , Geomechanics <i>Spring 2019</i> and Foundations <i>Spring 2019</i>	
UTFSM	VALPARAÍSO, CHILE
GTA Soil Dynamics <i>Spring 2019</i>	

Students co-supervision & Member Examination Committee

Imperial College London. CO-SUPERVISION	LONDON, UK
• Roy, S. (2019): <i>"Characterisation Of Monotonic Response Of Tailings Sands"</i> . MSc Thesis in Soil Mechanics and Engineering Seismology.	
Pontifical Catholic University of Chile. MEMBER EXAMINATION COMMITTEE	SANTIAGO, CHILE
• Urbano, S. (2016): <i>"Experimental Study of dynamic properties of thickened tailings. Application to stability analysis"</i> . MSc Thesis in Civil Engineering.	

Skills

Technical specialities: Matlab (*Intermediate Level*), Plaxis (*Advanced Level*), FLAC and FLAC3D (*Advanced Level*), Geostudio - Suite (*Advanced Level*), Phyton (*Beginner Level*) and L^AT_EX(*Intermediate Level*)

Natural languages: Spanish (*mother tongue*), English (*full professional proficiency*).