

Explosives Inspectorate OCE Seminars





Role of the Queensland Explosives Inspectorate

- The Qld Explosives Inspectorate is responsible for safety and security in the explosives and fireworks industries. It works closely with industry and the community to ensure the safety of people working in these industries and the general public.
- The Qld Explosive Inspectorate also:
 - Processes and approves explosives licence applications
 - Offers storage and disposal facilities for commercial explosives (through the government explosives reserves)
 - Collects and disposes of commercial explosives.



Qld Explosives Inspectorate Framework

- Broken into 3 regions
- Northern (Airlie Beach – Northern Territory Border – Cape York)
- Central (Airlie Beach – Bundaberg – Northern Territory Border)
- Southern (Bundaberg – Northern Territory Border – Qld/ NSW Border)
- Head Office is located in Brisbane.
- **24 Hour Emergency Response: 1300 739 868**



Scheduled audits and Inspections

- The Qld Explosives Inspectorate conducts scheduled audits/ inspections on all facets of the explosives life cycle:
 - Import
 - Manufacture (Manufacture Plants and on-site manufacture)
 - Transport (AEC and DG Code)
 - Storage
 - Use
- Inspections/ Audits also take into consideration Explosives Security:
 - During transport (Planned journey routes, Security Seals, Authorised Drivers)
 - Storage facilities – Detectable theft, Unsupervised access
 - During use – Unsupervised access
- Explosive Inspectors do not draft M.R.E.s. We compile full inspection reports which are distributed to the Nominated Contact Person on the relevant Explosive Licence for which the inspection was conducted.



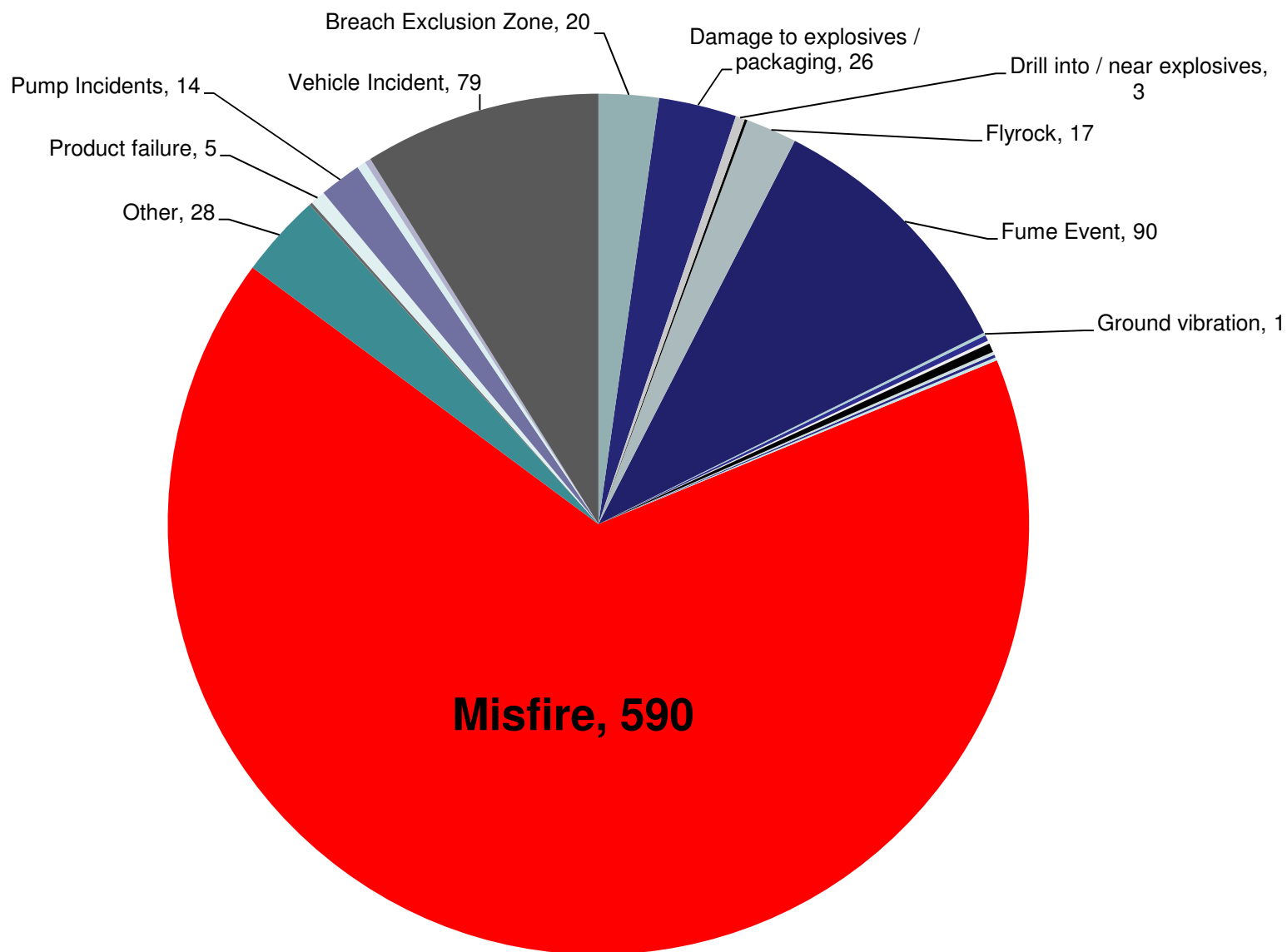
Hotspots for Central Region this year include:

