CEMI
Centre for Excellence in Mining Innovation

LECTURE SERIES

www.miningexcellence.ca/events/lectures/

November 30, 2011 at 11:00am Willet Green Miller Centre Auditorium (Main Floor)

Fracture modeling: New ideas for mineral deposit development and production planning

Fractures play an important role in many aspects of mineral deposits, from grass roots exploration through development and production. In many mineral deposits, they serve as the "backbone" for understanding where mineralized fluids, travelling through permeable pathways, precipitated economically viable concentrations of metals. Fractures also play an important role in understanding geotechnical studies of mine designs, from assessing suitable slopes for pit walls to assessing the stress and strain in underground workings. Fracture network models are also critical in modeling groundwater flow in and around mines.

Despite the central role of fractures in many aspects of development, planning and production, there are few tools for building 3D fracture network models that honour the many different types of fracture data available to us: direct observations of traces on the ground surface, and in underground working; observations of location and orientation in drill holes; data from monitoring of micro-seismic activity. In the past decade, Canada's nuclear waste management program has developed new tools for building 3D fracture network models that can honour much of the available data and that can be used for flow modeling, for assessment of geotechnical risks and for other studies where uncertainty in fracture geometry plays a role.

This talk provides an overview of existing methods for fracture network modeling, presents the new approach pioneered by Mr. Srivastava, and shows three case study examples of mining applications where the same method could significantly improve our ability to develop and operate mines.

R. Mohan Srivastava

President of Benchmark Six, geostatistical consultant with more than 25 years of experience in the practice of geostatistics, is one of the recognized experts in the application of statistical methods to earth science problems. He is an author of "An Introduction to Applied Geostatistics", the major introductory textbook on the practice of geostatistics, and of more than 50 technical articles and reports on the theory and practice of geostatistics. He has a Bachelor of Science degree in Earth Sciences from the Massachusetts Institute of Technology and a Master of Science degree in Geostatistics from Stanford University. He has applied geostatistics to a wide variety of mining projects throughout the world, including resource estimation and grade control for base metals, precious metals and energy fuels. In the past decade, he has assisted Ontario Hydro and Canada's Nuclear Waste Management Organization with their work on developing new procedures for building 3D models of fracture networks that honour a wide variety of data, including mapped traces of fractures on the ground surface and in underground workings, as well as observations of fracture location and orientation in drill holes.