

CALL & NICHOLAS

International Mining Consultants

Since 1979

BASE METALS PRECIOUS METALS INDUSTRIAL MINERALS COAL



▲ Dr. Rick Call, 1998

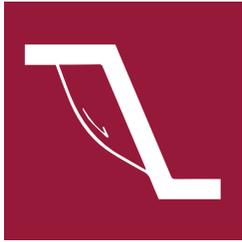
▲ Underground

▲ Open Pit

CALL & NICHOLAS (CNI) is an international mining consulting firm that specializes in geotechnical engineering and hydrogeology. We have been providing a wide range of engineering services to the mining industry for 40 years.

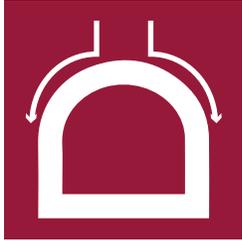
We are committed to providing our clients with the highest level of service and the most cost-effective solutions.

CNI is an industry leader in:



OPEN PIT

- ▶ Open-pit slope angle recommendations
- ▶ Waste stockpile and spoils pile stability evaluations
- ▶ Cost-benefit analysis



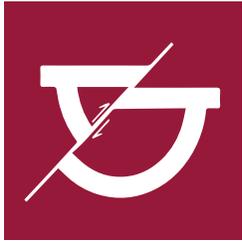
UNDERGROUND

- ▶ Underground rock mechanics and mining method selection
- ▶ Pillar and stope stability
- ▶ Ground support system design and implementation



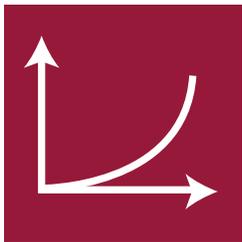
HYDROGEOLOGY

- ▶ Pit dewatering
- ▶ Numerical flow and transport modeling
- ▶ Groundwater data collection and monitoring



GEOLOGY

- ▶ Drill program planning and management
- ▶ Surface mapping and drilling data collection
- ▶ Geologic modeling



OTHER SERVICES

- ▶ Geotechnical instrumentation, parent company of Call & Nicholas Instruments
- ▶ Geotechnical testing laboratory
- ▶ Piezometer and TDR cable installation

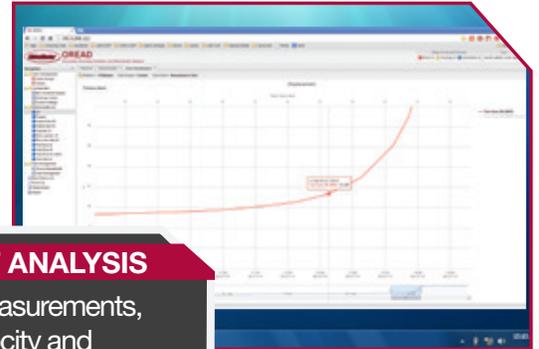
CALL & NICHOLAS

2475 N. Coyote Drive, Tucson, AZ 85745 USA
Tel. (520) 670-9774 \ cni@cnitucson.com

SlideMinder Wireline Extensometer System

Real-time Slope Movement Monitoring, Warning, and Analysis

SlideMinder continuously measures ground displacement of slopes in open-pit mines and waste dumps. The remote system uses reliable wireline extensometer technology with a patented design and powerful software to create a graphical data presentation, calculate velocity, and issue warnings based on user-defined parameters. SlideMinder's rugged design and construction are proven to work from day one with minimal site preparation and no routine maintenance needed after setup.



SHOPE MOVEMENT ANALYSIS

Powerful software displays measurements, and graphs displacement, velocity and system data.

AUTOMATED WARNINGS/ALARMS

On-site warning beacon, and automated text and emails alert personnel.

MEASURE PRECIPITATION

Mounted rain gauge records precipitation at the exact location being monitored.

REAL-TIME MEASUREMENTS

Monitors throughout slope failure without damage to the extensometer.