- Misfire prevention
- Flyrock
- Setting Exclusion zones – Blast and Fume
- Blast Design
- Explosives Security



Incidents

- Total incidents for Central Region (2011 – 12/04/2015) – 889
 - 66% were misfires
 - 10% were fume events
- Significant incidents
 - Misfires
 - Blast Design Planning
 - Multi-Bench
 - Mid-Splits
 - Fly rock
 - Vehicle Incidents – Angellala Creek
 - Explosive products run over on bench
 - Detonator down lines snagged on equipment (Stretch, Snap, Slap and Shoot)





Reporting of Incidents

- Explosives Act 1999 Section 55

55 Notice of explosives incident

The authority holder whose explosives are involved in an explosives incident must immediately give the Chief Inspector written notice of the incident and any loss of life, personal injury or property damage caused by the incident.

Maximum penalty – 170 penalty units



Definition of an Explosive Incident

As per the Explosives Act 1999:

explosives incident means any of the following events involving an explosive—

- (a) an explosive is, or appears to have been, lost or stolen;
- (b) an accidental explosion, fire or spillage;
- (c) the death of or an injury to a person;
- (d) unexpected damage to property;
- (e) an event, including a misfire, with the potential to cause any of the events mentioned in paragraphs (a) to (d), other than an event that normally happens when handling or using an explosive.

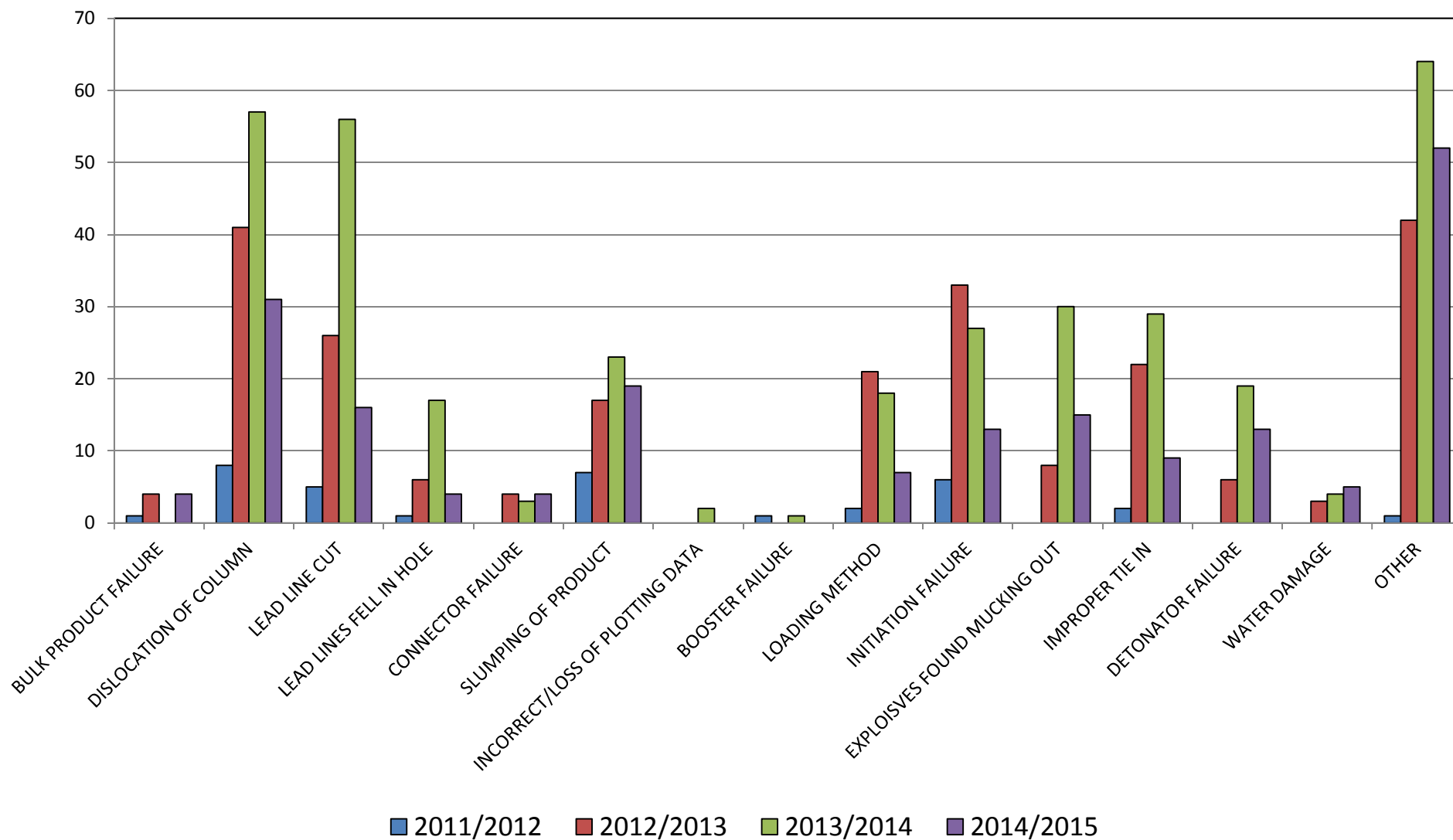


What is a Misfire...??

