

Blasting Incident Lessons Learnt

Small Mines Roadshow

February / March / April 2025



What we will Cover

- Recap of the incident
- The site
- The Safety Management System
- What went wrong on the day
- Lessons learnt
- Recommendations for Quarries

What happens when things go wrong ?



The Incident

A worker from a concrete batching plant adjacent to the quarry was in the exclusion zone at a temporary pump when the blast went off!



What happened ?

He felt the blast wave
and dove behind the
concrete truck then...

Pieces of rock started to fall in the
water and hitting the truck



Fly Rock

A neighbour also alleged that fly rock landed about 20 metres from where he was standing near his house





- Blast location
- Worker $\approx 300\text{m}$
- Reported Fly Rock $\approx 500\text{m}$

Both the worker and neighbour were shaken up...

Due to pure chance, they did not receive any injuries

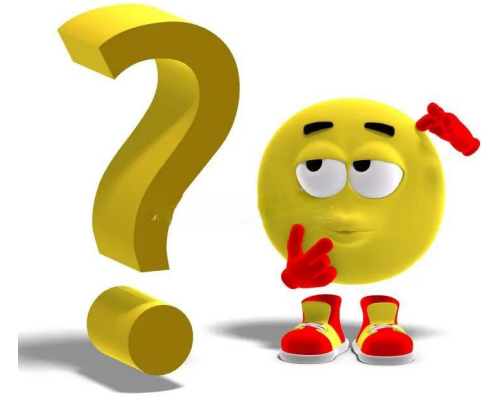
How did Quarry management feel???

