# Training to Manage Emergencies in Coal Mines

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# Mines Rescue in Queensland

- First rescue team training commenced in 1909
- Provide equipment & training for underground coal mines
- Provide mine Inertisation capability to coal mines
- Deliver ERT training for surface coal mining operations
- Deliver mine emergency management system training to coal mines
- Funded by membership levy & Fee for Service activities

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# Coal Mine Emergencies

## Underground Mines

- Isolated environments
- High energy release events
- Damage to infrastructure inhibits management
  - Communications & Gas monitoring
- Events may continue over extended periods of time

## Surface Mines

- Large energy events involving vehicles, explosives or strata
- Can also continue over extended periods

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# Coal Mine Emergencies

- In the absence of a structured and trained approach to managing these events;
  - errors will be made,
  - confrontation may develop, and
  - stress levels will rise

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# Incident Management Systems

- Queensland mines annually test coal mine emergency response
- An early recommendation was to establish clear organisational structures for the management of emergency events in coal mines
- The Australasian Inter-agency Incident Management System (AIIMS) is an emergency management system utilised by firefighting, police and other emergency services

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# Mine Emergency Management System (MEMS)

- In 2005 QMRS commenced training mine personnel in MEMS
- MEMS was adapted from AIIMS to reflect mining legislation and the complications of underground mining
- MEMS functions around;
  - A central decision making authority
  - A structured approach to planning and scenario evaluation, operational activity management and logistics coordination
  - Objective setting to progress the event recovery
  - Incident Action Plans to implement objectives

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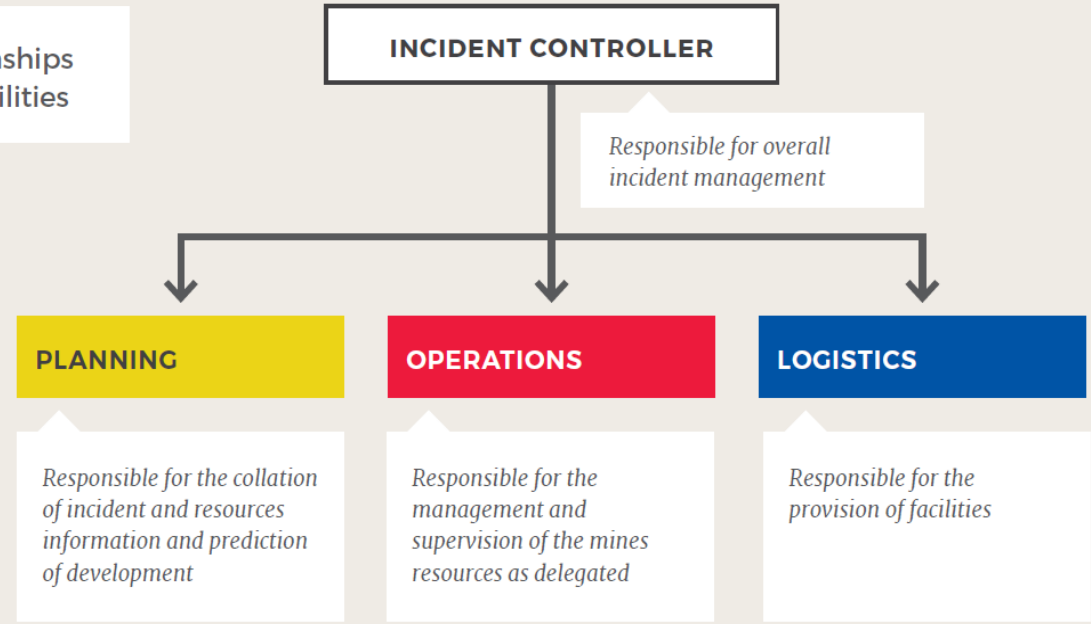
# MEMS Structure

