Catalina Alvarez

Senior Principal Consultant

Expertise   Advance Numerical Simulation and Modeling; Rock and soil mechanics

Education   M.B.A. (Finance), 2002
University of New York (E.S.C.E.M)/ Prague

Ph. D., Physics, 1996
University of Waterloo, Canada

M. Sc., Physics, 1990
B. Sc., Physics, 1988
University of Chile, FCFM, Chile

Professional Experience

2006 – Present	*Itasca S.A., Santiago de Chile, Senior Principal Consultant*
2005 - 2006	*Hewitt Associates, Prague, Czech Republic, Project manager*
2004-2005	*Radiant Systems, Prague, Czech Republic, Project manager*
2003	*University of Chile, Math Modeling Center, Visiting Researcher*
1997 - 2003	*PetRosEikon Inc., Milton, Canada, Research Associate*
2002	*Meridian Consulting, Prague, Czech Republic*
	External Financial Modeling Consultant

Project Experience

Rock Mechanics Applied to Underground Mine Design: Numerical modeling projects related to tunnel/pillar size optimization, caveability analyses (subsidence) and three-dimensional calibration of stress fields. Detailed three-dimensional assessments of Block and Sub level Caving intended to measure the impact of abutment stresses on the extraction drifts and crushers. Interaction projects with open pit mining, assessing caving propagation, cave overbreak and subsidence.

Rock Mechanics Applied to Surface Mining: Application and calibration of finite-difference continuum and discontinuum numerical models in two and three dimensional problems in slope-stability analysis, including the calibration of time dependant (*creep*) material properties. Evaluation of mitigation measures for slope stability, including support elements like cables, rock-bolts and piles. Use of probabilistic methods to evaluate probability of failure, such as the response surface method.

Soil Mechanics Applied to Civil Engineering: Numerical modeling assessments for a variety of civil engineering projects, including static and dynamic stability analyses of tailings dams, water reservoirs and waste dumps in highly active seismic areas. Calibration of numerical models for the analysis of liquefaction potential in saturated sands under seismic loading. Stability analysis of waste dam located under rock glacier undergoing creep motion (calibration of time-dependant material properties)

ITASCA

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Roller Compacted Concrete Dam (RCC) analyses: Three-dimensional Numerical modeling for fully coupled thermal-stress analysis of several RCC dams, including aspects like calibration of hydration model for concrete, implementation of ambient boundary conditions, construction schedule, etc. Analyses also included dam responses under seismic loading.

Advance Numerical Simulation: Worked on numerical aspects related to inverse problems in fluids. Performed R&D within the context of non-seismic data processing and interpretation tools. Developed simulation algorithms for the electromagnetic response of a buried object in a layered medium. Developed and modified computational geometry libraries able to manipulate 3D objects. Developed integration algorithms over general polyhedral anomalies, generated advanced technique to mesh and decimate complex models from CAD tools such as GEMCOM, and modeled data by using linear and nonlinear methods (Inverse Problem). Developed 1D inversion algorithms for resistivity, airborne EM & MT surveys. Developed 2D inversion algorithms for ray tracing tomography; and developed 3D Inversion algorithms for IP/Resistivity and DC Magnetic surveys.