Relief

Regret

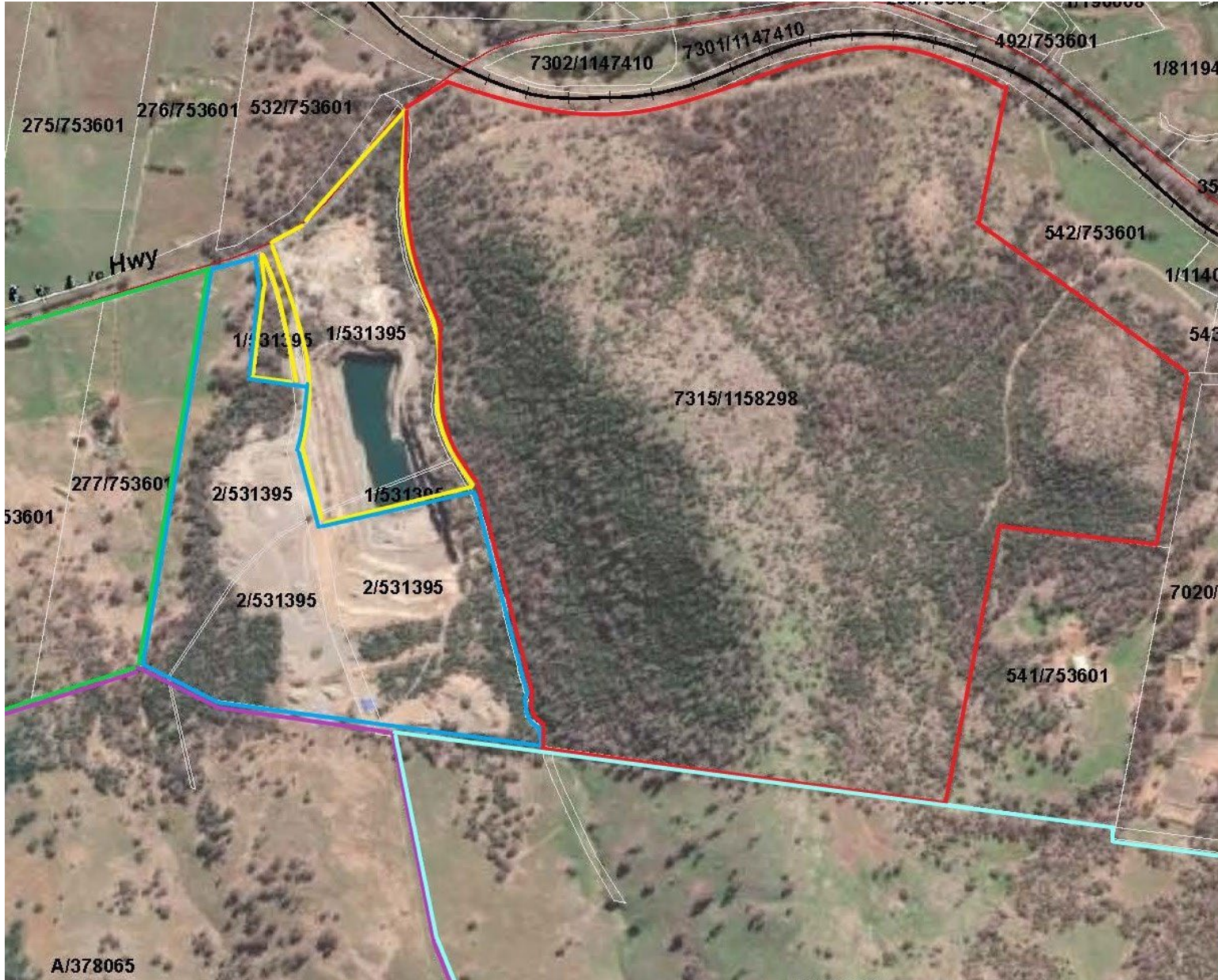
Embarrassment

How did this happen



The site

- The Quarry was in a complex locality for blasting.
- The blast exclusion zone included :
 - Public reserve
 - Concrete batching plant business (separate entity)
 - Neighbour's house
 - 2 other farms (paddocks only)



- Quarry
- Batching Plant
- Public Reserve
- Neighbours house
- Farmer 1 paddock
- Farmer 2 paddock

Exclusion zone



Safety Management System

- The Quarry used their own shot firing team
- They had in place:
 - Explosive Control Plan (ECP)
 - Blast Management Plan (BMP)
 - Blast Supervisor (BEUL and security clearance)
 - Shotfirer (BEUL and security clearance)

Safety Management System

The main issues identified with the SMS were:

- The ECP covered a number of quarries (not site specific)
- Generic risk assessment for blasting
- Simplistic exclusion zone map which didn't address the management of:
 - The public reserve (no signage, clearance procedures or blast guarding)
 - The batching plant (no notification or clearance procedures, no blast guarding)
 - The neighbours house (no clearance procedures)
 - The two neighbouring farmers(no notification procedures)

What went wrong on the day

- The blast at the Quarry was delayed
- There was a delay in blast guards being posted

Timeline

- 11:00am the batching plant worker was told the blast was at 1:00pm
- 12:30pm the worker left the site and went into town
- The worker was not notified of the delay in blast time
- 1:30pm batching plant worker returned – no blast guard at front gate
- He drove past the front gate

As far as he was concerned the blast had occurred, so he went to his office on the batching plant site

Quarry Front Gate - Any issues???



No time on blast
sign

Front gate of Quarry



Timeline of events

- At about 1:45pm the shotfirer recalls looking down into the pit
- Quarry cleared of personnel (Batching plant had no clearance process)
- The worker went down to a temporary pump in the pit
- At about 2:00pm the blast guards travelled to guard posts
- Blast siren sounded through-out quarry
- Then at 2:23pmBOOM!!!!

Contributory factors

- Quarry manager was filling in at the Quarry
- Blast supervisor was stepping up
- Shotfirer was stepping up
- Blast supervisor & shotfirer had minimal training in the ECP and BMP.
- There was no blast guard briefing conducted
- There were no procedures in place to:
 - Notify the batching plant of blasting
 - Clear the batching plant area prior to blasting
 - Notify of delayed blasts

Other issues with blast

No records found of:

- Assessment of free face pre-blast
- Drilling logs
- Assessment of bore holes -no bore tracking
- Load sheet
- Post loading review of risk assessment for the blast
- No video of the blast

How do you improve if you don't know what went wrong?

“Those that fail to learn from history are doomed to repeat it.”–Winston Churchill 1948

Investigation Outcome

- Company pleaded guilty
- Fined \$150,000
- Cost ordered of \$84,500

Lessons learnt

- Risk assessments should be site specific
- Explosive Control Plan's should be site specific
- Risk assessments should include competent people and the right information
- Blast Management Plan's should be blast specific
- Post loading review of the blast risk assessment should be done
- When people are stepping up make sure they are competent in applying the ECP

Lessons learnt

ECP should include:

- Notification procedures that are documented and include:
 - All required notification details (that are up to date)
 - Include phone contacts and email details
 - Procedures to manage notification of delayed blasts
 - Instruction on managing failed notification attempts
- Clear instruction on the use of blast notification signage
- Clear instruction on how to clear the exclusion zone

Lessons learnt

Other learnings are:

- Workers who use the ECP should be trained and competent
- Training and assessment needs to be documented
- Audits on the application of ECP should be undertaken
- All records of the blast need to be made and kept
- Recording blasts with a drone is beneficial
- Test the blast team communication with shotfirer prior to blasting
- A pre blast checklist with supervisor sign off ensures oversight.

