Dust problems in UG coal mines

By: Zhi Yang (Alexander)
Outline

- Introduction
  - Definition of coal dust
  - Types of coal dust
- Sources of coal dust in underground coal mines
- Influence of coal dust in underground coal mines
- How to reduce coal mine dust
Definition of coal dust

- **Coal dust** is a fine powdered form of coal, which is created by the **crushing**, **grinding**, or **pulverizing** of coal. Because of the brittle nature of coal, coal dust can be created during **mining**, **transportation**, or by **mechanically handling** coal.

![Diagram of Pulverizing Process](http://www.electrical4u.com/pulverized-coal-or-pulverization-of-coal/coal-milling-line.html)
Types of coal dust

1. **Inhalable/Respirable** coal dust  
   • Can cause Coal workers' pneumoconiosis (CWP or black lung disease)

2. **Flammable** coal dust  
   • Can cause explosion
Sources of coal dust generation in underground coal mines

Sources of dust generation on longwalls (The AusIMM Illawarra Branch, 2011)

(Retrieved from: https://www.youtube.com/watch?v=QleUtcTlXE0)
Influence of coal dust in underground coal mines

(Retrieved from: https://www.youtube.com/watch?v=NNmRrQQUi9k)

(Retrieved from: https://www.youtube.com/watch?v=czU1IJQ_9LE)
Coal Workers’ Pneumoconiosis (CWP)

Normal lung (left) and a lung from a miner diagnosed with CWP (right) (Anita & Jay, 2010)
Coal Workers’ Pneumoconiosis (CWP)

(Source: NIOSH Coal Workers' X-ray Surveillance Program)
Continuous Personal Dust Monitor

• Designed to operate continuously for 12 hours, and displays three values:

  • Respirable-dust concentration for the most recent 30-minute period,

  • Average Respirable-dust exposure from the beginning of the shift, and

  • Current percentage of the exposure limit.
Gravimetric Methods

Figure 4. Cyclone head of a personal dust filter.

Source: www.minewiki.org

Dust Control

Headgate side splitter arm and directional sprays on shearer (Jay & Edward, 2010)

Spray manifold on tailgate end of shearer (Jay & Edward, 2010)
Conveyor belt

Rotary wire brush

Rotary brush cleans the conveying side of the belt (James & Jay, 2010)

Stageloader enclosed
Belting at crusher inlet
Brattice covering stageloader

Enclosed stageloaders and crusher (Jay & Edward, 2010)


Questions?

Thank you!