

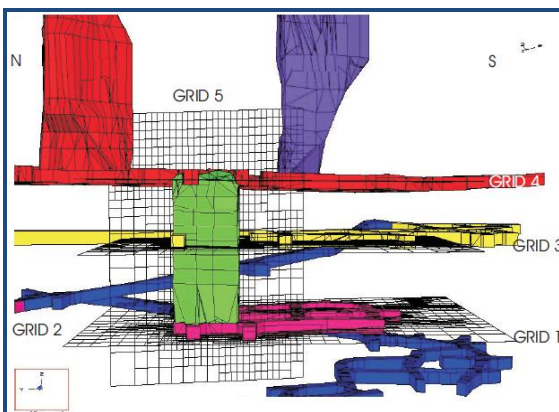
GEOHART is a geotechnical consultancy specialising in the following areas:

- Mining rock mechanics and strata control reviews
- Underground support - design and performance review
- Instrumentation and monitoring for blast vibration and ground motion at the skin of the excavation
- Tunnelling and shaft assessments / review

GEOHART Consultants Pty Ltd has been founded and established by Wouter Hartman – Principal Geotechnical Engineer, who has gained more than 20 years industry experience in exploration, underground and open-cut mining operations, mining and civil tunnelling consulting industries in Australia, Chile, UAE (Dubai), China, Indonesia and South Africa.

GEOHART is involved in all aspects of underground mining including exploration, feasibility studies, mine and excavation design.

We review chosen or proposed mining methods for rockmass stability and conduct numerical analysis to determine potential excessive unacceptable ground movement (3D and 2D software stress analysis).



MAP 3D numerical model

We design mining layouts, mining sequences and support systems to reduce seismic related risk. We in association with seismologists look at the appropriate installation of seismic systems.

Seismic Systems

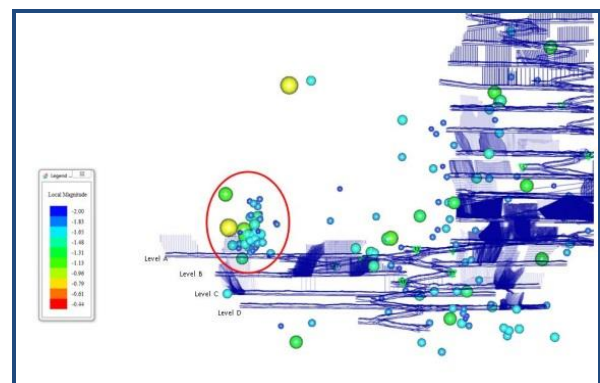
- Project management for installation of seismic systems
- Quantification of seismic risk
- Seismic risk assessments

Seismicity analysis

Through our worldwide associations, we have the capability of collating, investigating, assessing and reviewing small to large scale seismic incidents and accidents, providing the following services;

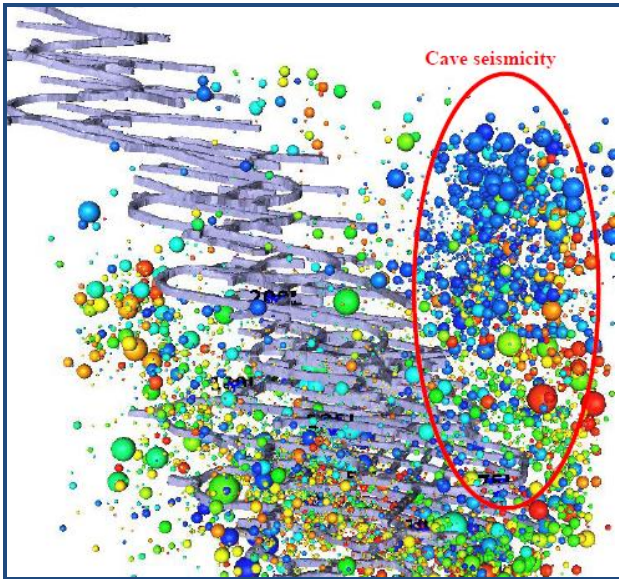
Review of seismic data and link to operational practices

Seismic data analysis and identification of potential adverse practices and problem areas



Plot of seismic cluster using Jdi (seismic analysis software)

- Short term and long term seismic monitoring interpretation
- Establishing relationships between seismicity occurrence and mining practices, geological structures, design and layouts

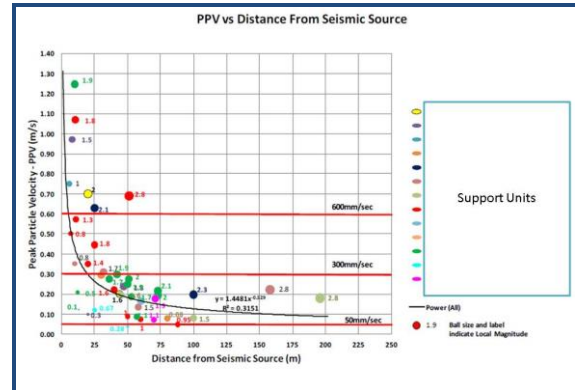


Jdi plot of long and short term trends

- Numerical modelling – rockmass response to mining, establishment of correlation between numerical models and seismic locations
- Underground seismic damage mapping



- Development of seismic damage database in plotting peak particle velocities (PPV's m/s) associated with rockmass and ground support response



PPV's vs Distance from seismic source plotted against damage ground support system

- Evaluate the suitability of ground support for dynamic ground response



Ground support failure associated with seismic event

