NEWSLETTER

SEPTEMBER 2023

MOSH DUST NEWSLETTER

#MakingMiningMatter

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MINING INDUSTRY OCCUPATIONAL SAFETY & HEALTH

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HARMONY MPONENG MINE ADOPTS
THE IN-STOPE ATOMISATION FOR DUST SUPPRESSION LEADING PRACTICE

Harmony Mponeng Mine' Health and Safety Committee

The in-stope atomisation for dust suppression best practice was launched as a leading practice for the widespread adoption in the mining industry in August 2021.

The leading practice had indicated significant benefits in terms of dust exposure reduction amongst stoping employees and was also identified by the South African Mining Industry, as a dust critical control for scraping activity. Dust liberated during scraping activities in a stoping panel travel with the ventilating air and may affect any employee working downstream of the prevailing ventilation. Most hard-rock stopes are ventilated in series (utilising the same air stream) due to conventional mining methods thus the furthest stope upstream (intake side) will also affect the next stope in series, exposing any employees working in the ventilation route (district) to respirable dust.

The practice is based on the principle of water atomisation, i.e., breaking bulk liquid into smaller water droplets (mist) travelling at a high velocity to capture dust particles. This can be obtained through nozzle design, selection, and increased air pressure. Portable atomisation units are placed at strategic position in a stope to prevent dust liberation.

LEAD ADOPTERS

Harmony Mponeng Mine took the lead in adopting this leading practice when it signed up for adoption in December 2021. During the leading practice orientation session with the mine's senior management team, a management buy-

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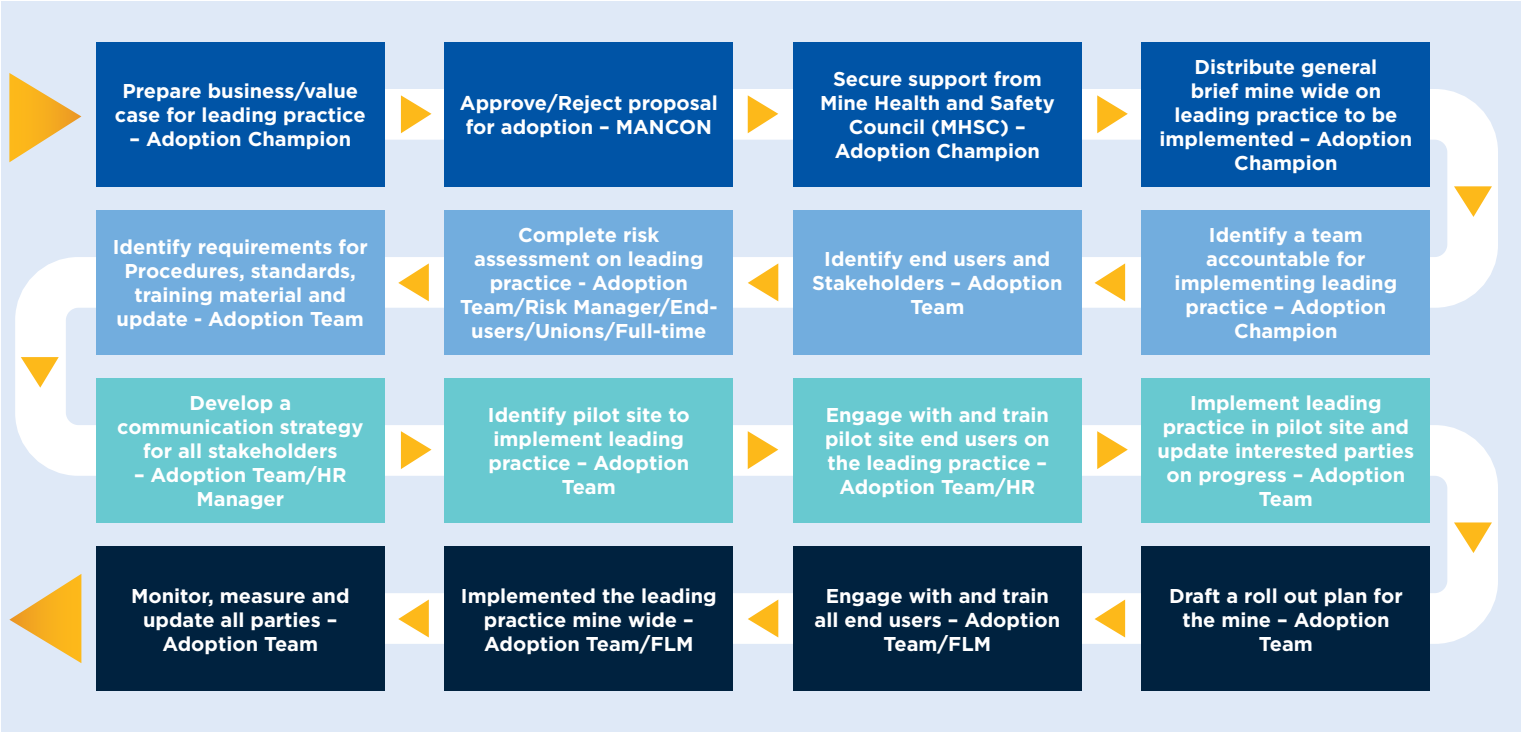
HARMONY MPONENG MINE ADOPTS THE **IN-STOPE ATOMISATION FOR DUST SUPPRESSION LEADING PRACTICE** continued

