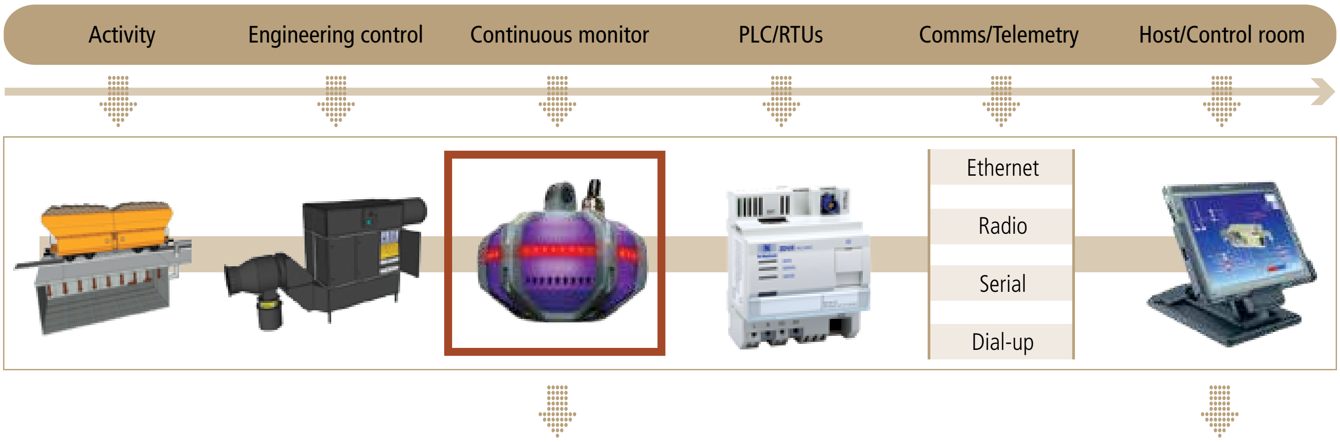
DUST LEADING PRACTICE

CONTINUOUS REAL-TIME MONITORING OF AIRBORNE POLLUTANT ENGINEERING CONTROLS: THE LEADING PRACTICE THAT WILL MAKE A DIFFERENCE

BY INDUSTRY FOR INDUSTRY



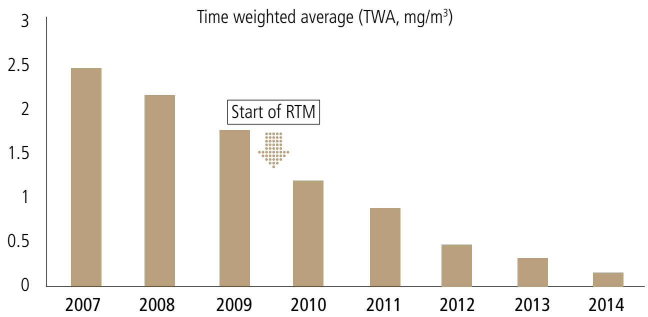
Adding a plug-in monitor that keeps engineering controls honest is the essence of this leading practice. Instruments are placed strategically at identified sources of an airborne hazard and plugged into an existing telemetry network to monitor the ambient air condition continuously in real-time at an effective engineering control. The data thus generated is utilised to initiate protection logic if a dust alarm occurs. All other constituents of the illustration should exist already.