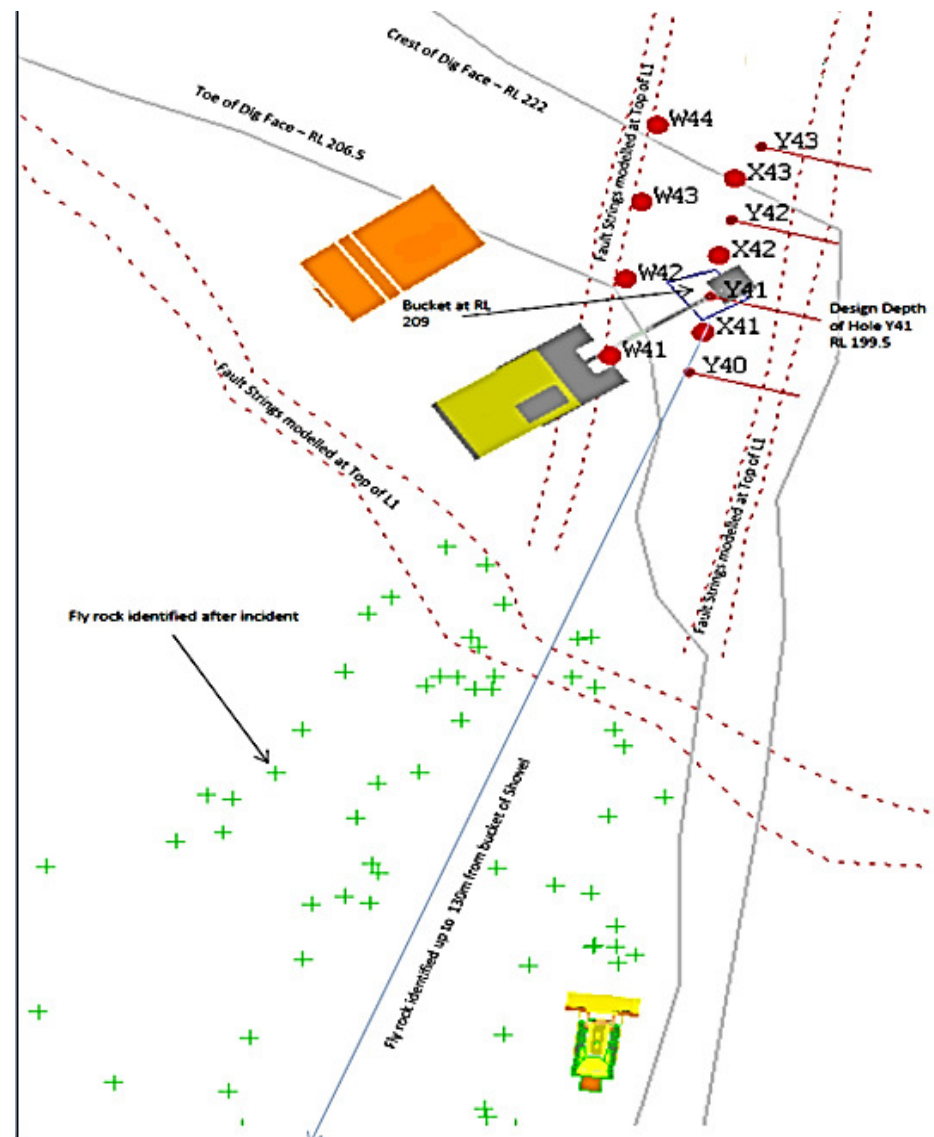
As defined in Schedule 7 of the Explosives Regulation 2003:

misfire means a charge, or part of a charge, fails to explode or ignite.

Misfires Broken Down into Categories per Year 2011- 2015



Misfire Unplanned Initiation





Misfire Records

- Should be a process to track known live misfires until they have been completely excavated and cleared.
- How does your site track any known live misfires???




Detonators – Non-electric and Electronic

- Using electronic detonators is not the solution to eliminating misfires.
- Sites transitioning from non-electric to electronic initiating systems must implement a thorough change management process.
- Causes of misfires when using electronics:
- Some brands are not as robust as non-electric detonators. Easier to cut off during loading practices and stemming practices
- Down lines more prone to snapping when holes slump.
- On-bench acquittal processes must be accurate.

Fly-Rock

- Definition of Fly-Rock (AS 2187.0 Terminology):
 - Material thrown beyond the blast site by a blast.