Recommendations

Review your risk assessments

- Review the ECP, consider requirements/guidance in :
- Work Health Safety (M&PS) Regulation 2022 - s30/Schedule 2
- Explosives Act 2003
- Explosives Regulation 2024
- Australian Standard 2187
- Code of Practice: On-Bench Practices for open cut mines and quarries (AEISG).
- Code of Practice: Blast Guarding in an Open Cut Mining Environment (AEISG).
- Guide - Health and Safety at Quarries (Regulators website)

Explosive Control Plan (ECP) Vs Blast Management Plan (BMP)

Explosive Control Plan (Quarry Operator)

- Required by legislation
- Sets out how the quarry operator will manage the risks from blasting
- Requirements detailed in schedule 2 of the WHS(MPS) Reg 2022
- The ECP can refer to the contractors BMP
- Should detail the review and acceptance process between Operator and Contractor.

Blast Management Plan (contractor)

- Document that provides information about the blast and the controls to be implemented to manage the hazards from the blast.
- The explosive contractor develops this for each blast to manage the hazards during the blasting life cycle in accordance with AS 2187.
- Forms part of the contractor health and safety management plan which needs review and written acceptance.

ECP and BMP

- Work hand in hand to safely manage the blast
- Forms part of the review and sign off undertaken between operator and contractor

Example

- ECP may detail how the Quarry will manage the exclusion zone i.e. notifications, clearance procedures and blast guarding procedures
- BMP may detail the blast design, explosive management, security and the required exclusion zone for the blast

Make sure the plans work together and meet the requirements of schedule 2, and is clear on **who does what, when & how.**

Resources

Small scale mine safety management kit

The toolkit is not current but can be used as a starting point.

Completion of the forms does not ensure the mine operator has met their obligations with respect to the Work Health and Safety legislation.



17.0 EXPLOSIVES CONTROL PLAN¶

17.1 AIM: The aim of our Explosives Control Plan is to ensure that all explosives used on site are transported, stored, used, disposed and managed in a safe manner to eliminate any potential harm to workers, equipment, the environment, contractors and members of the community.¶

Our plan is designed to manage all activities associated with blasting, by ensuring the competency of persons handling and using explosives, ensuring the security of explosives on site, the correct design of blasts, the use of agreed blasting risk based checklists and procedures, the allocation of responsibilities and the promotion of consultation.¶

17.2 WHAT: The Explosives Control Plan will consist of four primary pieces of documentation, namely,¶

- → FORM 17-A – Whole of site explosives & blasting risk assessment¶
- → FORM 17-B – Blast specific check sheet¶
- → FORM 17-C – Managers Blast checklist ¶
- → FORM 17-D – Blast Plan & Report¶

These four (4) documents reference information obtained from industry publications and Australian Standard 2187 "Explosives – Storage, transport and use". The use of these documents will prompt the user in determining the appropriate actions to control drilling and blasting activities and it will enable a record to be kept of the decisions made during the process.¶

¶

Blast Design:¶

Blast sequencing will, in principle, follow the 'mine plan' and will be conducted in accordance with the operating conditions set out in the quarry development consent. The design will consider geotechnical and geological information, final terminal walls, forecast production demands and constraints such as the type and size of equipment, haul distances, road widths and road gradient. ¶

We will always review historical blast information for pattern size, powder factors, back break, fragmentation and wall failures ¶

Mark-Out-and-Drilling:¶

The area to be marked out for drilling will be prepared to provide a workplace free of hazards, including a physical barrier or windrow to separate the blast zone from the everyday quarry activities. The blast zone will be marked out and signs and/or physical

Legislation

Explosive Control Plans **HAVE TO**
comply to Schedule 2 of WH&S
(Mines and Petroleum Sites)
Regulation 2022



