Jawad Arefi

Senior Geotechnical Engineer

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CPEng, CMEngNZ
PhD in Civil Engineering, University of Canterbury, 2014
MSc in Earthquake Eng. and Engineering Seismology, Uni. Pavia, 2008
M2P in Geosciences: Exploration and Risks, Uni. Grenoble, 2007
BSc in Civil Engineering, Sharif University of Technology, 2006

I am a chartered geotechnical engineer with 10+ years of research and practical experience in this field. I have been involved in broad geotechnical projects covering a wide variety of multi-disciplinary infrastructure, industrial, building, utilities and advisory projects. I am a self-disciplined professional who is passionate about geotechnical engineering. I always try to find ways to discover new concepts and experiment new ideas and apply them to deliver a better solution for clients.

Citizenship	Afghanistan; New Zealand Australian Permanent Residency
Membership	• Chartered Member of Engineering New Zealand • New Zealand Geotechnical Society • International Society for Soil Mechanics and Geotechnical Engineering
Special competence	• Numerical Modelling of Geomaterials
Background	2019-present: Senior Geotechnical Engineer, Beca Ltd, Christchurch, New Zealand 2013-2019: Geotechnical Engineer, Beca Ltd, Christchurch, New Zealand 2008-2013: Geomechanics Tutor, University of Canterbury, Christchurch, New Zealand

Relevant experience

Education

Otago Polytech Campus Development /Logic Group NZ Ltd, Dunedin, 2016 - 2017 (Beca Ltd)

Otago Polytech intended to develop its two campuses in Forth Street and Albany Street. I was the job manager and in charge of allocating resources to the job and liaising with the client. I also engaged a drilling contractor on behalf of the client and managed that contract. In addition, I was the geotechnical work package manager undertaking technical analysis for the proposed scope and ensured the Beca quality process was followed by documenting commission letters, verification evidences and risk assessment. I ensured the client understood the report and followed up with them on receiving feedback. In the following phases of the project, I liaised with the larger multi-disciplinary team ensuring concept design is fully understood by the team members. I also provided verification to the design calculations.

Government Advisory

Town Hall Review/ Christchurch City Council, Christchurch 2014 – 2016 (Beca Ltd)

Christchurch City Council repaired, strengthened, retrofitted and revitalized the Town Hall building. This $167 million project involved retrofitting the super structure and treating the underlying soil using jet grout columns. My role was to peer review the ground improvement design and foundation repair. This involved several site visits and undertaking parallel Plaxis modelling of the ground improvement and comparing them with Plaxis and Flac results of the geotechnical designer.

Lancaster Park Condition Assessment/Christchurch City Council, NZ, 2013- 2014 (Beca Ltd)

Beca Ltd was engaged to undertake geotechnical investigation of existing stone columns that form part of the foundation system beneath the Deans and Paul Kelly Stands at Lancaster Park (formerly AMI Stadium). The objective was to assess the

damage and level of silt contamination of stone columns after the Canterbury earthquake sequence. My role was to scope and supervise the near surface intrusive investigations and select soil samples for laboratory testing. In addition, original design works together with post-earthquake investigation were scrutinized in order to understand the original design's intention in relation to assessed damage and reparability. A literature review was also undertaken to study the stone column performance within a foundation system and the superstructure as a whole. I co-authored several conference papers on the performance of these stone columns during the Canterbury earthquake sequence.

Health

Burwood Hospital Redevelopment/CHDB, Christchurch, NZ, 2013- 2014 (Beca Ltd)

I undertook regularly site visits and monitoring during the course of substructure construction, which involved inspection of subgrade, hard-fill and liquefaction mitigation schemes designed for this project. Communication with the contractor and the project manager was a key element to the successful completion of the project according to the design specification and designer drawings.

Mining and Metals

Holcim Cement Silos – WLG & NPL/ Holcim, Wellington and New Plymouth, 2016 – 2018 (Beca Ltd)

Holcim engaged Beca to provide engineering services in relation to construction cement silos in Timaru, Wellington and New Plymouth. My role as geotechnical work package manager was to first resource for this job and later undertake technical design of the shallow and piled foundation.