in was solicited and the appointment of a motivated, self-determined and multi-disciplinary Mine Adoption Team led by Mr Richard Madhopershaad (Adoption Champion) followed soon thereafter. After investigating the value case for adopting the leading practice, the team worked together to secure adoption buy-in from all stakeholders. Once all team members were aligned on the objectives, the Mine Adoption Team compiled an adoption plan/ framework. Harmony Mponeng Mine's approach is to introduce in-stope atomisers at their training centre, where all mining employees are required to attend induction training. This will ensure that the training of the target population is met. To date, the team has managed to establish the baseline dust results at the training centre and have compared these to when in-stope atomisers are in use. These results indicate an improvement of about 80% in dust suppression, which is in line with the results from the source mine.

The MOSH Dust Team is working closely with Harmony Mine's Adoption Team to ensure successful adoption of this leading practice and roll out to the rest of the working stopes.

HARMONY MPONENG MINE ADOPTION PLAN/FRAMEWORK



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MOSH LEADING PRACTICE ADOPTION SYSTEM

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Three phases of MOSH leading practice adoption system

Identify leading practices with the greatest potential to address the major risks

Document the selected leading practice at the source mine where it is already applied

Facilitate widespread adoption of the practice using a Community of Practice for Adoption (COPA)

The MOSH leading practice adoption system is a process that identifies leading practices, selects and documents the best of them (possibly with refinements) at an operational mine (the source mine) and identifies possible aids and barriers of its adoption at other mines.

Technological details of the leading practice together with detailed leadership behaviour, behavioural communication plans and procedures for its adoption are then compiled by the relevant MOSH adoption team into a leading practice adoption guide. The guidance is tested at either the first adoption mine or at a special demonstration mine and updated accordingly by the MOSH adoption team to take account of lessons learned.

Finally, The MOSH Adoption Team facilitates adoption of the leading practice throughout the industry by presenting details at a Leading Practice Adoption Workshop and by establishing a Community of Practice for Adoption (COPA), where key employees from all potential adoption mines are brought together to provide continued assistance to individual mines to learn from one another on the adoption and continuous improvement of each practice. The MOSH leading practice adoption system fully recognises that, while a technological or procedural solution may have demonstrated effectiveness at one operation, the success in the adoption of the leading practice at another operation will depend on the key employees (decision makers, lead adopters and stakeholders) at that operation. The buy-in and support of all these key employees at the mine are fundamental enablers in the successful adoption of any leading practice, otherwise the leading practice adoption may fail or be short lived.

The behavioural or change communication aimed to address knowledge gaps, misinformation and misperceptions on the prevailing risks and controls, and leadership behaviour aimed at facilitating the desired behaviour of mine leadership are key distinguishing factors of the MOSH adoption system.


