

INNOVATIVE DUST CONTROL AT MANDALONG MINE

Nomination for the 7th Annual Australian Bulk Handling Awards

In the category of

Dust Control Technology, Application or Practice

By

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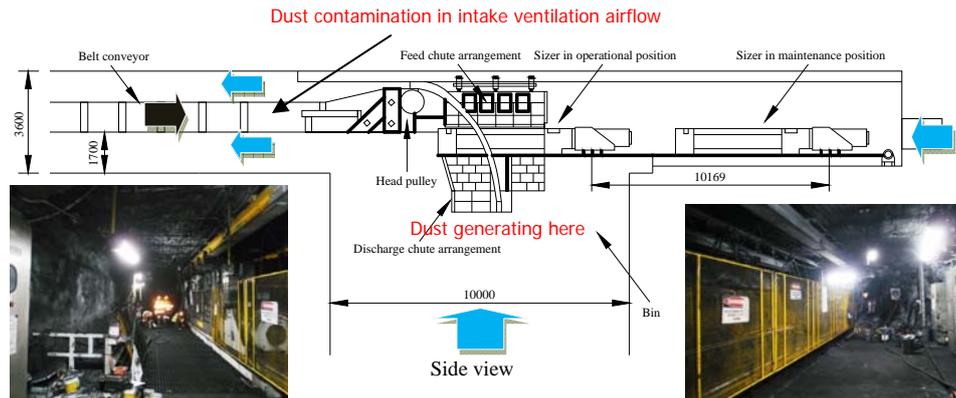


Centennial Coal

Tecpro
AUSTRALIA

THE PROBLEM:

Located near Morisset, NSW, Mandalong mine is owned by Centennial Coal, producing 5.5 million tonnes of coal each year from its underground Newcastle coalfields. Coal produced from its longwall face and development is transported by belt conveyor to an underground bin before being lifted to the surface. At the point where the coal drops from the crusher to the underground bin, a substantial dust cloud was being generated, causing severe contamination to the intake airflow as it travels towards inbye mine workings. Existing dust suppression system has not been effective in mitigating this problem.

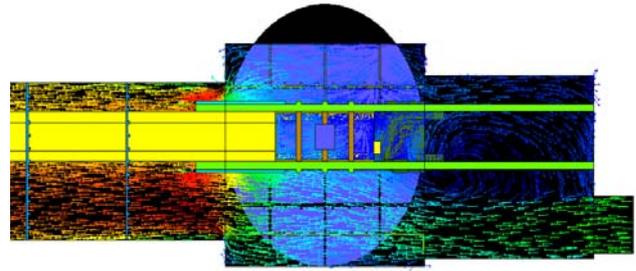
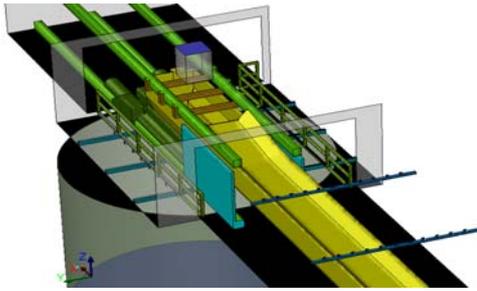


THE CHALLENGE:

- Complexity of ventilation system causing excessive airflow turbulence around the gallery above the bin and dust particles into airstreams;
- Interaction of moving objects (conveyor, coal, crusher and service cars)
- Multiple points of dust sources and inaccessible blind spots
- Key production transfer point requiring minimum interruptions

THE NOVELTY OF SOLUTIONS:

- Field investigations to obtain ventilation data, dust generation mechanisms and mine working designs;
- Development of 3D Computational Fluid Dynamics (CFD) models to provide scientific understanding of airflow and dust particle dispersion patterns and optimise the design and positioning of hose and droppers to suppress the dust in the vicinity of the underground bin;
- The selection of the latest spray nozzles and fabrication of the dust 'droppers' to best suit the particular requirements for this application based upon the above studies.
- On-site installation and fine-tuning of the dust suppression system. The system works by directing a fine curtain of water droplets inwards from the rim towards the crusher in the centre and has the effect of containing and suppressing the dust being generated. Aided by gravity, the dust particles fall into the bin instead of remaining airborne.

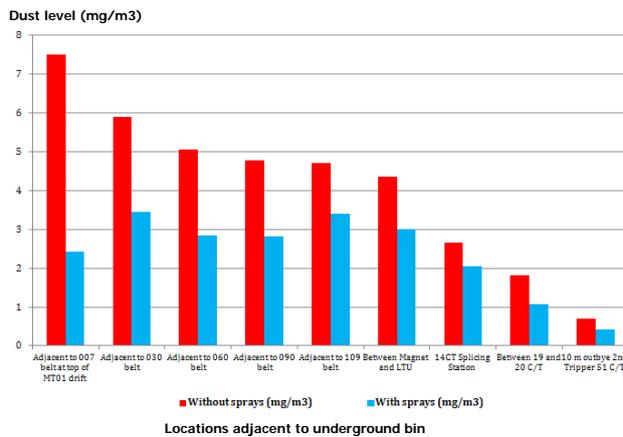


SUCCESS AND INDUSTRY IMPACT:

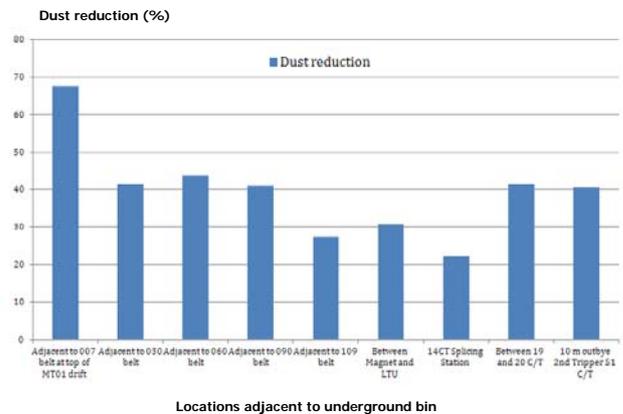
Following on-site installation of the dust suppression system, an independent dust suppression measurement was conducted by Coal Services to assess the impact of the system. Even only half of the nozzles were in operation at the time of testing, on average, a dust reduction above 40 per cent has been achieved, and more significantly, dust emissions had reduced by 68 per cent in the vicinity of the underground bin.

It was confident that with all the nozzles in operation, the dust suppression system will reduce the dust by more than 90 per cent.

The improvements in air quality achieved through the installation of this innovative dust suppression system have significantly improved the quality of mine ventilation air to be delivered to underground mine workers and helped Centennial Coal continue its ongoing program of improving mine environment, health, safety and eventually mine productivity.



(b) Dust levels at locations adjacent to underground bin – before and after the installation of dust control system



(a) Dust reduction (%) at locations adjacent to underground bin – after the installation of dust control system