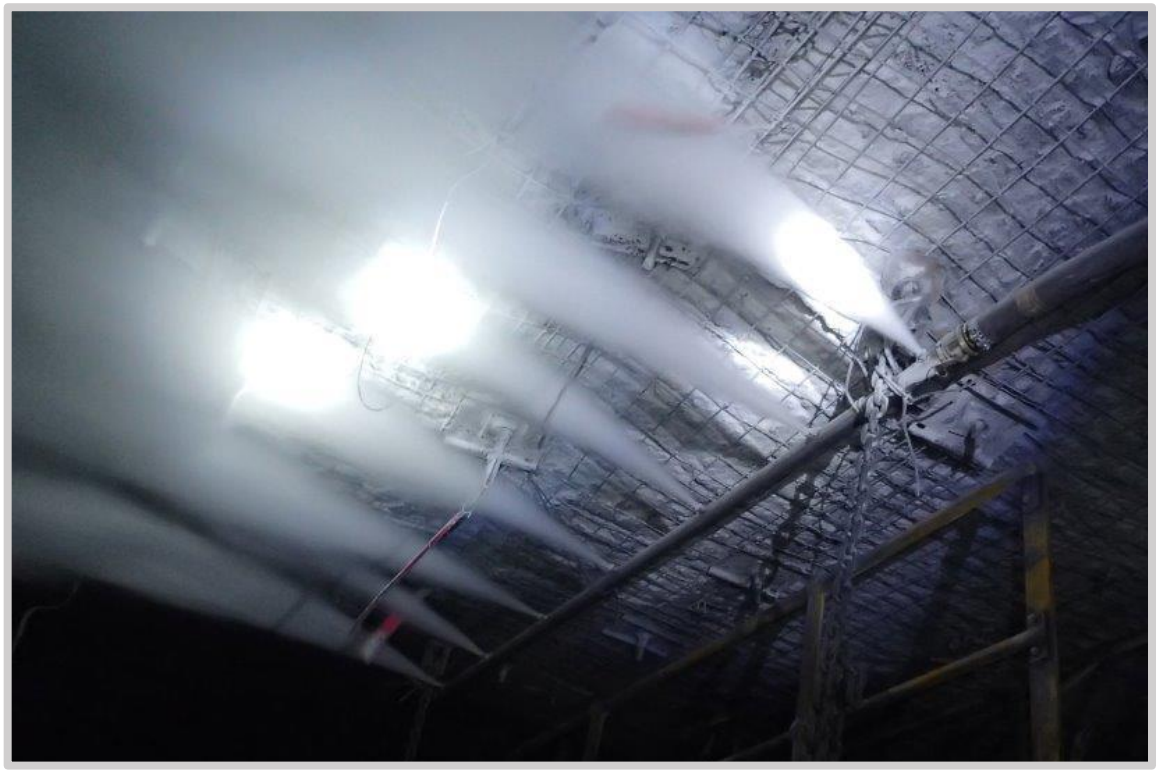
VALE

**Carborough Downs Coal Mine Complex**

## Queensland Mining Industry - 2015 Health and Safety Conference

## Innovation Award Submission



# Stonedust Spraybar

## Entry

The Stonedust Spray Bar is an innovative tool that can be utilised in underground mines to enable the mitigation of Coal dust explosions through the effective application of stonedust.

## Scope

The Stonedust Spray Bar enable both:

• A solution to a specific safety problems – Application of stonedust for the suppression of coal &

• A solutions to an identified occupational health hazard that will minimise workers' exposure by managing the hazard at its source – Manual handling 20kg Stonedust bags into a hopper - and that will provide a measurable long term benefit – Elimination of Manual Handling.

## The Problem

Stonedusting in the underground mine is conducted both by Mechanical Means (Flinger Dusters attached to Loaders) and Trickle Dusters (Brains, Drums – Manual Loading Requirement).

This Dusting is completed during a 4 hour window each week.

The Trickle Dusting option (usually implemented in areas where mechanical dusting is not possible – Trunk Conveyors / Drive heads / Coal Clearance) has previously been a physical / manual task. i.e. the loading of 20 Kg stonedust bags into the trickle dusters, dusting under belts and non-walk sides of conveyors by hand due to application of stonedust not effectively reaching these places.