Exclusion Zones Used in the Central Region Open Cut Coal Mines

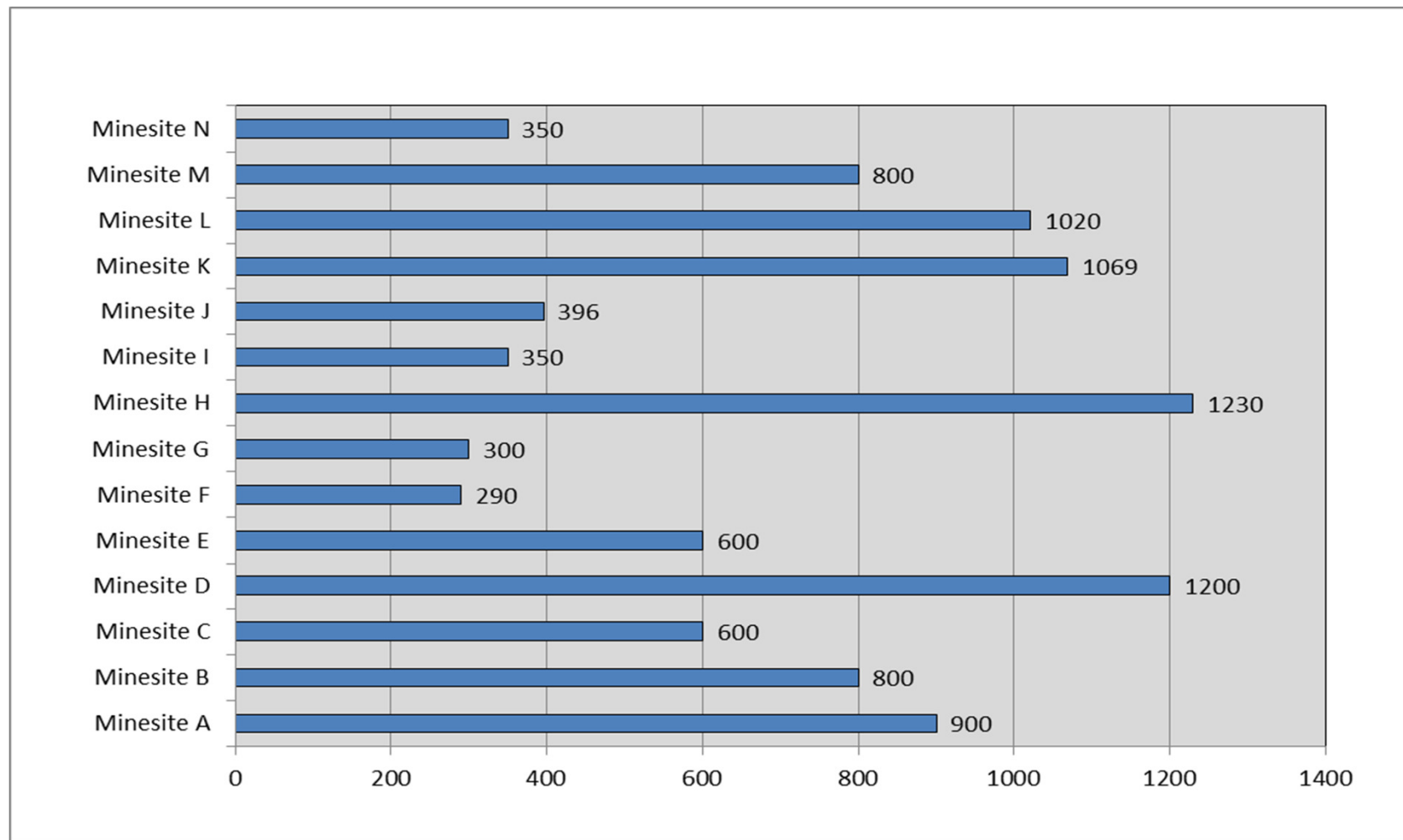
Equipment

- Minimum 200 metres
- Minimum 300 metres

Personnel

- Minimum 600 metres for personnel
or
- Minimum 1000 metres for personnel
or
- Scale Depth of Burial (SDB) calculation