MEMS Relationships and Responsibilities

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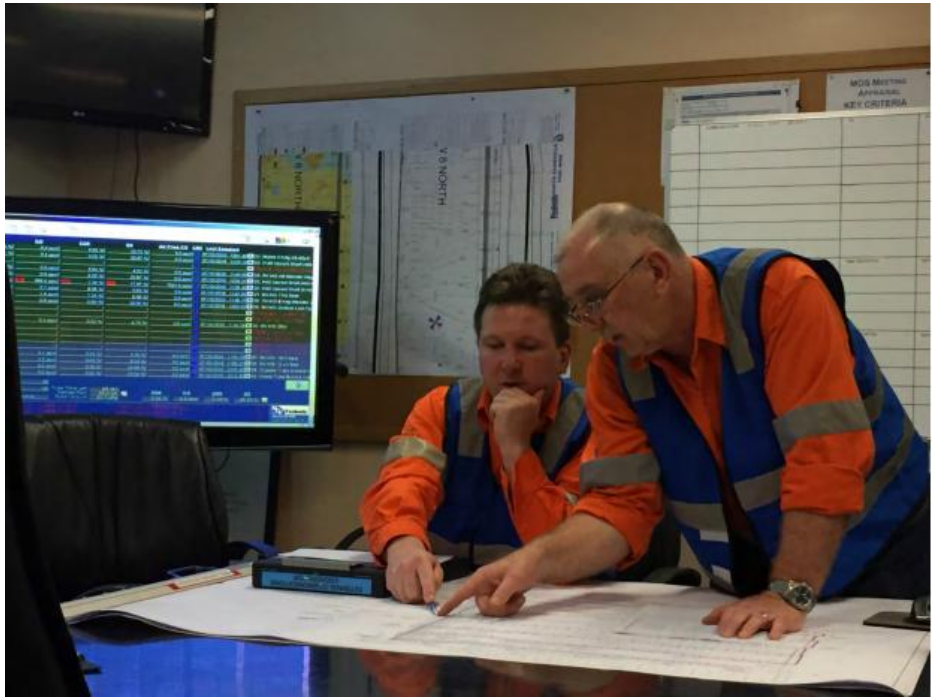
# MEMS Roles & Responsibilities

## Incident Controller

- Responsible for managing the incident
- Forms the Incident Management Team (IMT)
- Sets objectives in association with IMT
- Approves Action Plans developed prior to implementation
- Removed from detailed operational activities



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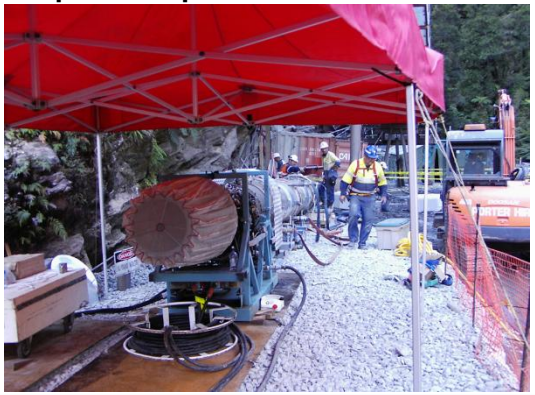
# MEMS Roles & Responsibilities

## Planning Coordinator

- A mine emergency requires information to be evaluated, scenarios to be considered and solution options to be developed.
- Develops action plans for the IMT to consider for implementation to achieve objectives (strategies)
- Obtains technical specialist advice/support as required
- Prepares plans for role handovers as event extends



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# MEMS Roles & Responsibilities

**Operations Coordinator**

- Responsible for the safety & management of operational resources
- Assess adequacy of available resources

**Logistic Coordinator**

- Source required resources for planning/operations
- Assist in preparing action and communications plans

All coordinators need to establish structures that maintain an adequate span of control

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# Incident Action Planning

- To move an event forward an Objective needs to be set.
- Consider the current event situation – what is known
- Strategies are developed to achieve the current objective
- An operational plan, tactics, is then implemented to execute the strategy
- The Incident Action Plan must have final approval of the Incident Controller prior to implementation

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# Information Management Systems

- An effective information management and decision support system will greatly increase the ability of the IMT to manage an emergency event
- In 2011 QMRS, as part of an ACARP project, made the Mine Re-entry Assessment System available to industry (MRAS).
- MRAS assists the IMT to;
    - consider event hazards in a structured way,
    - track action status as the event develops,
    - capture information and prepare reports.

