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MARCELO CHUAQUI, M.Sc.

SPECIALTY/SKILLS:

Monitoring Instrumentation Specialist;
Grouting and Grouting Related Technology Specialist

GEOGRAPHIC BASE: Toronto, Canada

TYPE OF COMPANY: Corporation (20 Employees)

**RESUMÉ
MARCELO CHUAQUI**

EDUCATION

M.Sc. Physics
University of Waterloo, Canada
B.Sc. Honors Physics
Queens University, Kingston, Canada

**PRINCIPAL
PROFESSIONAL
DISTINCTIONS**

Attendee, Alternate Dispute Resolution 40 Hours Workshop, Faculty of Law, University of Windsor, October 2007
Speaker, Field Measurements in Geomechanics (FMGM) Symposium, Boston, MA, September 2007
Lecturer, ADSC Anchor and Micropile Installation School (AMPIS), Federal Way, WA, June 2007
Lecturer, Short Course on Geotechnical Instrumentation - Tennessee Valley Authority, November 2005
Attendee, Time Management Seminar, Priority Management, 2006
Attendee, Better Contracts by DPIC Companies, February 2004
Attendee, Introduction to the Consulting Business – Golder Institute, Mississauga, ON, October 2003

Speaker, Effective Geotechnical Instrumentation and Monitoring for Transportation Projects – Evolution of Monitoring Techniques for Urban Tunneling, International Center for Ground Improvement, New York, NY, March 2003

Lecturer, ASCE Geo Institute and DFI Short Course - Computers in Grouting - 3rd International Conference on Grouting and Ground Treatment , New Orleans, LA, February 2003

Speaker, Soil Stabilization Grouting Under a Railway for Micro-Tunneling, Proceedings of the 3rd International Conference on Grouting and Ground Treatment, ASCE Special Publication No. 120, New Orleans, LA, February 2003

Attendee, Inclinometer Monitoring by Erik Mikkelsen, Toronto, ON, February 2003

Speaker, Workshop on Rock Anchors, US Army Corps of Engineers, Bluestone Dam, WV, September 2002

Speaker, Real-time Observational Compensation Grouting, ASCE Metropolitan Section Geotechnical Group, New York, NY, May 2001

Speaker, Real-time Geotechnical Monitoring, Association of Engineering Geologists, Pittsburgh, PA, May 2001

Speaker, Jet Grouting Pier 3 Bill Emerson Memorial Bridge 51st Highway, Geology Symposium, Seattle, WA, August 2000

Speaker, Grouting Technologies for Remediation of Pits and Trenches, Idaho National Energy Engineering Laboratory, January 1998

Speaker, A Multi-Grout Barrier to Control Sr⁹⁰ Release at Oak Ridge National Laboratory”, King Publications, DOE Containment Conference, Washington, DC, June 1997

Exhibitor, International Containment Conference, St. Petersburg, FL, February 1997

Attendee, Long Island Rail Road, Roadway Worker Protection Training – August 2001

Attendee, Leadership Training, Structural Preservations Systems, Inc., November, 2000

Attendee, Geotechnical Instrumentation Short Course, University of Florida, FL, March, 2001

Attendee, Deep Mixing Short Course, University of Milwaukee, WI, September, 1998

Attendee, Hazardous Waste Operations Emergency Response Training , 40 hour OSHA course, 1996

Radiological Worker II Training, Oak Ridge National Laboratory, Oak Ridge, TN, 1996

General Employee Training, Oak Ridge National Laboratory, Oak Ridge, TN, 1996

**PROFESSIONAL
EXPERIENCE AND
BACKGROUND**

PRESIDENT, GEOSUPPORT INC., 2002 - PRESENT

Mr. Chuaqui develops market opportunities for the company. He prepares designs and proposals for grouting projects. Mr. Chuaqui promotes business through technical presentations. He manages and plans operations, and assesses potential hires. He performs project management of grouting sites.

GENERAL MANAGER, MONIR PRECISION MONITORING INC., 2002 - PRESENT

Mr. Chuaqui is responsible for the development of market opportunities. In addition to preparing designs and proposals for geotechnical monitoring projects, he also provides project management of monitoring sites. He promotes the business through technical presentations. He is responsible for the management and planning of operations and assessing potential hires.

PRINCIPAL, MC GROUTING INC. (MCGI), 1995-2004

As the principal of MCGI, Mr. Chuaqui was responsible for providing the following services for grouting: jet grouting, ground improvement and geotechnical monitoring projects. He was responsible for design, appointment of site supervision/inspection, quality assurance/control and management services.

MARKET DEVELOPMENT AND PROJECT CONSULTANT, SOL DATA INC., 2000-2004

In the position of Market Development and Project Consultant, Mr. Chuaqui was responsible for the development of market opportunities for Sol Data in the United States. He prepared the designs and proposals for geotechnical monitoring projects. Mr. Chuaqui was promoting business through technical presentations and site visits. He prepared monthly status reports and performed project management of monitoring sites.