Harmony Mponeng Mine

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MOSH LEADING PRACTICE ADOPTION SYSTEM continued

The MOSH leading practice adoption process

Identify leading practice with greatest occupational health and safety potential

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Identify all potential adoption mines

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Direct inquiry investigation to identify mental models

Investigate details of leading practice at source mine

Investigate value case for leading practice

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Leading practice

- **Leg 1:** Behavioural communication plan
- **Leg 2:** Leadership behavioural plan
- **Leg 3:** Technical details

VALUE CASE DETAILS

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Draft leading practice adoption guide

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Conduct leading practice adoption workshop for all potential adopters

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Establish community of practice for adoption (COPA) involving all potential adopters

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Assist with adoption at first adoption mine and update draft adoption guide

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Facilitate widespread adoption – across all potential adoption mines

Kumba Iron Ore – Kolomela

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SERITI KHUTALA COLLIERY CONCLUDES THE ADOPTION OF THE CONTINUOUS REAL TIME MONITORING OF DUST ENGINEERING CONTROLS LEADING PRACTICE (CRTM-LP)

2024 Mining industry occupational health milestones

Elimination of occupational lung diseases

By December 2024, 95% of all exposure measurement results will be below the milestone level for respirable crystalline silica of 0.05 mg/m3 (these results are individual readings and not average results).

By December 2024, 95% of all exposure measurement results will be below the milestone level for platinum dust respirable particulate of 1.5 mg/m3 (these results are individual readings and not average results).

Using present diagnostic techniques, no new cases of pneumoconiosis and silicosis will occur amongst previously unexposed individuals.

Seriti Khutala Colliery MOSH-Mine Adoption Team Committee

THE JOURNEY

The journey towards zero harm includes a continuous effort to identify interventions which may yield maximum health and safety benefits - the adoption of the industry's leading practice is one intervention in which the mining industry can achieve this goal.

Following their decision to adopt the MOSH CRTM-LP in 2021, Seriti Khutala Colliery have now concluded their adoption journey.

The mine decided to install continuous real time monitoring (CRTM) units (dust sensors) at strategic locations across the mine in order to continuously monitor the effectiveness of dust controls e.g., traveling roads dust suppression, belt transfer points, water sprays, ventilation, continuous miner (CM) dust suppression systems (sprays and scrubber fans).

The CRTM data is used to proactively manage dust exposure through the setting of audio or visual alarms, to warn employees when in hazardous environments.

The CRTM is currently interlocked with the feeder breaker, where cut-outs are activated when dust concentrations are above the limit.

MULTI -DISCIPLINARY APPROACH

A multidisciplinary team comprised of various disciplines (engineering, ventilation and occupational hygiene engineering (VOHE), instrumentation, mining and training department) was formed to ensure the successful adoption of the leading practice. Each team member was assigned with a responsibility and was required to report back to the forum on a set regular basis. This team has been key to the successful adoption and effectiveness of the practice at their site.

The buy-in and involvement of key stakeholders on leading practice adoption are critical, hence the Seriti Khutala Colliery approach was to identify all persons to be affected by the leading practice adoption from the beginning. These included Belt Attendants, continuous miner (CM) Operators, Shuttle Car Operators, etc.

Organised labour was instrumental in securing employees' buy-in and support.

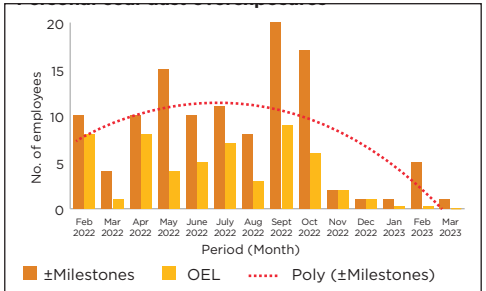
BENEFITS OF ADOPTING THE CRTM-LP

The CRTM is not a preventative control, however it is a monitoring control used to ensure or confirm the effectiveness of engineering controls in real time.

The Seriti Khuthala Colliery is now able to monitor the performance and effectiveness of engineering controls, thus allowing quicker response to risk control failures, but also to empower employees to take corrective action when audio or visual alarms are triggered.

Khutala Colliery has benefited from the adoption of the CRTM-LP in that a downward trend in personal coal dust overexposures is being observed, since the adoption of this leading practice.

The achievement of the 2024 OH milestones has been made possible with the adoption of the LP.



SERITI KHUTALA PERSONAL COAL DUST EXPOSURES

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CONVEYOR BELT AUTOMATED TRANSFER POINT DUST SUPPRESSION FOGGING SYSTEM SIMPLE LEADING PRACTICE(CBAT-SLP)

DESCRIPTION OF PRACTICE

The conveyor belt automated transfer point fogging dust suppression system is a leading practice (CBAT-LP) that has been recognised as a critical dust engineering control at ore conveyance transfer points. The system ensures that airborne dust particles are captured and trapped by increasing one droplet of water to create mist vapor (atomisation) capable of capturing respirable dust particles. The coagulation and the absorption of the dust particle by water is further enhanced by adding low dose surfactants that descale, sterilise (treat the water for fungal and bacterial agents) and increase the dust binding effect.

