

# Mining & Extraction

## INDUSTRY CONTEXT

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Mining and extraction operations take place in some of the most demanding and hazardous environments in the world. Workers operate alongside heavy haul trucks, loaders, drills, and conveyors in areas with limited visibility, high noise levels, dust, vibration, and constantly changing terrain. Many sites are remote, off-grid, and exposed to extreme weather conditions, making reliable communication difficult.

Mining operators need rugged, automated, and highly visible communication systems that improve situational awareness, reduce incidents, and function reliably in harsh, remote environments—without dependence on permanent infrastructure.

### Scenario

A surface or underground mining operation experiences frequent near-miss incidents between haul trucks and ground personnel near loading zones and haul roads. Static signs are ignored, radios are unreliable, and visual warnings are often lost in dust, darkness, or noise.

### BotIQ Systems Solution

BotIQ delivers a mining-ready safety and communication layer designed for extreme conditions:

- Rugged Dynamic Digital Displays deploy at haul road intersections, loading zones, portals, and processing areas.
- Precision Sensing LiDAR detects vehicle movement, personnel presence, and proximity in low-visibility environments.

- The LiDAR Controller evaluates distance, speed, and zone entry to trigger automated warnings.
- Optional audio alerts reinforce messages in high-noise areas.
- Solar power and cellular connectivity enable off-grid deployment at remote sites.

Messaging updates automatically as conditions change—improving safety, protecting workers, and supporting uninterrupted operations.

## MINING & EXTRACTION USE CASES

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### Use Case 1: Haul Truck & Personnel Proximity Alerts

#### **Description**

Detect and warn when ground personnel and heavy haul trucks approach shared work zones or intersections.

#### **Example Display Messages**

- "HAUL TRUCK APPROACHING — STAY CLEAR"
- "PERSONNEL IN VEHICLE ZONE"
- "STOP — HEAVY EQUIPMENT ACTIVE"
- "PROCEED WITH CAUTION"

#### **Value**

- Reduced struck-by incidents
- Improved worker awareness
- Safer haul road operations

### Use Case 2: Restricted Area & Blast Zone Warnings

#### **Description**

Prevent unauthorized access to blast zones, unstable ground areas, or active extraction zones.

### **Example Display Messages**

- "RESTRICTED AREA — BLAST ZONE"
- "NO ENTRY — ACTIVE EXTRACTION"
- "DANGER — UNSTABLE GROUND"
- "AUTHORIZED PERSONNEL ONLY"

### **Value**

- Improved compliance with safety protocols
- Reduced risk exposure
- Clear boundary enforcement

## **Use Case 3: Low-Visibility & Night Operations Safety**

### **Description**

Improve awareness during night shifts, dust events, or low-visibility conditions.

### **Example Display Messages**

- "LOW VISIBILITY — REDUCE SPEED"
- "NIGHT OPERATIONS ACTIVE"
- "USE LIGHTS — HEAVY TRAFFIC"
- "SLOW DOWN — WORKERS AHEAD"

### **Value**

- Safer night operations
- Reduced collision risk
- Improved operational continuity

## **Use Case 4: Equipment Maintenance & Shutdown Messaging**

### **Description**

Communicate active maintenance, lockout/tagout conditions, or equipment shutdowns.

### **Example Display Messages**

- "EQUIPMENT MAINTENANCE IN PROGRESS"
- "LOCKOUT/TAGOUT — DO NOT OPERATE"
- "AREA CLOSED FOR SERVICE"

- "MAINTENANCE CREW ON SITE"

**Value**

- Reduced equipment-related incidents
- Improved maintenance safety
- Clear operational awareness

## Use Case 5: Emergency & Evacuation Communication

**Description**

Deliver immediate instructions during emergencies such as slope failure, gas detection, or severe weather.

**Example Display Messages**

- "EMERGENCY — EVACUATE IMMEDIATELY"
- "SEEK SHELTER — WEATHER ALERT"
- "GAS DETECTED — CLEAR AREA"
- "EMERGENCY DRILL IN PROGRESS"

**Value**

- Faster emergency response
- Reduced confusion and panic
- Improved worker safety outcomes

## OPTIONAL ENHANCEMENTS FOR MINING & EXTRACTION

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- AI Cameras: Detect unsafe behavior and restricted-area entry
  - Audio Alerts: Audible warnings in high-noise environments
  - Solar Power: Fully off-grid operation
  - Cellular Connectivity: Remote updates for large or remote sites
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## WHY BOTIQ SYSTEMS FOR MINING & EXTRACTION

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- Built for harsh, remote environments
  - Operates reliably without infrastructure
  - Automates hazard detection and communication
  - Improves safety without disrupting production
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