Underground Communication Systems

Enhancing production and safety at all stages of the mining process

www.minesite.com.au

Australia: Sydney-Kalgoorlie-Mt Isa-Mackay  Canada: Sudbury  USA: St Louis

Today's world is about Connectivity

- Society uses multi-media communications to improve quality of life
  - Mobile phones, text messages, internet, email

- Business uses a range of technologies to improve the speed and efficiency of transactions- ERP systems, e-commerce

- How far have we progressed underground in matching surface communications?
Enhancing production and safety at all stages of the mining process

- Communication infrastructure
- Specific communication technologies and devices
- Safety enhancements through use of communication technologies
- Process control through the use of the technologies
- Integration with, and optimisation of, other production enhancing devices
- Support and Service of infrastructure

MST is the global leader in underground communications

- PED – a text message system to every miner underground
- TRACKER – a system to track location of people and equipment in zones thereby improving efficiency
- ICCL – integration of these technologies into a lightweight long life cap lamp battery
- ImPact – wireless technologies to automatically connect onboard data collection to MIS systems.
- VDV Leaky Feeder Radio - two way voice & data radio system
20 Years of Mining Innovation

Over 250 clients in 5 Continents

Australia:
- 3 ImPact Systems
- 66 PED Systems
- 40 BlastPED Systems
- 10 VDV Systems

China:
- 15 PED Systems
- 4 TRACKER Systems

United States:
- 2 ImPact Systems
- 20 PED Systems
- 2 BlastPED Systems
- 10 VDV Systems

Canada:
- 3 ImPact Systems
- 12 PED/BlastPED Systems
- 3 VDV System

Sweden:
- 1 PED System

Mongolia:
- 1 ImPact System

Chile:
- 2 VDV Systems
- 1 BlastPED System

Tanzania:
- 1 BlastPED System

Our Customers Include:

- Peabody
- Newmont
- CONSOL ENERGY
- BARRICK
- AngloGold Ashanti
- Placer Dome
- Centennial Coal
- INCO
- Falconbridge
Benefits Of Mine Wide Signal

- **Safety:**
  - Mine Wide Warning.
  - Custom message can detail hazard, evacuation route, update situation, etc.
  - Safer blast initiation.

- **Productivity:**
  - Contact personnel wherever they are in the mine.
  - Efficiency through remote control of fans, pumps etc.
  - Cost effective remote blast initiation.

PED Operation Schematic

PED Receivers can be:
- ICCL Personal Receiver (shown)
- AutoPED Vehicle Receiver
- ControlPED for Equipment Switching
- BlastPED for Remote Blast Initiation
**PED Receiver - from “Add ON” to Integration**

- **1989 Prototype Receiver**
- **1990 BeltPED 1 – 3.2 kg**
- **1992 BeltPED 2 – 3.1 kg**
- **2005 ICCL – 0.8 kg**
- **1995 BeltPED 3 – 2.4 kg**

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**BeltPED® Top**

- Push button to Light up Display or Recall Stored Messages
- Push Button Lights Display so time can be read, after 5 seconds the last message received is displayed.
- Liquid Crystal Display Screen
  Can display up to 32 character message
**PED® Antenna - Moranbah North Coal Mine**

33,000 ft Surface Antenna.

**PED® Antenna - Wallarah Colliery**

12,000 ft & 8,000 ft Surface Antennas
Powered by one Transmitter
PED® Antenna - Springvale Coal Mine

20,000 ft Underground Antenna.

PED® Antenna - Trail Mountain Coal Mine

25,000 ft Underground Antenna.
**PED® Antenna - Oaky North Coal Mine**

- 33,000 ft & 29,000 ft Surface Antennas

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**TRACKER Tagging System Benefits**

- You always know who is IN, or OUT of the mine.
- You know the location of Personnel and Equipment within clearly defined zones underground.
- Enables you to control mine logistics.
- Integrates with a mine’s existing communication systems.

Significant benefits can therefore gained in:
- Safety Management
- People
- Equipment-Asset Management
- Supplies
**TRACKER Tagging System - Basic Operation**

- Readers/Beacons are set up at Strategic Locations throughout the mine.
- An active Tag, worn by personnel or mounted on vehicles, radiates a unique “ID” to the Reader Beacons.

**TRACKER Beacon Layout - Coal Mine**

Data Link (e.g., wire or fiber)

TRACER Beacon
10 Years of Mining Innovation

TRACKER Display Software

20 Years of Mining Innovation
Zone Display Units

Large Format LED Units allow Tag numbers into zones to be displayed to control access, such as:

• Personnel numbers can be displayed relative to a pre-set limit (e.g. because of availability of SCSR’s or CABA re-fill points).
• Diesel equipment limitations can be automatically displayed to control access dependent on ventilation requirements.

Improves safety management of personnel, by knowing their location underground at all times. Benefits include:

¾ Streamlines access control into ventilation districts in line with available self rescue apparatus inbye – removes tag board delays.
¾ During an emergency the withdrawal of personnel can be monitored.
¾ During an evacuation the location of items (e.g. PJB) that may assist their evacuation can be known and advised.
¾ These safety enhancements are paid for by the vehicle/asset cost benefits.
¾ Potential to extend Tag technology into Proximity Detection.
Tagging System - Equipment/Asset Management

The benefits are in cost reduction and production improvement through better management of vehicles and implements. For example:

- Reduced time spent searching for particular vehicle or implement (such as buckets, forks, pumps, augers, etc).
- Track re-location of equipment to ensure correct item and correct location are achieved.
- Streamline diesel access control into ventilation zones – removes tag board delays.
- Can reduce fleet size through better utilisation.
- Improved management of Contractors’ resources on site (what goes in, comes out).