Novel Mining Methods

4th Biennial Conference

Presented by: Dr. Bessie Monchusi

Date: 10 October 2012
Conglomerate - Carbon Leader Reef
Contents

• Fundamental Earth Science Research

• Applied Collaborative Research
• How do we change our mining processes to mine the 50cm reefs efficiently, economically and safely?
Vision: Autonomous Mining Systems

- Rock breaking
- Rock removal
- Support
- Environmental safety
- Materials handling
Contents

- Fundamental Earth Science Research
GEOLOGY

Yeah, it rocks!!!
Geophysics

- Technology to image rock mass
  - Borehole radar
  - Electric Resistance Tomography
  - Radio Imaging Method
Rock Engineering

- How stable the rock is
Reef Information

• Geology
• Geophysics
• Rock Engineering
• Applied Collaborative Research
Platform Development

AR Drone

CSIR mine safety platform

Differential time-of-flight beacon
Sampling

Reef

Scan X-Y

Laser-Induced Breakdown Spectroscopy (LIBS) head

Laser/Spectrometer/Computer

www.csir.co.za  © CSIR 2012  Slide 13
Rock Breaking

Direct Current (DC)

Alternating Current (AC)
Microwave Rock Breaking
Infrared Photography & Numerical Modelling
Sensors for 3D Mapping

Xbox Kinect 3D
Thermal Imaging for Proximity Detection

- Extract “Region of Interest” ROI
- Measure distance
- Classify ROIs
- Calculate time to collision
Conclusion
Industrial Partnership

- Novel rock breaking techniques
- Robotics expertise
- Intrinsically safe design
- 3D point cloud mapping
- Machine integration
- Mining equipment supply
ROCKS
That's the way they are born.
Thank you