Includes:

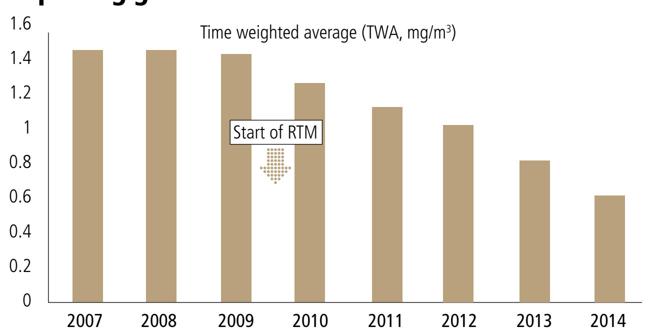
- Communication drivers
- Real-time data monitoring
- Real-time database
- Alarm and event journal
- Historic archive
- Configuration database

DOCUMENTED IMPACTS – SOURCE MINES

New Vaal colliery



Kopanang gold mine



Industry experts identified continuous real-time monitoring of airborne pollutant engineering controls as one of the leading practices with greatest impact for addressing the risk of harmful airborne pollutants at source.

The MOSH Adoption Team – Dust established the verifiable benefit of their systems in enabling a reduction of airborne dust with investigations at the two source mines, AngloGold Ashanti's Kopanang mine and Anglo American's New Vaal colliery. The practice offers outstanding management of the effectiveness of engineering controls applied to mitigate airborne pollutants. It has broad applicability, offers easy installation, has low maintenance requirements and has the potential to have a significant impact on a large number of affected employees across a broad range of commodities.

The adoption of this leading practice will enable industry to carry out predictive and preventative maintenance management on engineering interventions that control airborne pollutants. It allows for immediate intervention when the continuous real-time monitoring system detects excessive hazard levels.

The strategic context of this work is one of continuous improvement towards zero harm from silica dust and other airborne pollutants to which chief executive officers in the mining industry have duly committed.

The specific objectives of this document are firstly, to sensitise decision makers and potential adopters to the capabilities of this leading practice as a major tool to achieve the MHSC 2024 milestones; and secondly, to emphasise the sustainability aspect assured by following the MOSH adoption process.

The work of the MOSH Adoption Team – Dust has progressed to the stage where the leading practice is being adopted industry-wide.

KEY ELEMENTS OF THE LEADING PRACTICE

The aim of the leading practice is to prevent worker exposure to harmful airborne pollutants. Key features to address unresolved issues are listed. For areas with existing engineering controls relevance starts with element 3.

1. **Identify:** Document areas and activities associated with sources of airborne pollutants.
2. **Evaluate:** Interpret the airborne pollutant data and propose appropriate interventions and controls.
3. **Communicate:** The management team must sanction adoption. To facilitate sustainability, behavioural communication and leadership behaviour plans must be in place early in the adoption process.
4. **Demonstrate:** Prove the effectiveness of the engineering intervention tailored to control the airborne pollutant. Upgrade the controls until the desired outcome is consistently achieved.
5. **Monitor:** Select a suitable continuous real-time monitoring system and install it to monitor the effectiveness of the engineering controls.
6. **Protect:** Create interventions to protect workers from exposure to the hazards and incorporate it into the protection logic.
7. **Review:** Assess and refine procedures and criteria that are outlined in the Leading Practice Adoption Guide and ensure that these match mine operating procedures.

COMPETENCIES OF THE PRACTICE

The leading practice consistently provides assurance of the sustained integrity of appropriate engineering controls tailored to mitigate airborne pollutants. The practice also provides indications to:

- **Run** effective hazard protection programs for affected workers
- **Detect** working places or processes with unsatisfactory airborne pollution conditions
- **Find** sources or causes of such conditions
- **Determine** the effectiveness of airborne pollutant suppression methods or equipment
- **Upgrade** control measures
- **Confirm** that satisfactory conditions have been achieved following remedial measures
- **Endorse** that satisfactory conditions are being maintained
- **Improve** the design of ventilation systems
- **Show** trends of ambient conditions
- **Define** risk levels through appropriate risk assessments

These two photographs show the change made by the intervention at New Vaal colliery

