



MINE VENTILATION OPTIMIZATION



APPLICATION NOTE

MOTIVATION

Mines use large ventilation systems to maintain a safe and healthy environment for miners. Dilution of diesel particulate matter (DPM) is often a key factor used to determine the required quantities of ventilation air. DPM emissions and exposure levels are highly variable depending on mine schedules and activities. Due to lacking technology to continuously monitor levels, mine ventilation systems are often over-designed.

As mines go deeper it becomes more difficult to supply air, and the development of new shafts for air is not economically feasible. Cleaning and reuse of available air then becomes an attractive option to maintain good air quality. In such cases it is important to determine how efficient the air cleaning is.

Understanding the range and timing of DPM concentrations as related to mine schedules and activities may enable new ventilation-on-demand fan-and-filtration devices to be intelligently used to maintain safe and healthy work conditions while reducing ventilation costs.



EXAMPLE

BC MEASUREMENTS DURING MINING ACTIVITIES

- Real time measurements are performed in the mine to identify times of increased BC concentrations.
- Concentrations are increased during the shifts, but depend on the activities performed.
- Ventilations system can be regulated using the information from BC measurements thus removing the need for running at maximum power.
- In the Hecla Limited's deep metal mine example it is estimated that around \$40,000 would be saved each year on electricity alone.

SCRUBBER EFFICIENCY

- BC concentrations are measured before and after the scrubber to determine scrubber efficiency.
- Scrubber parameters can be altered to achieve maximum efficiency.

Related articles

- J. C. Volkwein et. al., „New sensor for continuous tracking of diesel particulate matter in mines to optimize mine ventilation systems“, SME Annual meeting, (2016).

MINE VENTILATION OPTIMIZATION