Flyrock Incidents – Distances travelled



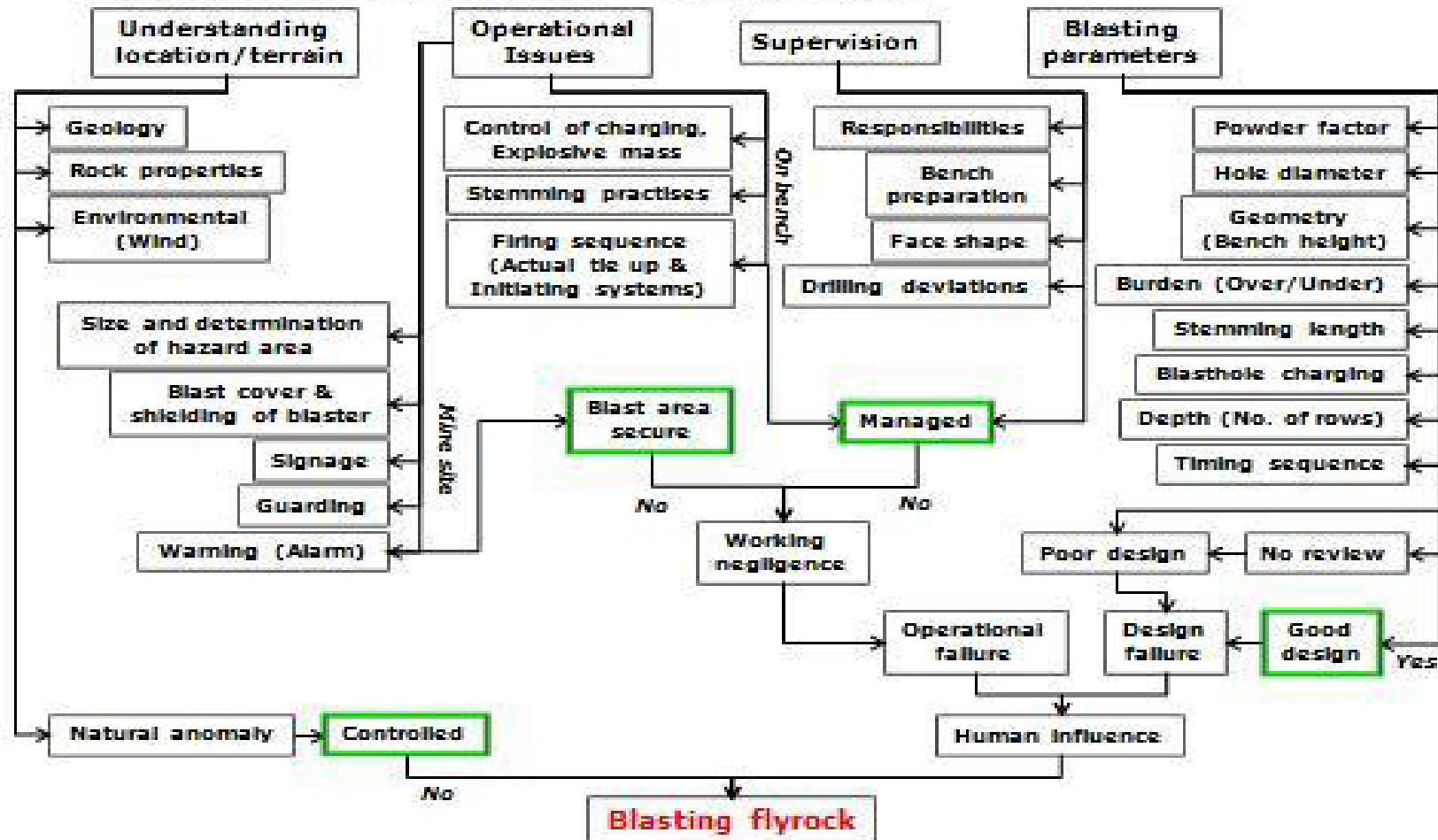


Four of the Main Causes of Fly-Rock are Split Under “Natural Anomaly” and “Human Influence”

- Natural anomaly
 - Understanding location/terrain
- Human influence
 - Operational issues
 - Mine site
 - On bench
 - Supervision
 - Blasting parameters

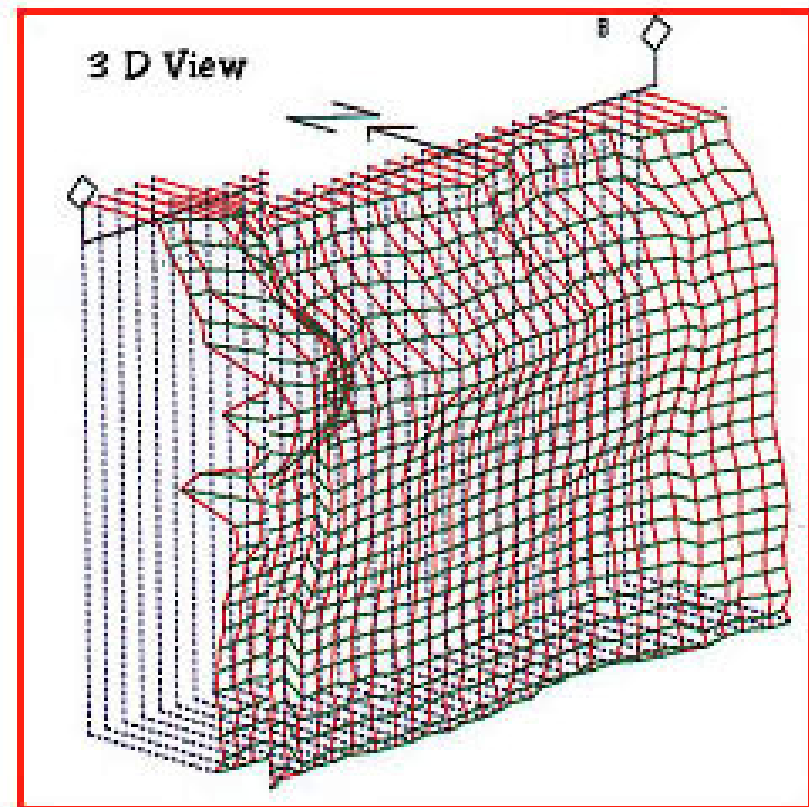
Abstract from “A Practical Approach to Managing Control of Flyrock” by Simon Tose
Paper submitted to the International Society of Explosives Engineers