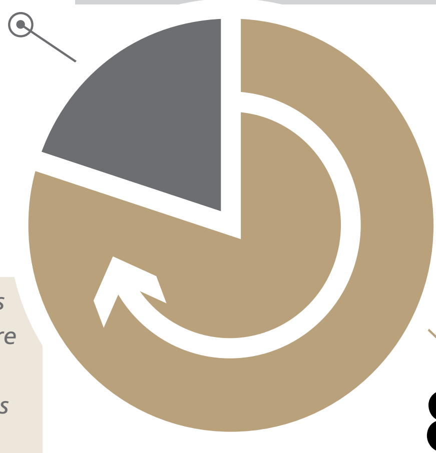
PRACTICE APPLICABILITY

The potential for adoption of this leading practice is not limited to dust sources only. It has exciting potential to be applied at engineering controls that were designed to mitigate other airborne pollutants.

Activities at transfer points, bunkers, crushers, conveyor belts, tipping points and furnaces are common to deep-level and opencast mines. Gold, platinum, manganese, iron ore, diamond, chrome, lead, silver, copper, zinc, limestone, kaolin, vanadium, silica, mica and titanium mines have the potential to adopt this practice.

It is a paradigm shift from reactive to proactive airborne pollutant management.

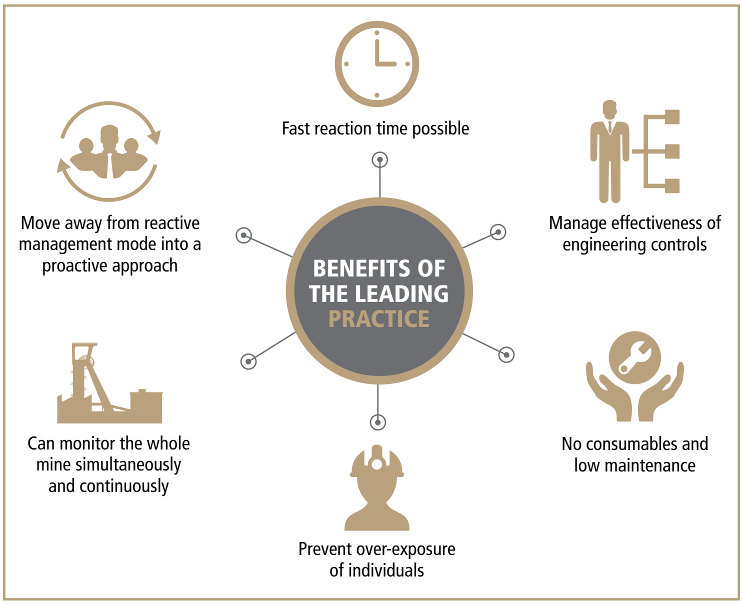
20%
problem finding



80%
dust management

By introducing continuous real-time monitoring, more time will be devoted to dust management and less on finding the pollution.

CHAMBER OF MINES
of South Africa



This leading practice will assist significantly in achieving the 2024 milestones on the ELIMINATION OF OCCUPATIONAL LUNG DISEASES

1 To eliminate **silicosis**

By December 2024, 95% of all exposure measurement results will be below the milestone level for respirable crystalline silica of 0.05 mg/m^3 *(these results are individual readings and not average results)*.

No new cases

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

2 To eliminate **pneumoconiosis**

By December 2024, 95% of all exposure measurement results will be below the milestone level for platinum dust respirable particulate of 1.5 mg/m^3 (<5% crystalline silica) *(these results are individual readings and not average results)*.

No new cases

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

3 To eliminate **coal workers' pneumoconiosis**

By December 2024, 95% of all exposure measurement results will be below the milestone level for coal dust respirable particulate of 1.5 mg/m^3 (<5% crystalline silica) *(these results are individual readings and not average results)*.

No new cases

Using present diagnostic techniques, no new cases of coal workers' pneumoconiosis will occur amongst previously unexposed individuals.

**Previously unexposed individuals are those unexposed to mining dust prior to December 2008 i.e. equivalent to a new employee who entered the industry in 2009.*

MOSH
Mining Industry Occupational Safety and Health

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