TECHNICAL AND MANAGEMENT CONSULTANT, SOLETANCHE INC., 2001-2004

As a technical and management consultant, Mr. Chuaqui assisted with bid and proposal preparation. He provided technical recommendations regarding means and methods for projects. He designed and maintained quality control/assurance programs. Mr. Chuaqui was also responsible for project management of sites.

MANAGEMENT CONSULTANT, GEO-STRUCTURAL DIVISION OF STRUCTURAL PRESERVATIONS SYSTEMS, INC., 2000-2001

Mr. Chuaqui was appointed Management Consultant at GEO-Structural Division of Structural preservations Systems, Inc. His responsibilities included training and mentoring of project engineers within the GEO Division, preparation of standardized quality control and method statements. He was also providing technical assistance on specific projects and project management on several major projects.

**PERMEATION
GROUTING
EXPERIENCE:**

INTAKE STRUCTURE SIR ADAM BECK TUNNEL, NIAGARA FALLS, ON, 2007

The project involved the design and implementation of a grout curtain to control inflow below circular cofferdams at the tunnel break-out. Technologies used included real-time monitoring and analysis of the grouting data, use of water hammer drilling methods and use of balanced stable cement based suspension grouts.

SOIL STABILIZATION TO ARREST SETTLEMENT OF A POOL, NEWARK, NJ, MARCH, 2004

The project involved soil stabilization with regular and microfine cement grouts to stop settlement of pool at an upscale condominium complex.

SODIUM SILICATE PERMEATION GROUTING OF WILLOW HIGGINS SAND, O'HARE AIRPORT, CHICAGO, IL, OCTOBER, 2003

The project involved permeation grouting of sands at tunnel break-in. Sodium silicate grout and sleeve-port pipes were used for the ground treatment.

PERMEATION GROUTING LRT EXTENSION, EDMONTON, ALBERTA , 2003

The project involved permeation grouting at the break-in and understructures and compensation grouting at surface for protection of buildings during EPB TBM tunnel construction.

CONSOLIDATION GROUTING, SOUTH BOUND LRT, MINNEAPOLIS AIRPORT, MN, 2002

The project involved consolidation grouting at the mixed phase and compensation grouting at surface for protection of two airport hangers from settlement during EPB TBM tunnel construction.

SOIL STABILIZATION TEST PROGRAM FOR SLRT TUNNEL, EDMONTON, ALBERTA, 2001

A field-testing program was performed to determine the injectability of the native soils and to evaluate the characteristics of the treated ground. A total of 12 holes were permeation grouted with three different types of grout. The grout operations were monitored with real-time monitoring equipment.

SOIL STABILIZATION UNDER A RAILWAY FOR A SEWER CROSSING, YORK, PA, 2000

Soil stabilization grouting was performed to facilitate tunneling under an existing active railway line. The design consisted of creating a circular perimeter of cemented soils around the trajectory of the future sewer tunnel by performing permeation grouting in conjunction with minor hydro fracturing through sleeve-port pipes.

BAJO LA ALUMBRERA, FLUOR DANIEL S.A., ARGENTINA , 1997

The project involved pressure grouting of bedrock for tailing containment facility. Project consisted of conducting a technical audit of the installation of the initial grout curtain that failed to meet the design criteria and recommending and assessing a remedial grouting program. The working language on this project was Spanish.

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TN, 1996

Permeation grouting of man-made waste forms. Grouting was performed using regular and ultrafine cement grouts and acrylamide solution grouts to reduce infiltration of surface water and flow of ground water through radioactive waste disposal trenches.

**GEOTECHNICAL
MONITORING:**

EXCAVATION MONITORING, GREATER TORONTO AREA , 2003-PRESENT

Typically have 10 to 15 ongoing projects at any time. The Projects involve monitoring existing structures and shoring walls during shoring installation and excavation work. Inclinometers, pile target monitoring, precision survey monitoring, and crack gauges are used in these projects. Structures being monitored include active road ways, railways and subways, as well as historic and/or urban buildings.

AUTOMATED MONITORING OF TORONTO TRANSIT COMMISSION TUNNEL, TORONTO, ON, 2006-2007

The project involved providing a real-time automated survey monitoring system to monitor movements of an existing active subway tunnel during excavation and installation of a neighboring shoring system. The monitoring system was configured so that data could be accessed in real-time over the internet by many different stakeholders. Real-time alarms were utilized to control the construction activities.

AUTOMATED MONITORING OF GO TRANSIT LIGHT RAPID TRANSIT LINE, TORONTO, ON, 2005-2006

The project involved providing a real-time automated survey monitoring system to monitor movements of existing active railway tracks, while an underlying water-main was replaced. The system was configured so that data could be accessed in real-time over the internet by many different stakeholders. Real-time alarms were utilized to control the construction activities.

