

Samuel Pena, P. Eng.

Geotechnical Engineer

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Senior Geotechnical Engineer with over 20 years of Canadian and International experience in consulting and construction engineering. Involved with several major geotechnical projects including foundations, slope stability, dam design and construction, retaining structures, transportation infrastructure, materials assessment and construction. Broad skills in organization, problem solving and time management with experience in project planning, coordination, estimating and construction supervision. Sound working knowledge of standards and codes, including those of the American Society for Testing and Materials (ASTM), American Concrete Institute (ACI), American Association of State Highway and Transportation Officials (AASHTO), the Canadian Standards Association (CSA), and the Canadian Foundation Engineering Manual.

WORK EXPERIENCE

2016 - 2017 SNC LAVALIN INC.

Mining and Metallurgy Division (Sustainable Mine Development) – Lima, Peru

Supervision Director and Construction Manager

Antamina Project, Copper Mine, Huaraz, Peru. Construction Supervision for Tailings Dam Raise from 4115 m to 4135 m a.s.l, Phases VI-A and B and Polishing Pond Dam from 4120 m to 4135 m a.s.l.

The main components of project comprised:

- Tailings dam raise including earth works (rock, processed aggregates (2B, 3A and 3B) and moraine fills), asphalt core, plinths, permeation and consolidation grouting curtain, access and haul roads,
- Seepage facilities works comprising arch segments gallery foundations (anchored wall, piling socketed in rock, soldier piles and footing concrete works).
- Side hill hydraulic structures including MCDC inlet to a diversion tunnel, enlargement of UCDC channel and pumping station from Polishing Pond.
- Polishing pond dam including cut off wall with plastic concrete, permeation and consolidation grouting curtain, earth works (rock, processed aggregates (2B, 3A and 3B) and moraine fills), asphalt core and plinths.

Responsibilities included the direction and management of dam construction supervision with a team of 45 people including project control, construction procedures, productions, scheduling, construction equipment control, quarry developments, cost analysis, contract administration, coordination of contractors, client liaison, project meetings, preparation, reviewing and approving of technical and admin reports and staff allocation.

2014-2016 Sola Engineering (Former Soil Probe Ltd)

Vaughan, Ontario

Principal Geotechnical Engineer

Management of geotechnical projects including proposal preparation, scheduling, cost analysis, coordination of subcontractors, Laboratory testing supervision, staff allocation, client liaison, preparation, reviewing and approving of technical reports for geotechnical projects mostly focused in shallow and deep foundations, slope stability, construction supervision, pavement design and materials testing. Clients included federal, provincial and municipal governments and commercial, industrial and residential developers in Greater Toronto Area (GTA) and Ontario Province.

The main projects carried out comprised:

- Concrete Assessment of Locks 39, 40 and 41 of the Trent-Severn Waterway, Ontario for Public Works and Government Services Canada (PWGSC). Works included concrete conditions assessment by sounding, Ground Penetration Radar (GPR), and concrete coring.



- Geotechnical investigation and construction supervision for foundations of dams at Haliburton County, Ontario for Public Works and Government Services Canada (PWGSC). Works included geotechnical investigations, foundation recommendations and construction supervision for the dam foundations on rock and soils including packer tests, injection of grout curtains and cut-off seepage walls with plastic concrete.

2007- 2014 SNC LAVALIN INC.

Infrastructure and Transportation Division (Qualitas)-Vaughan, Ontario

Geotechnical Engineering Manager

Responsibilities included managing and coordinating projects, reviewing and approving technical reports for foundations, slope stability, pavements, environmental and materials testing for provincial, regional and municipal projects and commercial, industrial and residential developments in GTA and Ontario Province playing significant role in business development plan and allocating human resources, developing the strategic planning and development of geotechnical group.