Mitigating Flyrock risk – Field Guide

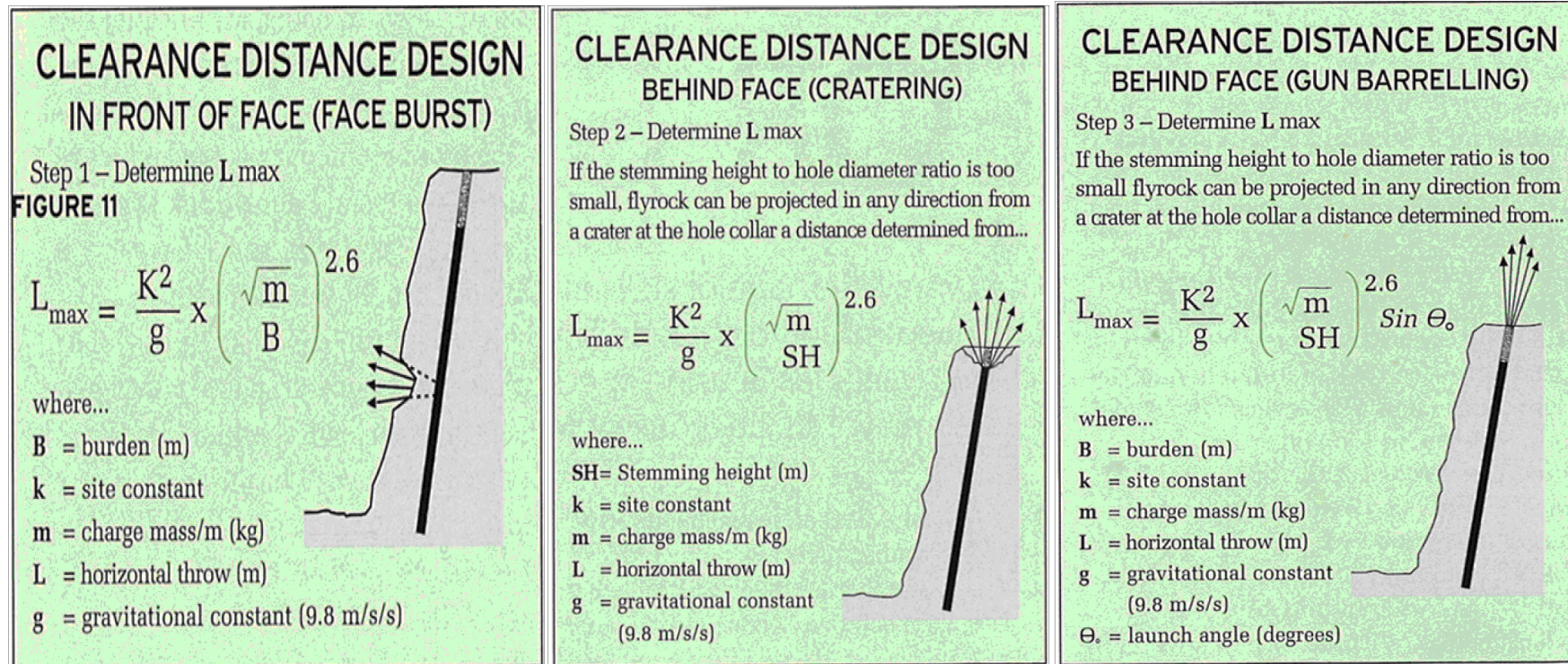


Abstract from “A Practical Approach to Managing Control of Flyrock” by Simon Tose
 Paper submitted to the International Society of Explosives Engineers

Face Checks – Physical or Laser Profile?



Calculations Used to Predict Fly-Rock for SDB



Reference: Moore A, Richards A, 2006, November 2006, Quarry Magazine Pheonix Publishing (PP 26 to PP27), Melbourne.



Considerations When Using Fly-Rock Models

- Explosives Safety Alert 72 and Explosives Information Bulletin 69, outline the risks and considerations that need to be applied in determining fly-rock/ blast exclusion zones.
- Other considerations in relation to the use of fly-rock calculations include:
 - Base lining site parameters to develop site assumptions
 - Auditable trail of how site has determined the “K” factor
 - Inspections and survey of actual blast parameters including burden, spacing, stemming length and condition, face and geological anomalies when compared to design
 - Notification, analysis and change management if overloading or a change from design occurs
 - Applying an adequate factor of safety
 - Human Error elimination
 - Pre-design and pre-blast processes
 - Ongoing reconciliation of actual fly-rock distance to the model prediction
 - Triggers for investigation where fly-rock exceeds model prediction
 - Blast management plan documentation as per Coal Mining Safety and Health Regulation Section 115 – Referencing AS 2187 “Explosives Storage, Transport and Use”
 - Relevant personnel trained and competent in process
 - Work force education
 - AS 2187.2 Appendix E – Fly-rock and Fly, as well as Appendix L – Exclusion Zones
 - Shot risk assessment and processes for shotfirer or blast controller to increase exclusion zone in consultation with design engineers.



Blast Controlling and Blast Guarding

- Shotfirers are in control of everything inside the demarcated blast area.
- Blast controllers are in charge of everything outside of the demarcated blast area.
- Blast Guards must be competent and aware of their responsibilities.



