



Realtime Monitoring in Surface Mines: Technologies, Benefits, and Regulatory Context

Presented by: Morne Strauss

NOHS Consultants

011 764 6510/072 231 7403

morne@nohshyg.co.za

Tell: (011) 764 6510
Fax: (011) 764 6511
www.nohshyg.co.za

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Presentation Overview

- Overview of Realtime Monitoring in Surface Mining
- Legislative Requirements From the DMPR
- Advantages and Disadvantages of Realtime Monitoring
- Limitations of Realtime Monitoring Systems
- Current Equipment and Technologies for Surface Mine Monitoring
- Questions



Legislative Requirements From the DMPPR



Overview of DMPR's Role in Mining Regulation w.r.t. Realtime monitoring

Safety Guidelines Enforcement

DMPR sets strict safety guidelines to protect mining workers during all operational phases.

Real-time Monitoring Systems

DMPR issued notice to Mines in South Africa in 2024 to implement real-time monitoring systems to maintain compliance and safety in mining operations. For implementation by end of September.

Mandatory Standards for Realtime Monitoring in Surface Mines from the DMPR



Legislative Framework:

Employers are mandated under the Mine Health and Safety Act (MHSA) to ensure safe working conditions, monitor exposure levels, and implement systems to control health risks. Real-time monitoring systems are recommended to enhance hazard management.

Current Issues:

Despite existing measures, employees remain overexposed to health hazards. Reactive systems are insufficient, and the adoption of advanced real-time monitoring technologies is encouraged to provide immediate data and enable timely interventions.



Standards for Monitoring Systems:

Real-time monitoring systems must comply with international standards (e.g., ISO 9001, IEC 61508) to ensure reliability, accuracy, and safety in industrial environments.

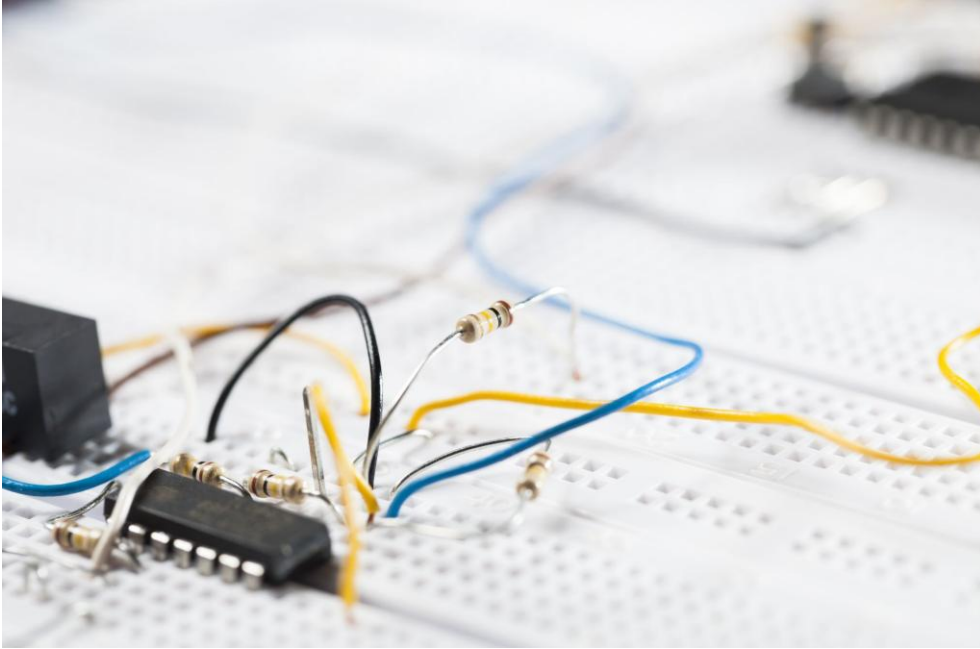
Implementation Phases:

Phase 1 (0-6 months): Conduct risk assessments, evaluate current controls, investigate real-time monitoring technologies, and develop a comprehensive implementation plan.

Phase 2 (6-12 months): Install real-time monitoring systems, train personnel, establish procedures for responding to alerts, and maintain records for compliance and improvement.



Overview of Realtime Monitoring in Surface Mining



Definition and Core Objectives of Realtime Monitoring

Continuous Environmental Observation

Realtime monitoring involves continuous monitoring of mining environments using advanced monitoring equipment.

Hazard Detection

Early identification/warning of potential hazards helps prevent accidents and overexposure and ensures worker safety in mining operations.

Hygiene and Health Oversight

Realtime data supports effective control of exposures in the workplace.

Timely Decision-Making

Immediate access to monitoring data enables prompt decisions to mitigate risks and improve outcomes.



Control measures

Realtime monitoring of control measures helps to effectively monitor any shortcomings or failures in existing and planned control measures.

Definition and Core Objectives of Realtime Monitoring (Cont.)

