

**Project Engineer**

**Expertise** Numerical Modeling, Telecommunications and Digital Systems.

**Education** M.S. (Electrical Engineering Sciences), High Distinction, January 1989  
Electrical Civil Engineering, 1989  
Universidad de Chile, Santiago de Chile

**Professional Experience**

2011 – Present *Itasca S.A., Santiago de Chile, Project Engineer*  
2001 – 2010  
2010 – 2011 *Harnecker Carey Ltda.*  
*Patent Specialist, Industrial Property (Electrical & Mechanical)*  
1998 – 2001 *Ministry of Economy, Development and Reconstruction of Chile,*  
*Industry Property Department,*  
*External Professional Expert for Patents Examination*  
1997 *BICE Bank, Operating and Information Technology Division*  
*Telecommunications Engineer*  
1995 – 1997 *Compañía de Telecomunicaciones de Chile S.A.*  
*Planning Department and Technology Department, Engineer*  
1991 – 1995 *Banco de Santiago, Automated System Division*  
*Telecommunications Area. Telecommunications Engineer*  
1989 – 1991 *SATEL Telecomunicaciones S.A., Electrical Civil Engineer*  
1988 – 1989 *Ministry of Transportation and Telecommunication of Chile*  
*Limited Service Department, Deputy Chief (1989)*  
*Telecommunications Department, Electrical Civil Engineer (1988)*

**Project Experience**

**Numerical Modeling of Caving:** Pre-feasibility studies to determine if ore resources below a proposed final pit could be exploited by caving methods. The predicted caving behavior is based on the three-dimensional numerical model created with FLAC3D. Functions for stress calibration, information transfer from block models, etc. were developed.

**Stress Calibration:** Construction of geomechanical models using FLAC3D or 3DEC codes taking into account topography, pits, cavities, etc., to reproduce the geomechanical conditions associated with in-situ measurements. Use of Itasca methodology for stress calibration.

**Block Model Processing:** Development of FISH functions for processing data included in block models in order to import the information into geomechanical models developed with Itasca codes.

**Two-Dimensional Modeling Using UDEC:** Construction of UDEC models, including topography, excavations and structural features. Safety factor calculation and interpretation.

*Generic Analysis of Pillar Behavior in an Underground Mine Using FLAC3D:* Construction of different models with alternative boundary conditions to identify critical pillars that will require special treatment, due to their rock mass characteristics, position relative to advancing cave front, etc.

*Post- Processing:* Post-processing results from Itasca codes using other applications (e.g., Excel).

*Development of Data-Transfer Algorithms and Functions for Different Applications in Itasca Codes:* Functions for inserting material property in a specific model from an original data table for calculating properties in later applications and for automatic recovery of data from AutoCAD to generate tables that can be used in any Itasca code; functions for including topographic information in FLAC3D models using original data from AutoCAD and “Surfer” software.

*Stability Analysis of Dumps:* Studies of different options for dump-changing construction parameters (height, slope, buttress, etc) and optionally including fluid flow and pseudo-dynamic analysis.

*Telecommunication Systems:* Frequency assignment; study and analysis of limited service projects in HF, VHF and UHF bands; installation, operation set-up, study and analysis of IBS (Intelsat Business Service) satellite services.

*Digital Networks:* Study and analysis of digital networks (LAN and WAN); evaluation and installation of digital network equipment.

*Telephone Systems:* Participation in preparing a Technical Plan for the CTC Intelligent Network (IN) and preparation of a specification of the IN Application Protocol for CTC and Telefonica Group; technical support for choosing a new service platform in mobile systems.

*Patents Examination:* Analysis of patent applications from the perspective of present law and regulations for industrial property in Chile belonging to the electrical, electronic and telecommunications areas.

*Patent Specialist:* Support to clients in obtaining a patent invention grant for national and international applications. Prosecution of the applications in Chile (Chilean Patent Office, CLPTO) and foreign offices (U.S., Europe, etc.).