Breach of exclusion zones

- Driving past demarcation – Some sites are implementing chicanes at entrances to blast areas
- Bypassing blast guards – Public Roads
- Personnel being left inside Blast Exclusion Zones
- Equipment taking short cuts and traversing over bunds through loaded blast patterns

Fume



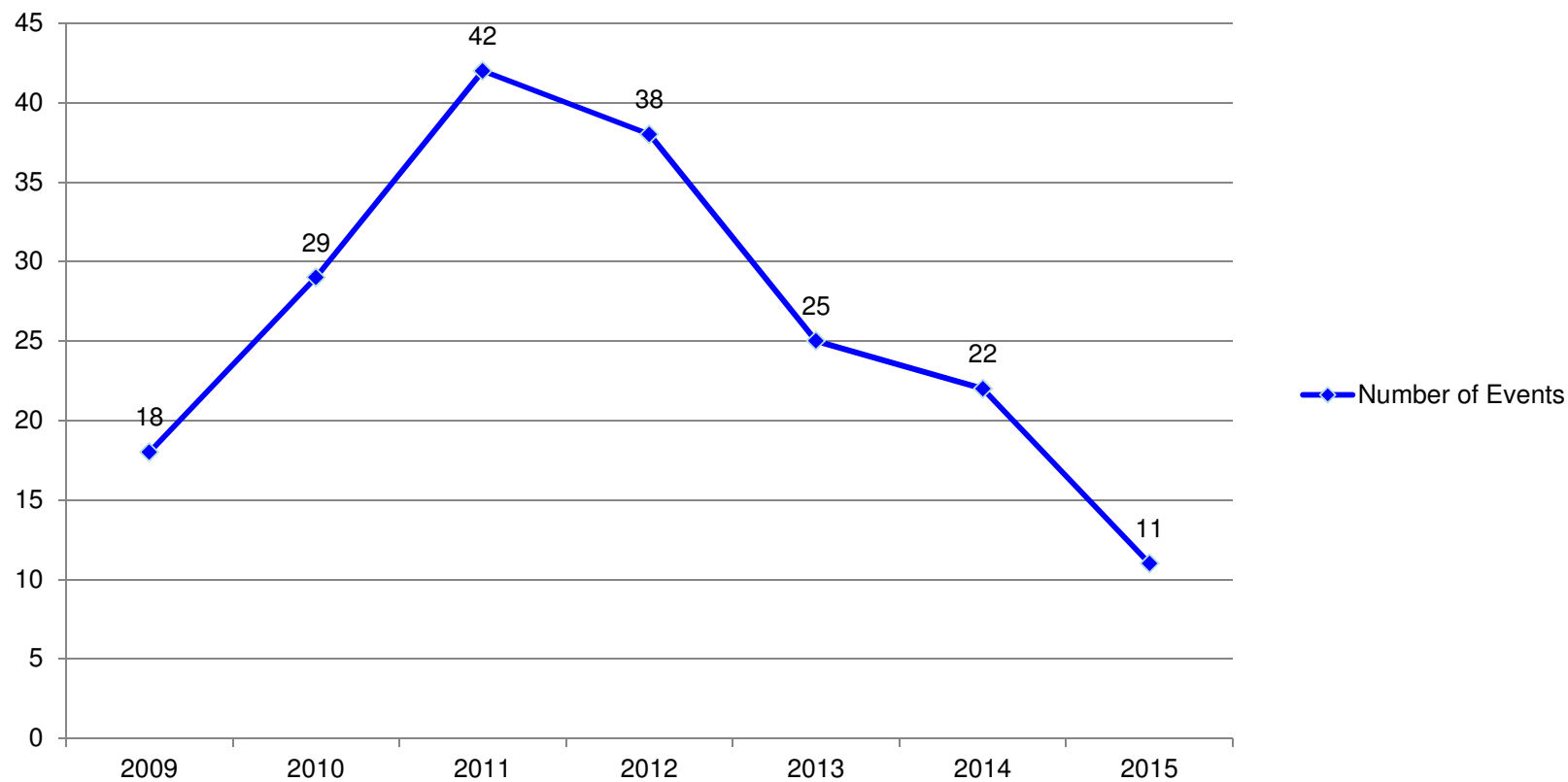


Fume Management

- Fume Management Zones should take into account site geographical layouts (such as void corridors), which have the potential to funnel wind/ dust/ fume.
- Static fume monitors must be numbered and GPS locations taken when being located in preparation for a blast.
- Fume events in 2015 have breached Fume Management Zones by distances up to 4 km. With fume travelling up to 8 km.
- One incident even saw the Fume Management Zone in a position 180 degrees to the actual wind direction...!!
- What processes does your site have in place for unplanned evacuations in the event of a fume event breaching the fume management zone?