Advantages and Limitations of Realtime Monitoring

Advantages

Real-Time Hazard Alerts

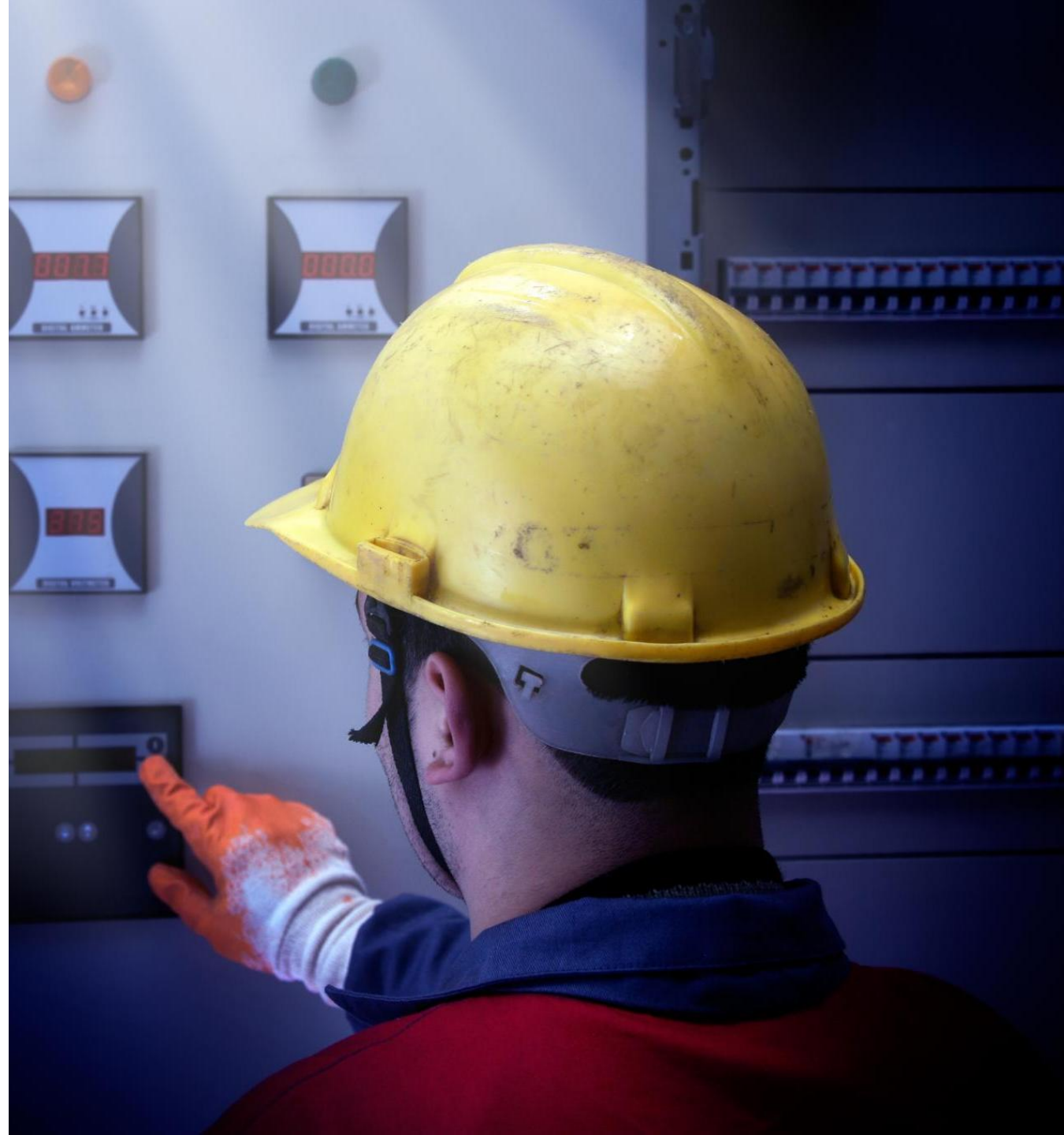
Monitoring systems provide immediate alerts for dangers like worker exposure to Noise, Airborne pollutants and Thermal stress to prevent overexposure with the Occupational exposure limits.

Timely Safety Interventions

Quick responses to alerts help protect workers and assets by addressing hazards before escalation.

Occupational Hygiene program integration

Realtime monitoring systems can be incorporated to assist the occupational hygiene monitoring program by providing day by day monitoring information on exposure trends in the workplace.



Limitations

Comparison of exposure with known methods

Occupational Hygiene measuring methods performed by using recognized sampling methodology through the HSE and NIOHS methods. These methods allow Occupational Hygienists to evaluate worker exposure and interpret the results. The results are compared with the Regulation 22.9 in the Mine Health and safety act. Time weighted average limits are provided herein and must not be exceeded. The current methods do not cater for Realtime monitoring for comparison with OEL's.

Equipment Reliability Issues

Unreliable or faulty equipment due to extreme conditions may provide incorrect sampling data.

Cost

Realtime monitoring equipment have a high initial and running cost. Realtime monitoring equipment have a high cost due to the nature of the equipment with respect to the technology and development of these instruments. They have been in the market for several years but have never been used for anything but stop gap monitoring to provide exposure data in investigations or identification of areas where personal monitoring may be required. Running costs include yearly calibrations of these instruments by a SANAS approved calibration laboratory.

Need for Skilled Personnel and local networks

Operating advanced systems requires trained experts, local networking or mesh systems for communication with Realtime monitoring equipment.

Current Equipment and Technologies available for Surface Mine Monitoring

Equipment and Systems available

- AMS Haden and Envirocon stock various solutions for Realtime monitoring as per the guidelines set out by the DMPR
- The equipment is classified between static and personal sampling of stressors
- Equipment costs may vary from R25 000 to in excess of R350 000 per instrument.

Questions

Contact details:

- NOHS Consultants
- 011 764 6510/072 231 7403
- morne@nohshyg.co.za