Smelter Building Seismic Study, PT Vale Indonesia TBK, Indonesia, 2019 (Beca Ltd)

My role in this project was to review an extensive ground investigation database and select appropriate and relevant information for the PT Vale Smelter building site at the Sulawesi island of Indonesia. Then, I had to work with the structural engineers to assess the lateral characteristics of the piles and evaluate its performance during a design action. The conclusion had to be delivered in a simple report understandable by the client.

Oil & Gas

NAM Groningen Structural Upgrade, BICL (NL) BV, the Netherland, 2017 – 2018 (Beca Ltd)

I undertook a comprehensive literature review of liquefaction-induced building damages from around the globe. The findings were categorised and rationalized to be used for the liquefaction induced damages for the URM buildings in the Groningen city of the Netherlands.

Ports/ Marine

Lyttleton Port Cruise Berth/ Lyttleton Port of Christchurch, New Zealand, 2016-2020 (Beca Ltd)

Following the 2010-11 Canterbury earthquake sequence, large cruise vessels have been unable to berth at Lyttleton Port. In line with Christchurch City council's desire to see large cruise vessels return to Lyttleton, the Lyttleton Port Recovery Plan included several potential options that would facilitate future cruise operations. The capital value for this project was approximately $65M.

I was responsible to review existing ground investigation information and scope for additional ground tests to provide geotechnical input to the structural concepts using a series of software packages including AllPile, LimitState Geo, Lpile, Settle3D, SlopeW, Plaxis, Wallap, and GRL Weap.

In addition, I contributed heavily in the enabling works design. This involved several meetings with the ECI contractor and the client going over many possible options and assessing performance of each using nonlinear modelling of Plaxis. The enabling work design of such a challenging site took several months and it was peer reviewed by an ex-academic expert. This job needed a thorough work package management and resilient business acumen skills which improved my client relationship competency to a great extent.

I also undertook regular site visits and was fully committed to the construction monitoring phase as an observational approach was adopted for the temporary works construction.

Port Nelson Main Wharf Extension/ McConnell Dowell Constructors Ltd/ Nelson, 2018 – 2020 (Beca Ltd)

I was part of the tender design team analysis and designing the new piled wharf structure and adjacent lattice ground improvement. Later after winning the job, I was part of the developed and detailed design team assessing the final option. This involved a highly technical suit of calculations using Wallap, SlopeW, LimitState Geo, AllPile, and LPile. I undertook many verification works as had to delegate many of the computational work to junior staff.

Cashin Quay 3 Berth Deepening/ Lyttleton Port of Christchurch, New Zealand, 2016 (Beca Ltd)

To allow the berthing at Cashin Quay 2 of vessels up to 300m long whose drought requires a berth pocket to -15.1m CD, Lyttleton Port of Christchurch wanted to understand the feasibility of deepening the berth in front of the adjacent Cashin Quay 3 by up to 2m over a length of approximately 70m to 80m. The feasibility and developed concept design options were undertaken by Beca. The capital fee was approximated $20M.

I was the job manager and also the geotechnical engineer for this job. This task involved desk study, scoping for further ground investigation, interpretation of the results and undertaking a detailed static and dynamic geotechnical assessment using software package Plaxis. I also prepared a design statement report for the proposed options.

Power Transmission

Lancaster and Marshland Substations /Orion New Zealand, Christchurch, 2013 - 2019 (Beca Ltd)

I was the geotechnical work package manager for these two jobs. I scoped for the required ground investigations and managed the resources for undertaking the static and seismic assessments of the foundation configurations for the 66kV switchgear buildings and adjacent transformer pads. I also verified the geotechnical calculations for the foundations and earthworks and eventually undertook site inspection during construction.

Road and Transport

Sumner Road D&C/ McConnell Dowell Constructors, Christchurch, 2017 (Beca Ltd)

I was responsible for the design of several retaining walls along the repaired Sumner Road which was closed after the Canterbury Earthquake Sequence. My task involved several site visits to assess the existing ground and slope conditions and propose wall options for different sites. I had to work with a much wider team within geotechnical discipline for efficiency and consistently of wall design along the road as well as with multi-disciplinary team members from water drainage and civil design ensuring an efficient overall design. This project won several awards including CCNZ and H&S Initial award of NZ minerals forum.

