Environmental & Safety Mines

College of Petroleum & Mining Eng.

Mining Engineering Dept.

4th Class

Lecture No. 2 – Chapter 15 Part-II

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Firefighting

- Provide Manual/Automatic water-deluge or foam-generating fire-suppression devices designed to quickly extinguish a fire.
- In each coal mine section, the following are required for most mines:

1. Two portable fire extinguishers
2. 240 lb (109 kg) of rock dust
3. Waterlines into the section or two portable water or chemical cars
4. A portable foam-generating machine or a portable high-pressure rock dusting machine and 60 bags of rock dust

- In addition, portable fire extinguishers are also required on each piece of mobile equipment, at electrical installations, at oil storage locations, and at other crucial points in the mine.

Escape Procedures

- Whenever a fire or an explosion occurs, the escape of mine personnel is of paramount importance. Three strategies of escape may be utilized:

1. Utilize the escape-ways, donning self-protection equipment where needed.

2. Barricade a non-affected part of the mine by trapping a supply of uncontaminated air.

3. Move to a refuge chamber.

Mine Rescue

- The rescue of personnel is always the primary concern in the aftermath of a fire or an explosion.
- Check-in system to determine how many persons remain in the mine
- Mine rescue attempts normally involve entry into the mine by mine rescue squads or the drilling of escape boreholes into mine workings suspected to be the location of survivors.

Mine Rescue

- The team normally consists of at least six experienced miners who are physically fit, properly trained as a team, and expert in the application of first aid to injured personnel.
- The teams are arranged in a hierarchy with a captain, a second in command, and so on.
- A team is generally equipped with oxygen breathing apparatus for each team member capable of supplying oxygen for 4, a lifeline for connecting all personnel when traveling in smoke, a means of communicating with its base, a reserve breathing apparatus, gas-measuring equipment, first-aid supplies, and a stretcher if applicable.

Mine Sealing

- When a mine fire is out of control, is too remote, or cannot be fought without endangering personnel, it may be necessary to seal the mine or part of the mine.
- O2 must cut-off mine
- The standard type of mine seal used in the coal industry is 16 in. (0.4 m) thick and made of solid concrete blocks with a center pilaster.
- The seal is keyed into the mine opening using channels cut into the floor and ribs.
- The blocks are laid in an interlocking pattern and mortared to provide the necessary strength to resist explosion forces

Mine Sealing

- Crib blocks and rock dust, cementations' foam, or low-density foam blocks can be used to meet the requirements of design.

Additional concern when sealing the mine:

- The first is the disposition of ventilation of a fire zone during the building of the seals
- The second concern in erecting permanent seals is the provision of sampling lines for monitoring of the gas chemistry behind the seals.

Use of Inert Gases

- The use of inert gases in an attempt to control mine fires, often termed *inertization,* is intended to reduce the percentage of oxygen in the mine atmosphere.
- The introduction of inert gas to flush a fire zone while maintaining normal ventilation is generally termed *local inertization;* filling a sealed area with inert gas is called *area* or *zone inertization*.
- The most common gases used for inertization are nitrogen and carbon dioxide.

Use of Inert Gases

N2	Co2
Close to air in specific weight	More dense than air
Not dissolved in water	soluble in water
Not absorbed by coal/coke	-
	May be lost in wet mines

END OF PART-II