PRACTICE BENEFITS

Following the installation of the CBAT, airborne total dust liberation has been reduced to between 0.397mg/m^3 and 0.433mg/m^3 time weighted average (TWA) from between 1.352mg/m^3 and 0.461mg/m^3 TWA in the immediate vicinity of the transfer point. This has resulted in up to 86.2% airborne pollutants reduction in the general atmosphere at the source mine.

PRACTICE APPLICABILITY

This practice is applicable to all underground mining operations seeking to reduce ambient dust load, especially at underground intake airways, where conveyor belt transfer and tipping points may be situated. It is also applicable at ore crushing points, both on surface and underground.

EMPLOYEES IMPACTED

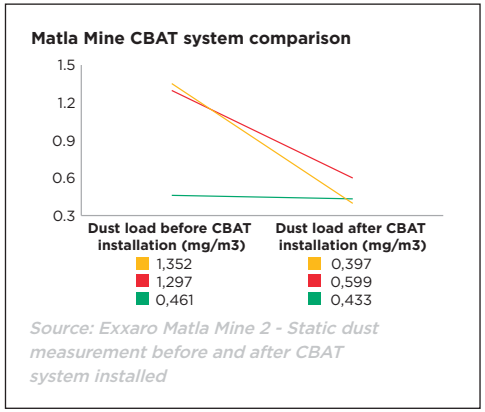
All employees that are exposed to coal dust (respirable crystalline silica or nuisance dust) in an underground coal mining operation, especially those working in close vicinity with the conveyor belts and ore transfer point e.g., Belt Attendants/Operators and belt maintenance personnel. Most conveyor belts or ore transfer systems are situated in the intake airways and a general reduction in the dust load will benefit every employee in an underground operation, especially at collieries.

CBAT-SLP AS A DUST CRITICAL CONTROL

The practice was identified by the South African coal mining sector as a dust critical control for conveyor belt transfer points. At these transfer points, continuous monitoring (control availability and performance) is essential.

Most mining operations where the practice is available have interlocked this dust suppression system with belt movement (only operational when coal is on the belt).

A case study was documented at Exxaro Matla 3 on the CBAT-SLP.



Source: Exxaro Matla Mine 2 - Static dust measurement before and after CBAT system installed

CASE STUDY OVERVIEW

Mining company
Exxaro

Commodity
Coal

Operation/Mine
Matla 2

Number of employees affected by the health and safety case study
421 employees

Stakeholders consulted
Organised labour, engineering and production employees

Occupations affected/benefited
Mine Overseers, Section Managers, employees in the surrounding area of implementation and Section Engineers

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MOSH DUST TEAM UPCOMING EVENTS

NEXT ISSUE

- Sibanye Stillwater (gold) journey to meeting the 2024 OH milestones
- Exxaro Matla (dust) behavior change communication

- **Gold Dust working group meeting**
  18 October 2023, Virtual meeting
- **MOSH Dust Day of Learning (coal commodity)**
  6 October 2023, EMalahleni
  20 October 2023, Secunda
- **Continuous real time monitoring (CRTM) joint COPA**
  1 November 2023, Virtual meeting
- **MOSH Dust Day of Learning (platinum commodity)**
  22 November 2023, Virtual meeting
- **Conveyor belt automated transfer point fogging dust suppression system leading practice (CBAT-LP) interest group meeting**
  TBC, Virtual meeting
- **MOSH Dust Day of Learning (gold commodity)**
  TBC, Virtual meeting

For more information and updates on MOSH Dust events, please follow the MOSH Dust webpage link www.mosh.co.za or scan the QR code:

www.mosh.co.za

MOSH DUST TEAM

Sibusiso Masanabo
Principal Adoption Specialist: MOSH Dust
smasanabo@mineralscouncil.org.za
011 498 7168

Salome Makgato
Adoption Team Manager: MOSH Dust
smakgato@mineralscouncil.org.za
011 498 7156

Israel Sibisi
Adoption Team Manager: MOSH Dust
isibisi@mineralscouncil.org.za
011 498 7135

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