



Design and Installation of Refuge Chambers

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Simtars



Some examples

- Courriers mine in 1906 coal dust explosion -

20 days after the explosion 13 survivors found their way out of the mine and another man 5 days later.

South Africa

- Hlobane, 1983: 68 dead - Self-rescuers coalmines.
- Kinross, 1987 : 177 dead - Self-rescuers goldmines.
- Middelbult, 1993: 53 dead - Leon commission.

Australia

- Moura No. 4, 1986: 12 dead - Filter self rescuers, Flame proof lamps.
- Moura No. 2, 1994: 11 dead - Filter self rescuers.
Warden's Inquiry led to the development of new safety standards.



Points to discuss

- How did matters occur in South Africa.
- Why refuge bays in SA.
- What were expected from them.
- The progress in Queensland.
- Some experiences.
- Present feelings.



The SA Coal mining environment

- Long distances to sections(3-4 kms)
- Sections over a km in length
- Mostly bord an pillar mining
- Up to six sections per shaft
- Up to thirty people per section

Workers would be in large numbers and geographically expanded



Decision to install refuge bays

- Scenario development and planning.
- No alternative solutions to identified problems.
- Best horse for the course.
- Drew up general specifications.
- Mines to develop details.



Design issues -SA

- To withstand an overpressure event of 20psi.
- First one needs to be within 600 meters from where workers work.
- Needs positive pressure inside bay – air supply.
- Doors to create seal.
- Well signed or identified.
- Communications to surface.
- Provision of food, water and sanitation facilities.



Air supply

Reason

- Supply of breathing air.
- Creation of positive pressure.
- Cooling of environment.

Method

- Compressed air - where it is available.
- Surface borehole with fan.
- Oxygen generators or bottles. (no pressure)



Communication issues

- Need for leadership.
- Cannot communicate with SCSRs and only limited when using CABAs.
- Problems with one-way communications.
- Need for consolidation of actions.



Historic proof

- Refuge bays have worked in South Africa and have saved lives. (elsewhere as well)
- Gloria - even after four days.
- Emaswati- colliery.
- Canada and Tasmania
- People have also died in mines with refuge bays.



The QLD mining environment

- Low numbers of workers.
- Concentrated mining. (high seams, LWs)
- High air speeds- quick pollution.
- Less prescriptive regulation.
- High emphasis on management of risks and use of safety management plans.

Changeover and communication stations

Task group 4 Recommendations

- Intervals based on person travelling on foot.
- Readily locatable and accessible.
- To resist low intensity explosions.
- Provided with respirable air.
- Provided with robust communications.
- Method to determine toxicity and oxygen content of air.
- Sized to cater for demand.



Emergency exercise experience.

- Communications a problem.
SCSRs and CABAs
- Changeover to EBAs a problem.
- Social environment could cause problems.
- Decision making in aftermath –time problem.
- Travelling and escape routes can be beyond the capabilities of rescue crews. (2 mile long walls)
- Not all men are equal.
- Even in the simulated exercises, things are not that easy.



Historic reality- QLD

- Have held exercises every year.
- Have identified issues and made alterations.
- Industry is highly committed.
- Have had successes and failures.
- No real emergencies have occurred to test the present systems.



Some concluding thoughts

- Refuge bays, emergency shelters , safe havens , changeover stations – same concept.
- Not easy to install and maintain.
- Quite a few alternatives.
- Not the only solution, just part of a system.
- Must suit, and fit in with system at the mine.
- Costs money, effort and other resources.
- The alternative??