AUTOMATED MONITORING OF PIVOT PIER BRIDGE, LACROSSE, WI, 2003-2004

The project involved providing a real-time automated survey monitoring system to monitor movements of an existing active railway bridge, while piles for the replacement bridge were being driven. The system was configured so that data could be accessed in real-time over the internet by many different stakeholders. Real-time alarms were utilized to control the construction activities.

INSTRUMENTATION OF A US ARMY CORPS OF ENGINEERS SOIL MIXING TEST SITE, NEW ORLEANS, LA, 2003

The project involved installing an automated system to monitor the loading of a soil mixing test site. A pattern of columns was installed and then loaded until failure. The geotechnical instrumentation captured data in real-time. The data could be viewed from offsite by different stakeholders via internet connection.

AUTOMATED SURVEY MONITORING OF UNION STATION, WASHINGTON, DC, 2003

The project involved monitoring the side of the station adjacent to a major excavation. One robotic total station with internet access to monitoring data was used.

AUTOMATED SURVEY MONITORING FOR COMPENSATION GROUTING, MINNEAPOLIS AIRPORT, MN, 2002

The project involved utilizing two robotic total stations to continuously monitor building movements during tunnel and compensation grouting operations.

REAL-TIME IN-PLACE-INCLINOMETER MONITORING FOR NYNJ PORT AUTHORITY, NEW YORK, NY, 2002

The project involved using three in-place-inclinometer chains to monitor the side of an excavation adjacent to an active railway line at Jamaica Station in Queens. Real-time data was transmitted to stakeholders via e-mail.

REAL-TIME VIBRATION MONITORING OF SMITHSONIAN INSTITUTE DINOSAUR EXHIBITS, WASHINGTON, DC, 2002

The project involved installing an automated vibration monitoring system at the dinosaur exhibits to ensure no damage resulted during adjacent construction activity. Baseline readings were used to establish threshold levels for automated alarms. The alarms were used to control the contractor's activities.

MONITORING OF STRUCTURES WITH ROBOTIC TOTAL STATION DURING KARST GROUTING, FREDRICK, MD, 2001

Project involved void filling in Karst under sensitive structures. A real-time monitoring system using an automated theodolite was used to control movements of structures during grouting.

CEASE ACTIVE FLOWS EXPERIENCE:

STOPPING A MAJOR INFLOW, LONESTAR QUARRY, CAPE GIRARDEAU, MO, 2002

The project involved stopping a massive 40,000 GPM leak through a Karst feature in limestone. Drilling and grouting depths were in excess of 300'. The driving head across the curtain was equivalent to 200' of water column. The leak was successfully stopped with use of hot bitumen, low mobility and high mobility grouts.

CENTRAL ARTERY PROJECT, BOSTON, MA, 2001

The project involved stopping a series of unexpected leaks along different areas of the immersed tube tunnels crossing at the Fort Point Channel. Active leaks of 10,000 GPM were stopped using LMG, polyurethane and accelerated cement based grouts. The work lasted 6 months and was on the critical path of the Central Artery project.

REPAIR OF DAM LEAKAGE, CHAGRIN FALLS, OH, 2001

The project involved the use of polyurethane grouts and cement/sodium silicate based grouts to stop active leaks in a dam.

MILLVILLE QUARRY, MILLVILLE, WV, 1997-1998

Multiple phase grouting program to successfully stop a 35,000 GPM inflow through a Karstic limestone formation into a quarry. Technologies used included large diameter geotextile bags, MPSP permeation grouting, hot bitumen grouting, and compaction grouting.

POTASH MINE, SUSSEX, NB, 1997

Emergency grouting program to stop a fresh water inflow of 10,000 to 15,000 cubic metres per day; hot bitumen and cement based grouts were injected into a massive void located 700 metres below surface to remediate an inflow into the underground mine.

MARCOPPER MINING CORPORATION, PHILIPPINES, 1996

This was an emergency grouting program. Hot bitumen and cement based grouts were used to construct a bulkhead to stop a major tailings inflow through a tunnel. Technologies used on this project included hot bitumen grouting, polyurethane grouting, large diameter geotextile bag installation, gyro-surveying, jet grouting and multiple component grouting systems (cement/sodium silicate and hydroblock).

**LOW MOBILITY
AND CONTRACT
GROUTING
EXPERIENCE:**

CENTRAL ARTERY PROJECT, BOSTON, MA, 2002

Compaction grouting was used to improve soil properties.

VOID FILLING GROUTING SR202 KING OF PRUSSIA, PA

The project involved void filling in Karst to stabilize the ground for future roadway construction.