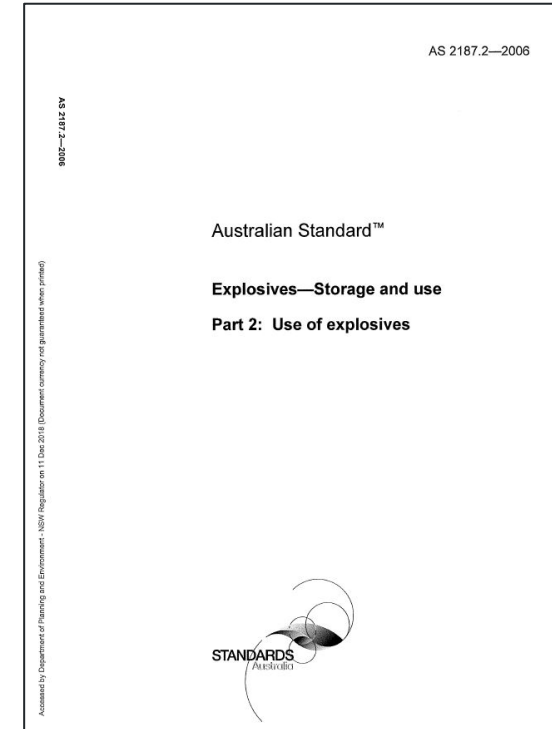
The screenshot displays the NSW Government's legislation website. The header includes the NSW Government logo and the title "NSW legislation". A navigation bar lists various categories: In force, Repealed, As made, Bills, Notification, Gazette, Tables, Information, Historical information, Search, and My favourites. Below this, a secondary navigation bar offers options like "View whole instrument", "Parent Act", "Turn history notes on", "Legislative history", and a search bar. The main content area is titled "Work Health and Safety (Mines and Petroleum Sites) Regulation 2022" and notes the current version is for 13 December 2024 to date. It highlights "Schedule 2" and provides a "Point-in-time versions" timeline with dates: 26/08/2022, 11/11/2022, 15/12/2023, and 13/12/2024. A search bar for the exact version date is also present, with "19/12/2024" entered. The bottom of the page shows the heading "Schedule 2 Principal control plans".

<https://legislation.nsw.gov.au/view/html/inforce/current/sl-2022-0509#sch.2>

Legislation

The Explosives Regulation 2024 and WH&S (Mines and Petroleum Sites) Regulation 2022 require compliance with the Australian Standard.

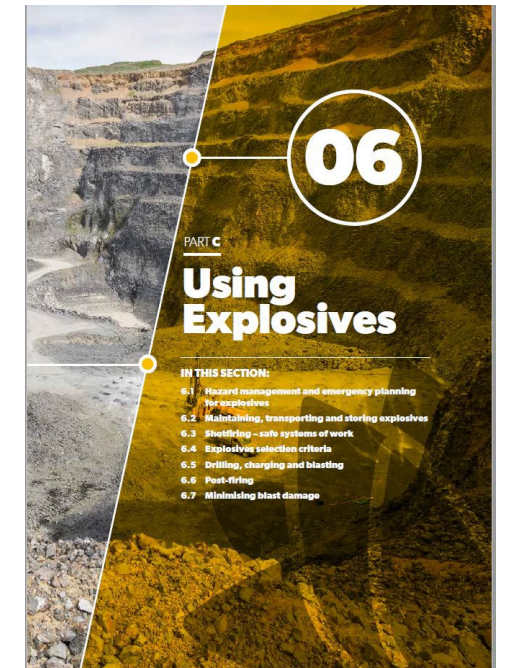
AS 2187 Explosives — Storage, transport and use.



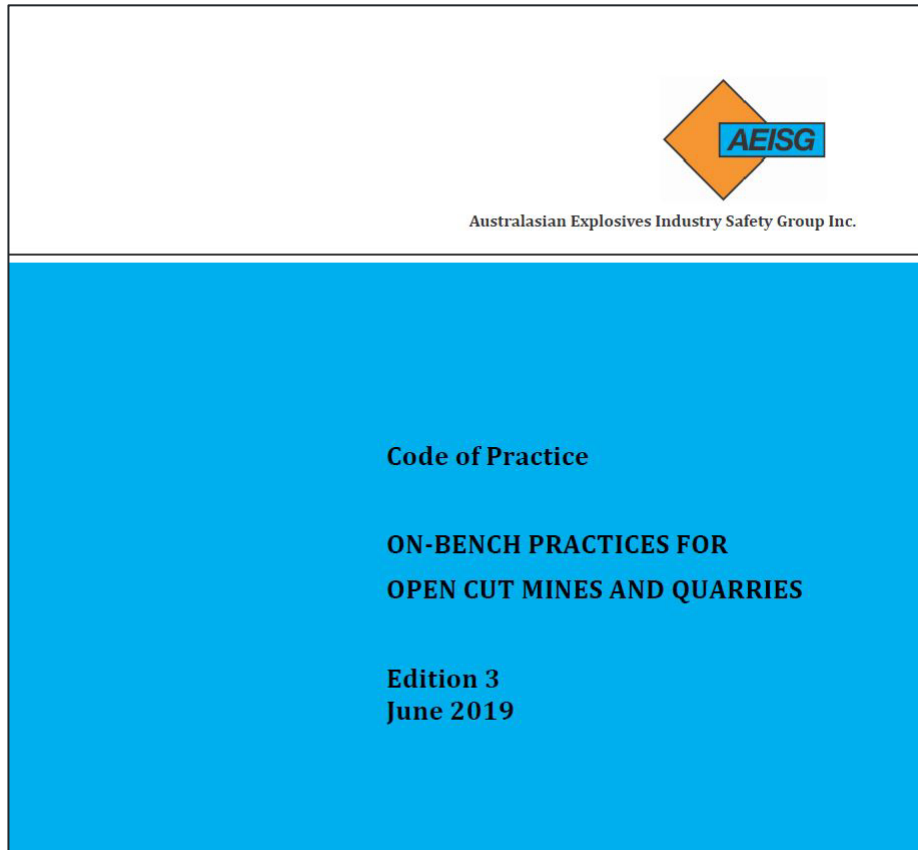
<https://legislation.nsw.gov.au/view/whole/html/inforce/current/sl-2024-0439#sec.56>

