



PROPOSAL

Automated Decline Dust Suppression System



SAFETY PRODUCTS TO ENHANCE OPERATIONAL EFFICIENCY

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PROJECT SCOPE

Reduce dust in travel ways at your underground operation.

CONTEXT

Excessive dust in main travel ways such as declines is an issue in underground mines with respect to employee health, safety and visibility. The two main causes for excessive dust in these travel ways are:

1. Dust generated from truck pay loads.
2. Dust generated from road ways as a result of vehicle traffic.

PROPOSAL

ME SAFE believe that the dust hazard can be significantly reduced by employing a two stage approach targeted at the root cause for each source of dust. A summary of each stage is outlined below with further information provided the Detailed Proposal.

Stage 1: Install an automated spray system in the backs to wet down truck pay loads prior to the trucks accessing the main decline.

Stage 2: Install an automated spray system in the main decline to keep the roads and walls wet at all times.

It is recommended that one 'Stage 1' assembly and a 200m length of 'Stage 2' assembly be installed in a dust prone section of the mine to assess the suitability and effectiveness of the system at your underground operation.

DETAILED PROPOSAL

The following outlines in detail the proposal for each stage of the project.

Stage 1:

Description of the system

The purpose of this stage is to wet down a trucks pay load prior to the truck accessing the main decline. This will reduce dust being blown off the back of the truck and down the decline.

This system is activated by the loaded truck leaving the level and passing a sensor mounted on the wall of the drive. This sensor activates a spray system mounted in the backs of the drive which in turn wets down the top of the trucks pay load prior to the truck accessing the main decline.

The system is set up so as it is only triggered by heavy vehicles leaving the level (*not accessing*) and turns off via a timer.

The system can be powered by mine power or compressed air.

The following figure 1 illustrates how the system operates:

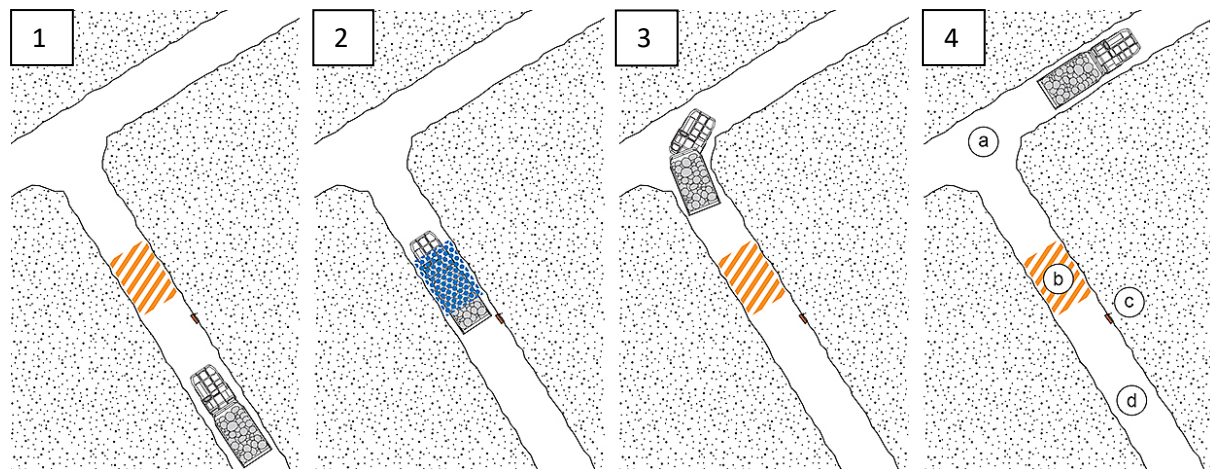


Figure 1

Loaded truck leaving the level and approaching the activation sensor, 1. The loaded truck has activated the sensor and is in the spray zone, 2. Loaded truck with wetted down pay load leaves the level and turns into the main decline, spray system turns off via timer, 3. Schematic showing: a – main decline, b – Spray zone, c – activation sensor, d – level access, 4.

Operational Requirements

The following operational activities are required for this stage of the dust suppression system:

- Ensure access to water services at the stage 1 spray zone.
- Grade the roadway in the stage 1 spray zone so as the spray water flows to the closest sump and does not wash away the roadway.
- Stakeholder engagement via communication to trucking crews.

Stage 2

Description of the system

A major source of dust in declines is generated from roadways as a result of heavy vehicle traffic. The key to keeping dust to a minimum in declines whilst maintaining a safe roadway for heavy vehicle travel is to keep the roadway damp at all times. If the roadway is allowed to dry out in-between sprinkler cycles, then fines accumulate on the road creating a slippery surface when wet which is hazardous for heavy vehicle traffic.

The purpose of this system is to keep the roadway and decline walls damp at all times. This is achieved via an automated sprinkler system which activates decline sprays at pre-set time intervals.

This system can be powered via mine power or compressed air with the control units housed in a water and dust proof case which can be installed in the backs safe from vehicle interactions.