Mining and Metallurgy Division (Sustainable Mine Development) - Toronto, Ontario

Senior Geotechnical Engineer - Geotechnical Operations Manager - H&S Officer

Main projects as Senior Geotechnical Engineer:

- Geotechnical and Hydrological Study for Mafia Island Airport, for Millennium Challenge Account, Tanzania. Geotechnical lead for landslide remediation measures and management of field investigations.
- Mina de Cobre Project (Copper Mine), Basic, Detail Engineering and Construction Supervision for Minera Panama, Province of Colon, Panama. Foundations and earthworks lead for plant site, water control and tailings dams, port facilities, marine structures and access roads. Responsibilities included management and coordination for onshore and offshore geotechnical investigations.
- Lennox Generating Station Geotechnical Study for Aecon, Greater Napanee, Ontario, Canada. Supervision of field geotechnical works and preparation of geotechnical investigation report including foundation recommendations for ignition oil piping.
- Qakimajurq Feasibility Geotechnical Study for Xstrata Nickel, Raglan Mine, Quebec, Canada. Field Manager for geo-mechanical field investigation in rock by oriented core logging (4500 m). Responsibilities included staff managing and supervision of field geotechnical works, logging, sampling, core laboratory testing and preparation of factual report.
- Katinniq and Kikilalik Project for Xstrata Nickel, Raglan Mine, Quebec, Canada. Field Manager for geo-mechanical field investigation in rock by oriented core logging (1650 m). Responsibilities included staff managing and supervision of field geotechnical works, logging, sampling and preparation of geotechnical report for tunnel design.
- Third Ball Mill Project for Rio Paracatu Mineração-Kinross, Gold Mine, Paracatu, Brazil: Supervision of field geotechnical works and laboratory testing, preparation of geotechnical reports with foundation recommendations and foundation construction supervision for a Ball Mill.
- JV Vault Project for Agrium, Potassium Mine, Saskatoon, Saskatchewan, Canada. Preparation of foundations design criteria, geotechnical reports and foundation recommendations for a Plant expansion and seepage cut-off wall for tailings facilities.
- TTD (Thickened Tailings Disposal) Collahuasi Project for Compañía Minera Doña Ines de Collahuasi, Copper Mine, Región 1, Chile: Responsibilities included supervision of field geotechnical works and laboratory testing, preparation of geotechnical reports including stability analysis, settlements calculations and foundation recommendations for construction of two rockfill dams, thickeners decks foundations, access roads and pipelines.



- Potasio Rio Colorado Project for Rio Tinto, Potassium Mine, San Juan, Province of Mendoza, Argentina: Responsibilities included supervision and analysis of field geotechnical works and laboratory testing for a feasibility study of a railway (350 km) from mine site to port facilities on the Atlantic Ocean as well as assessment of materials and preparation of a scope of work and specs for geotechnical investigations for the next phase of the project.
- St Lawrence Fluorspar Project for Burin Minerals Limited, Fluorspar Mine, St Lawrence, Newfoundland: Geotechnical investigation and laboratory testing for rockfill dam design for Tailings Disposal Facilities (TMF), including assessment of materials, estimation of quantities and construction schedule.
- Barro Alto II Project (EPCM) for Anglo-American, Nickel Mine, Barro Alto, State of Goias, Brazil: Superintendent for the supervision of a dam construction (1.200.000 m³), including laboratory testing for quality assurance/quality control, concrete works for a gallery and HDPE liner installation (300.000 m²), as well as the design of a sand vertical filter base for the dam, schedule and control of the work production and installation supervision of 450 pre-bored piles and 2200 continuous flight auger piles (CFA) for plan site area.
- Moa Nickel Project for Sherritt International, Province of Holguin, Cuba: Responsibilities included supervision of a drilling program, field works and laboratory testing, results analysis, pile capacity and load capacity for driven piles, preparation of geotechnical reports, foundation recommendations and supervision of driving for 450 piles including Pile Driving Analyser (PDA) testing.
- Las Brisas Project for Gold Reserve, State of Bolivar, Venezuela: Responsibilities included control and analysis of laboratory testing, review of borehole logs, settlements calculations, consolidations and stability analysis for a Tailing Management Facility dam.
- Ambatovy Project for Dynatec-Sumitomo, Madagascar: Reviewer of a drilling program, field works and preparation of borehole logs using gINT.
- Kabanga Nickel Mine Project for Kabanga Nickel Company Limited, Tanzania: Reviewer of a drilling program, field works and borehole logs using gINT program and foundation settlements analysis under an ore stockpile.