This method is slow and requires multiple people to perform the manual intensive task.

Previously utilised hand-dusting method required 4 men to dust by hand, 60m of roadway over the same dusting window (4 hours)

## The Solution

It was identified by the Stonedust Coordinator (Dino Pittaway) when inspecting water spray bars on a conveyor belt that there was a possibility that Stonedusting via a similar spray bar could be effective. Trials began into this innovation.

Stonedusting Spray Bars were designed and coupled to a 3 Tonne Pressurised Stonedusting Pod Duster. The Spray bars were then hung off of the roof and testing on angles of the Application nozzles and the method for supplying Stonedust to the spray bars from the Stonedusting Pod were trialled.

During the trials, it was also identified the Spray bar application of Stonedust could also be utilised through the use of service pipes enabling the Stonedusting of the longwall tailgate during longwall retreat.

During the implementation phase of the trial a Stonedust Fallout Analysis was conducted on two methods of Stonedust application Stonedust Spray Bar and Brain Trickle Dusting method.

The results of the analysis Identified that through dispersing the stonedust particles more finely into the already existing ventilation stream across a wider area of the underground roadway the application of stonedust via the spray bar method delivered a more consistent coverage of the roof, ribs and floors over the same distance as the Brain Trickle dusting method.

A procedure and cross sectional review of a procedure for implementation of the Longwall Tailgate System has been undertaken prior to this submission.

The trials were initially conducted in the Trunk Conveyor areas of the mine with the Stonedusting Spray bar method now being included as part of the sequence plan for Stonedusting at the mine.

The Stonedust Spraybar effectively coats 150m of roadway & ribs. The dust does coat up to 250m+ but for the purpose of effectiveness this area is overlapped and dusted separately.

A procedure and cross sectional review of a procedure for implementation of the Longwall Tailgate System has been undertaken prior to this submission.

## Benefits/Effects

The benefits of the implementation of the stonedust spray bar for Stonedusting in the mine include:

- Elimination of the manual handling risk of adding Pellets of 20 Kg Stonedust bags to a Brain Trickle Duster to dust hard to dust areas of the mine (E.g. Conveyors). One (1) tonne stone dust bags are now loaded into the Pressurised Pod Duster utilising an underground Loader with attachments. The pod duster is then connected to the Stonedust Spray bar for effective application.
- The application of the stonedust through the spray bar has been proven to be more efficient as only 1 person is required to setup and execute the task which takes less than 1/3$^{rd}$ the time to apply 3 times more stonedust more effectively than the Brain Trickle Dusting Method utilising the 20 Kg Nags of stonedust manually loaded into the hopper.
- Stonedust application via the spray bar has proven to apply stonedust to the roof ribs and floors more effectively and consistently across the same area as the Brain Trickle Dusting method. There has also been considerable improvement on the non walk side of the belt and under the belt while utilising the spray bar. This is due to minimising immediate dropping out of stonedust and increasing Air/Stonedust mixture to disperse dust into the ventilation with increased effectiveness.

See Appendix 1 for Stonedust Fallout Analysis Results.

## Transferability

This innovation is transferable to all underground mines requiring application of materials for suppression of coal in areas where manual handling is currently required to stonedust un-trafficable areas (by loader).

## Innovation

Although Trickle dusting and pod dusting has been around for some time. The use of Spray bars to disperse stonedust to better the application in hard to dust areas id considerably new.

## Approximate costs

The costs of this project are minimal due to each of the required parts already existing onsite.

The design of the spray bar allows for ease of manipulated to allow for various configurations / adaptations to increase effectiveness even further.