**STABILIZATION OF SENSITIVE STRUCTURES ON KARST FEATURES,
FREDRICK, MD, 2001**

Project involved void filling in Karst under sensitive structures.

**IRON MINE CLOSURE BY HIGH MOBILITY GROUTING, CHESTER, NJ, 2000-
2001**

An abandoned iron mine was discovered during construction of a new sub-division. The mine was closed out to the standards required by the NJDOL using a systematic slurry-grouting program.

MILLVILLE QUARRY, MILLVILLE, WV, 1997-1998

Compaction grouting was used to improve soil properties.

CORAL GABLES, MIAMI, FL, 2000

Project involved implementing a remediation program to stop flooding of an underground garage due to buckling of the slab during heavy storm events.

CRYSTAL SALT MINE, MI, 1995

Design of grouting methodology to seal around concrete bulkheads during closing of the Crystal Salt Mine. The design work also included the use of geotextile bags to restore contact between mine back and eroded pillars.

CP RAIL VAUGHN INTERMODAL TERMINAL VAUGHAN, ON, 1995

Site supervision of the rehabilitation of deteriorated and unstable foundation slab (crane pad). Polyurethane hydrophobic resins and specialized mortars were used to patch cracks in slab.

**TORONTO TRANSIT COMMISSION, SHEPPARD SUBWAY LINE, TORONTO, ON,
1995**

Assisted in the design of a grouting program to permit tunneling required for a new subway line; including a modified infilaggi system to control settlement during the launch of a tunnel boring machine.

GEOTEC CONTRACTING LTD., AGINCOURT, ON, 1994-1995

While working for GEOTEC Contracting Ltd, which specializes in applied grouting technology, Marcelo became familiar with many of the practical aspects of grouting, and gained experience working with cement-foam, epoxy, vinyl-ester, polyurethane, and cement based suspension grouts. Projects included: installation of a cement foam roof; contact grouting of columns for building upgrade; polyurethane and epoxy crack injection; concrete rehabilitation; and soil grouting.

JET GROUTING EXPERIENCE

JET GROUTING FOR SHAFT PROTECTION, TORONTO, ON, 2007

The project involved installations of jet grout columns at the 'eye' of tunnel shafts in glacial till soils to meet permeability and strength criteria for the treated soil.

JET GROUTING OF ORGANIC/PEATY SOILS, CHICAGO, IL JANUARY – FEBRUARY 2004

The project involved construction of jet grout columns in organic/peaty soils to support a grout filled geotextile bag foundation for a new sewer line. This construction method provided significant time savings to the general contractor by allowing for optimization of construction sequence.

JET GROUTING SLURRY WALL AND COFFERDAM CONNECTION, NEWARK, OH, OCTOBER - DECEMBER 2003

The project involved installing jet grout columns to provide a hydraulic cut-off at the connection between an existing circular cofferdam cells and a new slurry wall. The columns were installed with single-fluid jet grouting system. The continuity and permeability criteria of 5×10^{-5} cm/sec were both met.

JET GROUTING IN KARSTIC LIMESTONE, US ARMY CORPS OF ENGINEERS, KENTUCKY LOCK LAKE DAM, KY, 2002-2003

The project involved constructing a seepage cutoff beneath a cofferdam within a soil filled Karstic feature. The seepage control was constructed by using single fluid jet grouting techniques to install three rows of low permeability columns across the caverns. Each column was surveyed to ensure continuity of the cut-off. The curtain was 50 feet long and columns ranged from 124' to 184' deep. The continuity and permeability criteria of 5×10^{-6} cm/sec were both met without any extra work beyond the original foreseen scope.

JET GROUTING FOR SLOPE STABILIZATION, SIMS BAYOU, HOUSTON, TX, 2001

A jet-grouting program was initiated to stabilize a slope for the US Army Corps of Engineers in Houston.

PIER 3, BILL EMERSON MEMORIAL BRIDGE, CAPE GIRARDEAU, MO, 1998 - 2000

Three fluid jet-grouting in a limestone formation to remove clay from Karst features and replace it with grout. Jet grouting was executed to ensure the seismic stability of the middle pier of a new cable-stay bridge across the Mississippi River.

**COMPENSATION
GROUTING
EXPERIENCE:**

LIGHT RAPID TRANSIT EXTENSION, EDMONTON, ALBERTA, 2002

The project involved permeation grouting at the break-in and understructures and compensation grouting at surface for protection of buildings during EPB TBM tunnel construction.

SOUTH BOUND LIGHT RAPID TRANSIT, MINNEAPOLIS AIRPORT, M, 2002

The project involved consolidation grouting at the mixed phase and compensation grouting at surface for protection of two airport hangers from settlement during EPB TBM tunnel construction. The tunneling portion of this project has been completed.

PUBLICATIONS:

Approximately 14.