Current Situation Report

Incident Date: 19/11/2010
Incident Time: 15:30
Incident Type: Fire

Incident Description: Explosions and subsequent fire at Pike River Mine. Mine has been sealed and fire brought under control.

| Date | Time | Current Situation |
|---|---|---|
| 3/07/2011 | 18:00 | Hebel block wall completed 1715hrs. Drift effectivley sealed @170m All atmospheric conditions stable throughout mine. O2 2.26% @potal mointor (Inbye Seal). Objective achieved, IMT dissolved 1800hrs. |
| 3/07/2011 | 9:38 | IMT convened 0845hrs. Concurred to complete seal with Hebel blocks and moratr. Will require approx 80 blocks. Team 1 to establish base for for wall on top of grout. Small iincrease in 02 at PRDH45 (Expected.) O2 falling at Portal 1.9%.. |
| 2/07/2011 | 19:34 | Last team out 1929hrs. Remaining distance to roof 1.9m RH side 1.6m Lh side. Pumping slowand strata binder setting slwalso pushing seal out. Proposal to finish seal with Hebel blocks to roof with mortar. |
| 2/07/2011 | 15:04 | Team entered 1100hrs, pumping recommenced 1200hrs. Product quality poor for the first hour. Team 1 exite 1300hrs. Team 2 entered 1315hrs pumped to 2.2m exited 1515. Grout flow slow. Team 2 enterd 1530 due out 1730. |
| 2/07/2011 | 10:19 | IMT resumed 09:00; Atmospheric readings stable all TARPS remain stable. TB pressure slight increase due to frost. Lines continully monitored for failure. Seal fill tactics agreed and confirmed as per decision precious IMT 2 teams to portal 10:00hrs. |
| 1/07/2011 | 19:00 | IMT concurred to fill remainder of seal with 6m3 Hebel Bloccks and 6m3 Strata Binder. Pump with " Blue Heeler" and Clarke M150 pumps. Contingency to use Pitcrete spray and Picolla pump. All to start normal time tomorrow. |
| 1/07/2011 | 17:30 | Pumping continued for 5 hrs seal fill to 1.6m. IMT informed at 1700hrs not enough grout to complete job only 1m left. IMT reconvenned 17:15. All atmospheric conditions stable. Team 2 exited 18:20hrs. |
| 1/07/2011 | 11:00 | IMT resumed 800hrs All gas readings and trends within acceptale limits. Permit to Enter issued to 0900 - 2000hrs. Team 1 entered @ 1015hrs. Pumping commenced 2 lines blocked. 1 line left and newline ordered from town. |

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# MEMS Scalability

- For a small incident the controller will manage all functions.
- As incident size & complexity grows delegation of functions occurs.
- As an event is brought under control resources can be released or allocated to returning the mine to operation
- As such the MEMS structure expands and contracts with the progress of the event.

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# Application of MEMS

- The principles and structure of MEMS can apply from small to the largest of events
- MEMS applies equally well to surface coal and non coal mine incident management
- Training is delivered via scenario based activities along with theory in the basic psychology of decision making, communicating with the media and in planning for resourcing extended events.
- Using the same techniques to manage other major activities at mines will increase familiarity with the process

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# Conclusion

- Application of MEMS at Simulated Emergency events has met with varying success
- Research into AIIMS and by association MEMS indicates that without comprehensive training and developed team relationships these systems are likely to fail
- Most mines have their people attend the initial training course
- The same techniques need to be applied to all emergency simulations and where possible integrated into other mine activities to develop familiarity
- Utilising appropriate information support technology, such as MRAS, will aid the control and communication of an event

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# Questions

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