Two 25mm sprinkler lines are run down the shoulder of the decline with the sprinkler nozzles facing the opposite wall. The location of the sprinkler heads in the sprinkler line is out of phase with each other as shown in figure 2 and figure 3 and they operate independently, not at the same time. This enables even sprinkler coverage of the decline and minimises the draw from the main water line.

The wind speed in the decline dissipates the sprinkler water across the walls and roadway keeping the decline damp. Pig tail type sprinkler nozzles with a 170° spray cone are used to maximise water coverage.

To commission a section of decline it is recommended that the sprinkler system be left on for 12 to 24 hours depending on the road conditions. This will wash out the fines leaving the course material on the road surface. Roads should be ripped prior to this stage for heavy vehicle traffic and graded to ensure that the excess water flows to the closest sump and does not wash out the road.

Flashing strobe lights with '*Sprinkler in Operation*' signage are automatically activated when the sprinkler system is operating. These signs are installed at each end of the section of decline in which the sprinkler system is operating to alert traffic of changed road conditions.

If required, this sprinkler system can talk to the mine communication network and can be activated/deactivated remotely.

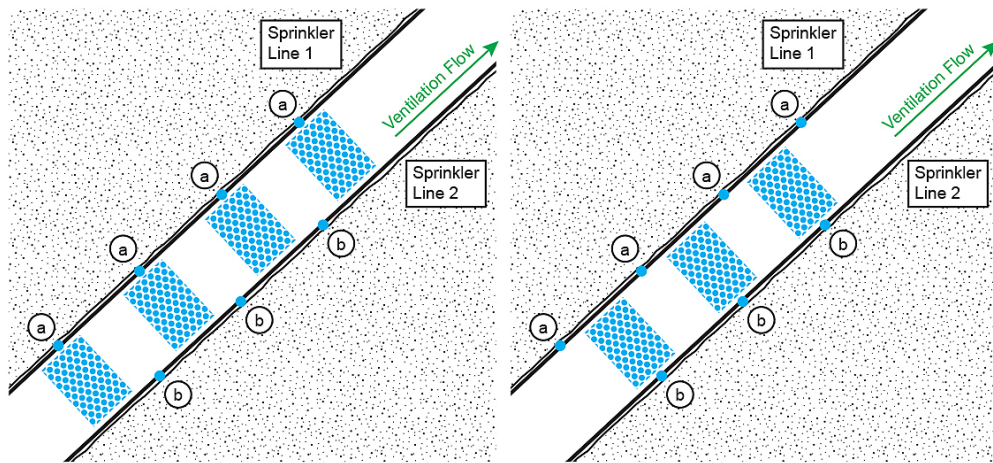


Figure 2

Plan view of a section of decline with two sprinkler lines installed down each side of the decline. 'a' shows 'Sprinkler Line 1' spray nozzles and 'b' shown 'Sprinkler Line 2' spray nozzles. Note that when 'Sprinkler Line 1' is operational 'Sprinkler Line 2' is off and when 'Sprinkler Line 2' is operational 'Sprinkler Line 1' is off. This enables even coverage of the decline.

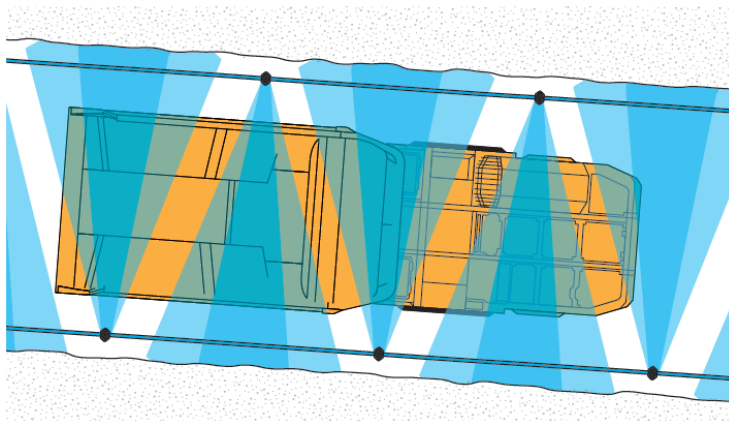


Figure 3

Plan view of an underground haul truck traveling along the decline showing sprinkler coverage. It is important to note that wind speed in the decline disperses the sprinkler cone in the direction of the ventilation flow.

Operational Requirements

The following operational activities are required for this stage of the dust suppression system:

- Initial road way preparation – depending on road conditions, rip the roadway in the section of decline where the system is to be trialled for heavy vehicle traffic.
- Grade roadway so as sprinkler water reports to sumps.
- Ensure sumps are bogged prior to commissioning.
- Initial wash down of decline walls to remove dust.
- Stakeholder engagement via communication to trucking crews.

Summary

ME Safe believe dust can be reduced in the main travel ways at your underground operation by employing a two stage approach to dust control targeting the root cause.

The two systems that we propose can be fully automated and require minimal maintenance allowing the underground operation to safely focus on its core business.

Our team look forward to discussing this project with you further.

Kind regards



Sam Thomas
Director
ME SAFE
+61 4 22 928 066
sam@mesafe.com.au
www.mesafe.com.au