Transmission Gully – Peer Review/AECOM, 2015- 2017 (Beca Ltd)

The Transmission Gully (TG) project traverses a distance of approximately 27.1km from MacKay’s Crossing in the north to Linden in the south. The TG project comprised 28 bridges of which I peer reviewed the geotechnical components of nine bridges and MSE wall packages and also managed the relevant work packages. This review comprised a totally independent assessment of liquefaction susceptibility, settlement, slope stability, MSE wall design, bearing capacity and soil-foundation interaction. The work package management involved following verification chain and resourcing.

NZTA MaWh NOC15/Higgins Contractors Limited, State Highway 4, 2015- 2016 (Beca Ltd)

On Friday 19 June 2015, a storm event tracked across the North Island. The storm event generated long periods of heavy rainfall and landslips affecting the Manawatau and Whanganui regions. A number of landslides and underslips occurred along State Highway 4 resulting in considerable damage and loss of the carriageway. The NZTA awarded the Manawatu Whanganui Network Outcomes Contract to Higgins Contractors and in association Beca to undertake the provision of additional services including site inspection and engineering services for post-emergency recovery work.

I was responsible for the concept and detailed design of associated retaining walls for two slope failure sites. This involved considering different retaining wall options for each site and preparing a report, explaining pros and cons. After an agreement with NZTA, the preferred option for each wall was analysed in detailed design stage using SlopeW and Wallap software. Construction drawings were prepared for the final retaining wall along with construction Specifications.

Tourism

Millennium Hotel Review, Jegual Investments Ltd, Christchurch, 2014 – 2015 (Beca Ltd)

My role was to assess the performance of the Millennium hotel in Christchurch during the Canterbury Earthquake Sequence for insurance claim purposes. This involved extensive high level assessment of the foundation and basement retaining walls.

Water and Wastes

WDC Infrastructure EQ Recovery/Waimakariri District Council, 2013- 2014 (Beca Ltd)

I undertook a desktop study for several sites for proposed pump stations in Kaiapoi. This included summarizing ground conditions, analysing observed damages during Canterbury Earthquake Sequence as well as ground water measurements. In addition, I carried out liquefaction analyses for some of the selected sites. I also assisted in preparing the geotechnical report for the Hilton Street Pump Station.

Software

- ABC, AllPile, Cliq, CPeT-IT, DeepSoil, FLAC, Frew, Geo, Group Pile, LPile, MSEW, PLAXIS, RocData, RSPile, Sesoc Soil, Settle3D, Shake, SigmaW, Slide, SlopeW, Strata, Wallap, and Weap.

Awards

- 2018 12th ANZ YGP Conference travel grant
- 2012 Civil Engineering Department Postgraduate Research Scholarship
- 2011 New Zealand Geotechnical Society Scholarship
- 2009 New Zealand Geotechnical Society Student Award
- 2009 University of Canterbury Doctoral Scholarship
- 2006 European Commission Erasmus Mundus Scholarship

Presentations

- Arefi J, Young R., Stewart N. (2018): Comparison of predicted and observed seismic performance of Kekerengu and Tirohanga bridges during Kaikoura 2016 earthquake, 12th ANZ YGP Conference, Hobart, 7-9 November
- Arefi J, Cubrinovski M, Bradley BA. A model for nonlinear total stress analysis with consistent stiffness and damping variation. 15th World Conference on Earthquake Engineering (15 WCEE) 24-28 September 2012. Lisbon, Portugal.
- Arefi J, M Cubrinovski, M Rahman (2012): Effects of fines on stress-strain behavior of sands. Melbourne, Australia: 11th Australia-New Zealand Conference on Geomechanics (ANZ 2012), 15-18 July, Paper 226

Professional Development

- Design and Construction Techniques on Soft Ground Course, Christchurch 2018
- Geosynthetic Reinforcement in Highways Seminar, Christchurch 2017
- Level 1 Traffic Controller (TC1) course, Christchurch, 2016
- 6th International Conference on earthquake geotechnical engineering, Christchurch, 2015
- Advanced course on computational Geotechnics; Dynamics and Seismic Analysis (Plaxis), Wellington, 2014