Guide - Health and Safety at Quarries

<https://www.resourcesregulator.nsw.gov.au/sites/default/files/2022-07/nsw-resources-regulator-mines-and-quarries-book-complete-v6.pdf>



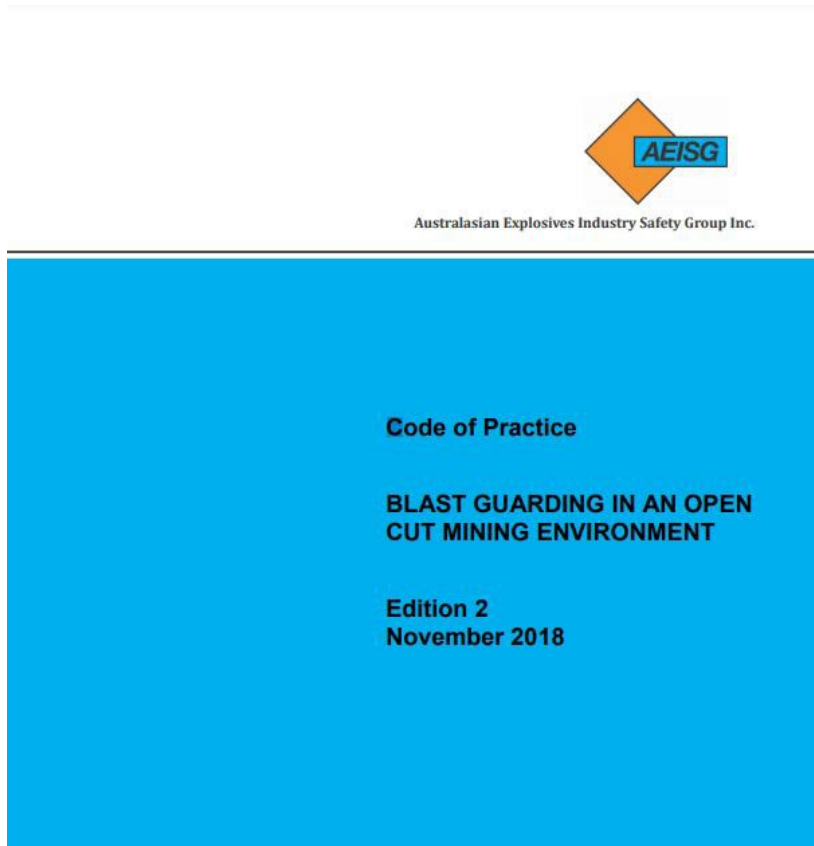
Code of Practice



On-Bench Practices for open cut mines and quarries - (AEISG)

[www. https://aeisg.org.au/wp-content/uploads/AEISG-COP-ON-BENCH-PRACTICES-FOR-OPEN-CUT-MINES-AND-QUARRIES-JUNE-EDITION-3.pdf](https://aeisg.org.au/wp-content/uploads/AEISG-COP-ON-BENCH-PRACTICES-FOR-OPEN-CUT-MINES-AND-QUARRIES-JUNE-EDITION-3.pdf)

Code of Practice



Blast Guarding in an Open Cut Mining Environment (AEISG).

www.aeiscg.org.au/wp-content/uploads/AEISG-COP-BLASTGUARDING-IN-AN-OPEN-CUT-MINING-ENVIRONMENT-NOVEMBER-EDITION-2.pdf

When things go right





Questions ?

Thank you
We hope you're having a blasting good time!!!