## Photos


Brain Pod Duster (Open-end Hose) Method of Application

Pressurised Pod (Spray Bar) Method of Application

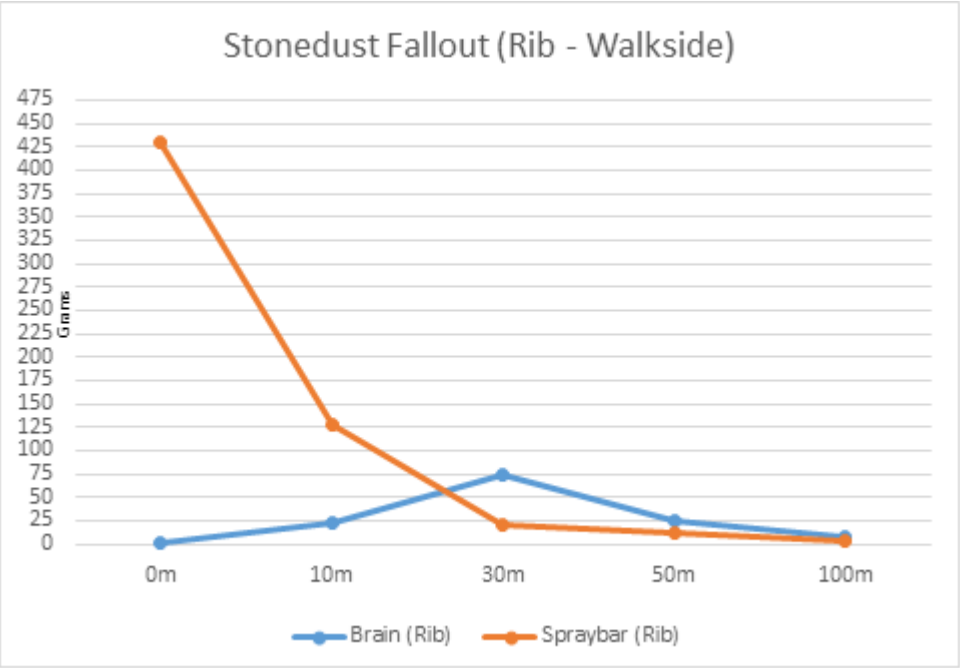
Spray Bar Nozzle

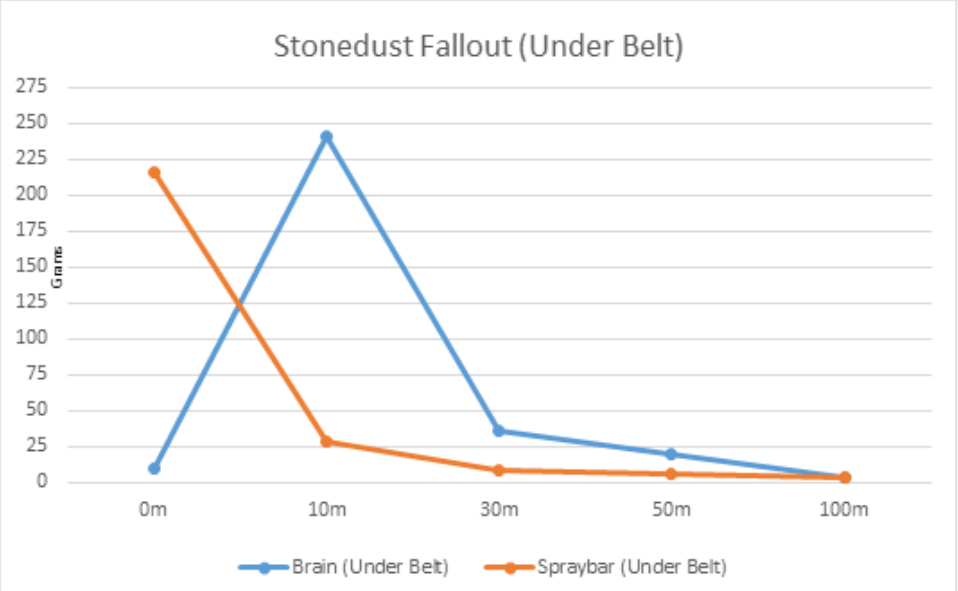
## Attachments

Please find attached:

- Video of Stonedust Spraybar in Operation
- Video of Brain Pod Duster (Open-end Hose) in Operation
- Video Showing Setup of Stonedust Spraybar

## Appendix 1


Stonedust Fallout (Rib - Walkside)
475
450
425
400
375
350
325
300
275
250
225
200
175
150
125
100
75
50
25
0
Grams
0m
10m
30m
50m
100m
Brain (Rib)
Spraybar (Rib)


Stonedust Fallout (Under Belt)
275
250
225
200
175
150
125
100
75
50
25
0
Grams
0m
10m
30m
50m
100m
Brain (Under Belt)
Spraybar (Under Belt)