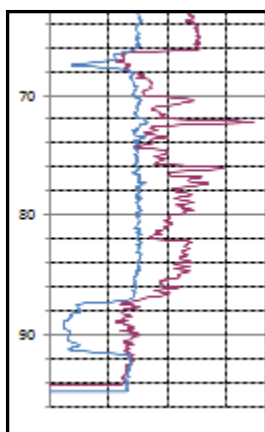


**GEOHART is a Geotechnical Consultancy specialising in the mining and civil areas of:**

- **Underground Longwall Mining:**
  - Numerical Analysis (2D & 3D)
  - Design for layouts, pillars, caving, bolt patterns, shafts, drifts, punch longwall and portals
  - Principle Hazard Management Plans (PHMP) - all aspects
  - Mine Site Services – exploration, hazard plans, monitoring & testing, technical support & training for all levels, project management
- **Opencut Mining:**
  - Ground Management Plan (GMP)
  - Slope Stability Assessments (High and Low Walls, Waste Dumps)

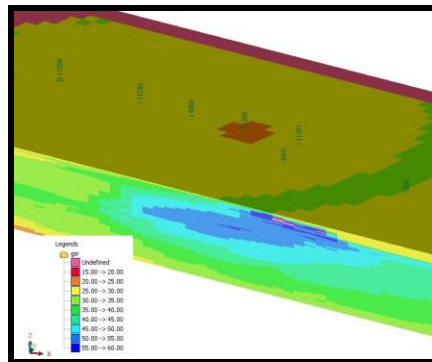
GEOHART CONSULTANTS are in the business of providing an efficient geotechnical, geological geomechanical Consulting Service through innovation and experience for mining and civil projects. GEOHART was established in 2009 by Wouter Hartman – Principal Geotechnical Engineer. In particular, Geohart Consultants have developed a geotechnical underground and opencut coal capability providing geotechnical services for coal mines.



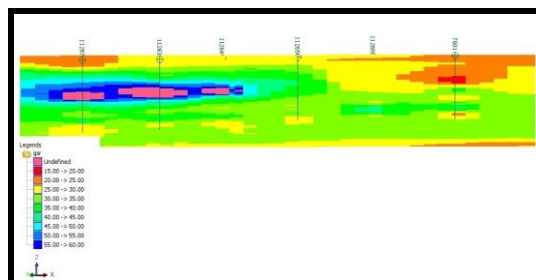
**Ground predictions based on drilling, core and downhole geophysics**



A 3D geological strata and/or Ground Strength Rating (GSR) model is generated from borehole data.

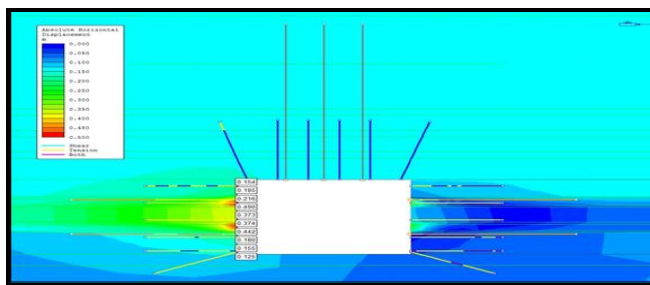


Interpolated GSR long sections can be produced for hazard maps.



The strata model along with 2D stress analysis for roadway geometries forms a geotechnical model to show induced mining stresses for roof and ribs.

**2D Finite Element stress analysis**



Geohart Consultants are capable of conducting 3D stress analysis through boundary element solutions programs (e.g. MAP 3D) for underground coal mine options studies.

## GEOHART CONSULTANTS Pty Ltd

ABN: 28 979 550 809 / ACN: 137 859 128  
<http://www.geohartconsultants.com.au>

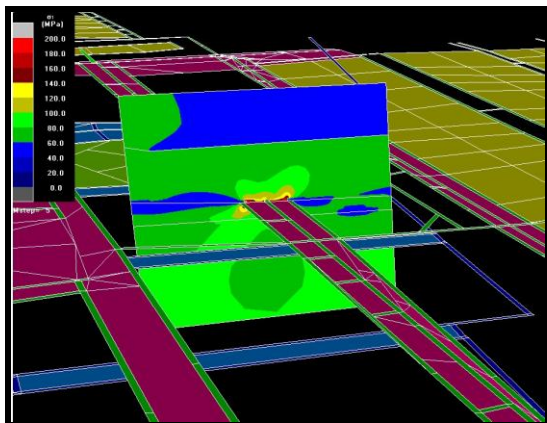
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**Auckland:** PO Box 35929, Browns Bay  
 0753, North Shore, Auckland, New Zealand  
 Tel: + 64 21412610

This is done for both single and multi seam coal mining.

3D Mine Layout for Multi seam project (China)



Non-Destructive ground support assessments through our MODSHOCK System.

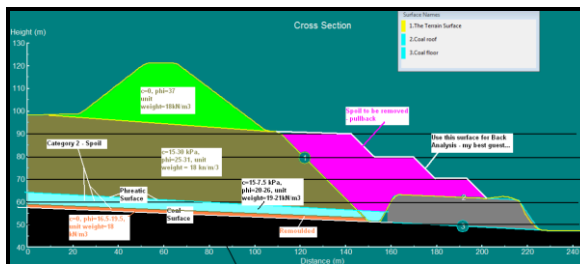


Drift assessments.



Spoil removal for coal extraction is an art and could sometimes lead to instability. Geohart Consultants is capable of assessing a variety of problems using limit equilibrium analysis software such as Slide.

Slope Stability limit equilibrium 2D model



**Software** – Surpac, Map3D, Phase2, Slide, Swedge, Dips, Unwedge, Cad, Blastware, Seismic Analysis Software Trace (JMTS) and JDi.

Geohart provides a wide range of pit services, including;

- Inspections, investigation and reports
- Instrumentation, monitoring and mapping
- Development of underground hazard plans
- Risk Management and Principle Hazard Management Plans - risk analysis, related procedure, hazard plans and TARPs)
- Geotechnical Training

For assistance please contact:

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