Current Research in Mining Geophysics at Virginia Tech

Presenter: Dr. Erik C. Westman, PE
University/Organization: Virginia Polytechnic Institute
Phone: 540-231-7510
Email: ewestman@vt.edu
Mailing Address: Virginia Tech
                                       Department of Mining and Minerals Engineering
                                       Attn: Erik C. Westman, Ph.D., PE
                                       100 Holden Hall (0239)
                                       Blacksburg, VA 24061

ABSTRACT

The Department of Mining and Minerals Engineering at Virginia Tech is actively involved in the practical application of geophysical methods to solving challenges in mining. Funded research projects focus on developing borehole seismic sensors and on improving the ability to image stress-induced physical property changes around mining.

A project funded by the Department of Energy, Industries of the Future program seeks to improve ground-imaging capabilities. Seismic tomography has been used successfully to monitor and evaluate geologic conditions ahead of a mining face, however a primary limitation to existing technology is the placement of sensors. The goal of this project is to develop an array of intrinsically-safe seismic sensors which are capable of being mounted in either a vertical or horizontal borehole.

The National Science Foundation has provided funding for a project focused on prediction of rock failure through high-resolution tomographic imaging. The specific tasks associated with the research include generating time-lapse three-dimensional tomographic images to observe relevant alterations to the fabric of rock samples loaded to failure, and comparing generated images with numerical modeling results. The images will be obtained for unconfined compression and diametrical tension (Brazilian) tests of both isotropic and anisotropic rock types of four different diameters.