ACCURATE

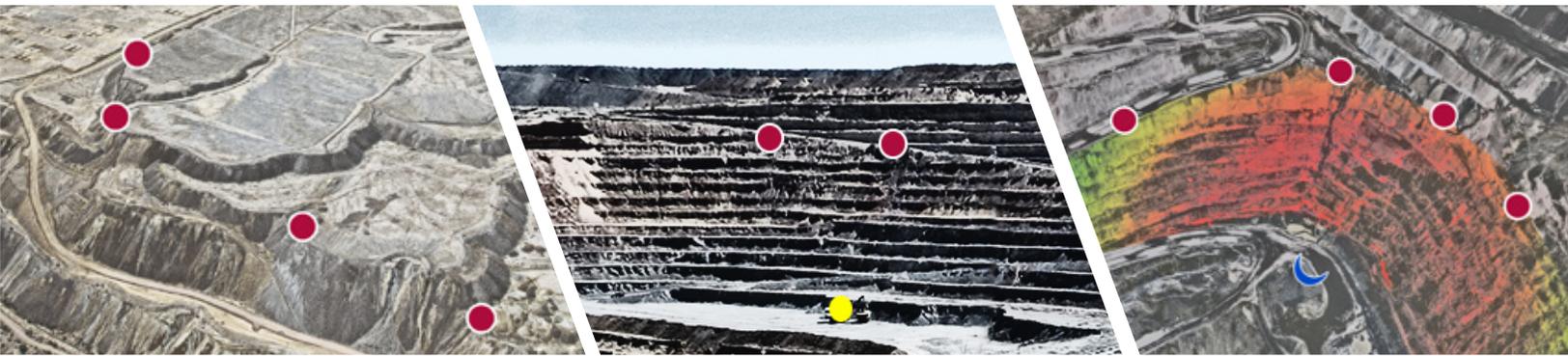
Measures movement to 0.01 cm

MINIMAL SITE PREP

Requires small footprint for tripod and pole, no line power required.

Stand Alone, Network, or Integrate with Slope Monitoring Applications

SlideMinder can be used as a single device, in a network, or integrated with radar or robotic total station systems. As a stand-alone sensor, SlideMinder can be installed quickly for short-term or long-term operation at a single location. The system can also augment performance and meet redundancy requirements of radar and prism monitoring systems. SlideMinder is a practical and proven solution to monitor slopes in the harsh mining environment.



▲ Cost-effective automated slope monitoring of dumps

▲ Use SlideMinder in active mining areas

▲ SlideMinder provides secondary vectoring to radar

Waste Rock Dump Monitoring

Assess the stability and safety of dumps that are constantly moving from compaction and settlement and can advance into unstable configurations.

- Save manpower with remote, automated measurement
- Monitor at the crest despite the constantly changing slope face due to dumping
- Shift dump sequencing based on slope movement data

Monitors Slopes in Active Mining Areas

Accurately monitor slopes where machines are actively mining the face. SlideMinder provides an immediate, visual notification to personnel to cease operations when acceptable safety parameters are exceeded.

- Motion of mining equipment does not interfere with SlideMinder readings
- Activates on-site warning beacon to alert personnel when ground movement exceeds preset thresholds
- Helps protect personnel and equipment

Integrate with Radar Slope Monitoring Systems

Improve coverage and reliability of radar slope monitoring systems where topography creates poor geometry for accurate triangulation.

- Overlay the movement recorded by radar with the secondary vectoring of SlideMinder
- Integrate SlideMinder data into the radar system's 3D display and analysis software
- Add redundancy with real-time monitoring from the crest



Call & Nicholas, Inc. is an internationally recognized geotechnical engineering consulting firm that has been providing a wide range of engineering services to the mining industry since 1981. CNI's outstanding reputation has been built on the expertise and integrity of our staff, and their dedication to excellence. Our geotechnical engineers, engineering geologists, and technicians are committed to providing our clients with the highest level of service and the most cost-effective solutions to each individual problem.

Call & Nicholas Instruments, Inc., a division of CNI, is home to the SlideMinder slope movement monitoring and warning system and offers geotechnical instruments and accessories.

CNI Geotechnical Instruments & Accessories



Manual Wireline Extensometers

- ▲ Manual wireline extensometer is highly portable and works when real-time telemetry is not required.



Warning Beacons

- ▲ LED warning beacons designed for heavy duty use on mining equipment.



Prisms

- ▲ Survey prisms and prism targets for manually monitoring ground movement.



Goniometers

- ▲ The Oriented Core Goniometer measures the circumference angle and angle to core axis to the nearest degree.

Call & Nicholas Instruments, Inc.

2475 N. Coyote Drive, Tucson, AZ 85745 USA
Tel. (520) 670-9774 \ sales@cnitucson.com
www.slideminder.com \ US Patent 7,222,540