As Geotechnical Operations Manager responsibilities included to plan and allocate human resources to projects, ensure the distribution of work among all staff, support the Health and Safety Officer of the Toronto office, ensure safety standards and procedures were followed, manage the allocation and use of material resources of the office, assist more senior project personnel in carrying out technical tasks. Key person in the strategic planning and development of the group playing significant role in business development, obtain and analyze office and staff performance data including conduct staff performance evaluations.

As Health & Safety Officer responsibilities included a continued work to implement a NO ACCIDENT/ZERO HARM mentality in the geotechnical group and ensure that all staff had appropriate HSE training before mobilization to any project site and enforce rules and procedures.

1998-2006 SERVICES AND CONSULTING ENGINEERING LTD, Bogotá, Colombia

Director / Project Manager

As Director / Project Manager carried out geotechnical investigations and studies for foundations, retaining structures, slope stability, pavements and materials testing including supervision of drilling, field works and laboratory testing, analysis, preparation of geotechnical reports and foundation recommendations for municipal and government projects and industrial, commercial, and residential developments.

1988-1998 CDU LTD CONSTRUCTION & URBAN DEVELOPMENTS, Bogotá, Colombia

Director / Project Manager

As Director / Project Manager signed and developed public works contracts for government projects per schedule and budget, coordinating all different project phases including bidding and contracting process, procurement, production, schedule, personnel, and quality control. Construction projects



included roads, bridges, pavements, railroads, irrigation channels, sewage systems, institutional building and phone networks pipelines.

1982-1983 JOSELIN OLMOS & COMPANY LTD, Bogotá, Colombia

Site Engineer

Site engineer for institutional and industrial buildings. Responsible for reinforced concrete structures design and geotechnical studies for foundations.

EDUCATION

1982-1984 Specialization in Geotechnics, National University, Bogotá, Colombia
1977-1982 BSc, Civil Engineering, Santo Tomas University, Bogotá, Colombia

ACADEMIC POSTS

1984-1987 SANTO TOMAS UNIVERSITY, Bogotá, Colombia

Professor

Responsibilities included teaching, consulting and facilitating Physics and Strength of Materials and Laboratory courses for undergraduates of the Faculty of Civil Engineering and researcher about strength of materials at the Research Center.

PROFESSIONAL DEVELOPMENT

2013 Tensorsoil Pro Mechanically Stabilized Earth (MSE) Design software, Nilex, Toronto, Ontario
2013 Certificate for Advanced Tailings and Mine Waste Facility Design, Construction, Operation and Closure, University of British Columbia, Canada
2013 H&S modules including The Critical Risk Control Protocol, WHMIS, Field Orientation, Incident Investigation, Personal Risk Assessment and The Culture Curve, SNC Lavalin Inc.
2011 Construction Safety Training System, Alberta Construction Safety Association
2011 Project Management, SNC Lavalin Inc.

COMPUTER APPLICATIONS

GeoStudio 2012 (Slope/W, Seep/W, Sigma/W), LPILE, GRLWEAP, gINT, Rocscience (Dips, Slide), Plaxis 3D Foundations, SAP2000, AutoCAD, Mathcad, MS Office (Word, Excel, Project, PowerPoint, Outlook), Acrobat Professional.

PROFESSIONAL ASSOCIATIONS

- Professional Engineers Ontario (PEO), registration 100114425 since 2008
- Ontario Society of Professional Engineers, since 2004
- Canadian Geotechnical Society, since 2008
- National Professional Council of Engineering (COPNIA), Colombia, registration 25202-08619, since 1982

LANGUAGES

English, Spanish, French (Basic)

INTERNATIONAL EXPERIENCE

Colombia, Venezuela, Cuba, Brazil, Chile, Panama, Peru and Tanzania.

