MINE SAFETY

2nd INDO-US COAL WORKING GROUP MEETING

WASHINGTON

NOVEMBER 2005

GENERAL OBSERVATION

- No of coal mine accidents in India have reduced from 222 in 1975 to 90 in 2004 & the no of fatalities also reduced from 664 to 99 in corresponding period.
- More than 50% of the accidents are due to inundation and the next major cause of accident is gas explosion
- For the UG mines side fall & roof fall are also cause of many accidents.
- For OC Mines slope failure of dumps is one of the major cause of accident.

REGULATORY FRAME WORK FOR MINE SAFETY

- Safety, welfare & health of mine workers are regulated by Mines Act 1952 & the rules & regulations framed there under.
- These are administered by the Directorate General of Mine Safety (DGMS) under Ministry of Labour & Employment.
- Safety in Coal mines is monitored by the various committees starting from unit level to company board including representatives of Trade Unions & DGMS.
- The safety situation is also reviewed at the Govt level by Coal Minister.

Safety issues in UG mines - Detection of the voids

- Most of inundations have occurred due to failure to barrier pillars or partings in between the seams.
- These have occurred due to inaccurate knowledge of water bearing workings.
- Suitable techniques for establishing the thickness of the barrier and the partings and detection of voids and abandoned water bearing workings needs to be developed.

Safety issues in UG mines - Strata Management

- Most of the Indian coal seams have hard roofs, which are difficult to cave.
- Roof fall and side fall in the mine roadways are of major cause of accidents in underground mines in India.
- Suitable support system with roof bolters for Bord & Pillar workings are required.

Safety issues in UG mines - Strata Management

- A well-established technology/method for hard roof management both for extraction / depillaring and development workings may be explored.

- Techniques based on numerical modeling for subsidence prediction & control are required.

Safety issues in UG mines - Communication

- The communication in Indian Coal Mines is primarily based on CDS, signalling or telephone system. Telephones are located at strategic points in UG mines.
- This system has the inherent limitation as wires are to be laid to the specific points and a direct two-way communication is not possible.
- Advanced wireless communication technology for direct communication from surface to underground and vive-versa may be a better alternative.
- The advanced communication system should be able to transmit voice, data, video-telephony, real time production information and track machinery & personnel deployed in the underground

Safety issues in UG mines – Fire control

- Occurrence of mine fires & explosion is a critical area for Indian Mines.
- Suitable techniques such as mine fire mapping by thermal infra-red remote-sensing method may be explored to detect fire.
- Suitable technology may be explored for detection & measurement of conductor temperature in mine trailing cables to prevent premature insulation failure leading to electrocution and fire hazards.

Safety issues in OC mines - Slope Stability

- Slopes of mine, stockpiles, and overburden need to be monitored for their stability.
- Laser imaging system can be used in geological mapping, stockpile survey and pit development surveys.
- This system collects measurements and images of everything in sight, data other than that required for the original purpose is automatically available for different applications at any time such as that for monitoring open-pit slopes of high walls and internal dumps.

Safety issues in OC mines - Reduction in dangers associated with blasting

- Use of explosive is inherently dangerous.
- New techniques, some of which are given below, can considerably reduce the dangers associated with fly-rocks, inadvertent blasting, fumes etc.
  - ✓ Digital Energy Control System
  - ✓ Pyro-Breaking Capsules (PBC)
  - ✓ Threshold Blasting Technology

Co-Operation Required

- Detection and mapping of old and unapproachable workings & safety barrier for adjacent workings.
- Suitable support system for old workings & for hard roof conditions both for bord & pillar and long-wall mining system.
- Adoption of advanced blasting techniques involving Digital Energy Control System, Pyro-Breaking Capsules and Threshold Blasting Technology at suitable Indian locations.
- Suitable techniques for mine fire mapping by thermal infra-red remote-sensing method may be explored to detect fire.

Co-Operation Required – Mines Rescue

- Advancement made in the Rescue Services including rescue equipment.
- Procedures & Techniques for locating & rescue of trapped miners in UG Mines.
- Provision of rescue setup & services for mining industry.


THANK YOU