Fume and monitoring

Number of Fume Events 2009 – 1st May 2015

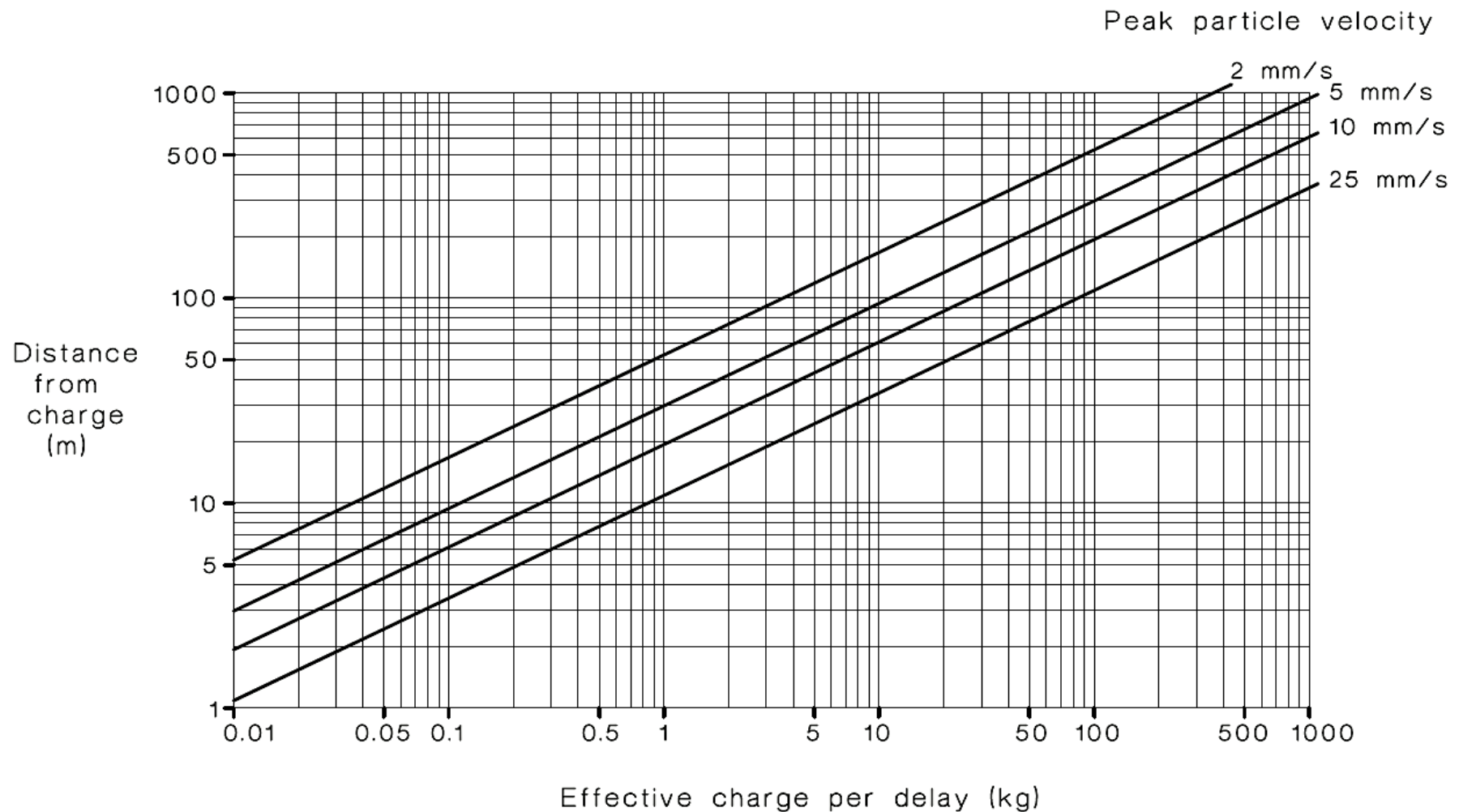




Blasting Environmental Considerations

- There are other environmental impacts, such as dust, but the main two impacts are:
 1. Airblast overpressure, deciBels
 - Typical limits 115 dB(lin) for 95% of blasts and up to 120 dB(lin) maximum, unless agreement is reached with the occupier that a higher limit may apply.
 2. Ground Vibration, mm/s peak particle velocity.
 - Typical limits 5mm/s for 95% of blasts and up to 10mm/s maximum, unless agreement is reached with the occupier that a higher limit may apply.
 3. Site may have reduced limits imposed on the Environmental Agreement

Appendix J (AS 2187.2) Ground Vibration





Ground Vibration and Air Overpressure

- Does your site monitor these??
- Ground vibration can impact:
 - Site structures (structural integrity), such as CHPPs, office buildings and maintenance personnel working under supported machinery
 - Infrastructure off lease, such as rail lines/ power lines, public roads..

Explosives Security





Explosives Security

- During inspections, look for the following:
 - Signs of unauthorised access/ attempted unauthorised access
 - Signs of detectable theft – use of security seals
 - Night shift deliveries – Are transport drivers authorised for unsupervised access to reload compounds?



Reference Material

- Coal Mining Safety and Health Act 1999
- Coal Mining Safety and Health Regulation 2001
- Queensland Explosives Act 1999
- Queensland Explosives Regulation 2003
- Australian Standard 2187.2 – Explosives Storage and Use

Part 2: Use of Explosives

- Queensland Explosive Inspectorate Information Bulletin 53 – Storage Requirements for Security-Sensitive Ammonium Nitrate (SSAN)
- Queensland Guidance Note 10 – Handling Explosives in Surface Mines and Quarries

Any Questions...???

