

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Monorail Beam Installation and Salvage System



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



- Oaky No. 1 underground mine uses a monorail system
- Monorails common with Longwall mining
- Allow safe, efficient management of services to the mining face
- Roof-mount monorails increase safety- keeps walkways clear
- Eliminates manhandling of heavy cables and hoses
- Nature of Longwall mining means system must be constantly moved as the face advances



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



The Problem

- Moving monorail beams labour intensive
- Involved manual handling components



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



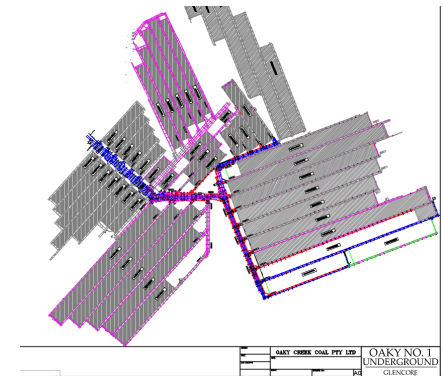
Introduction- The Challenge

During mine life:

- 2,800 tonnes of beam lifted by personnel
- beams carried by underground personnel over 800km
- SiteSafe statistics reflect high manual handling risk
- Monorail System has high incidence of crush, strike, strain, trip incidents.



OAKY NO.1
UNDERGROUND
GLENCORE



www.qldminingsafety.org.au

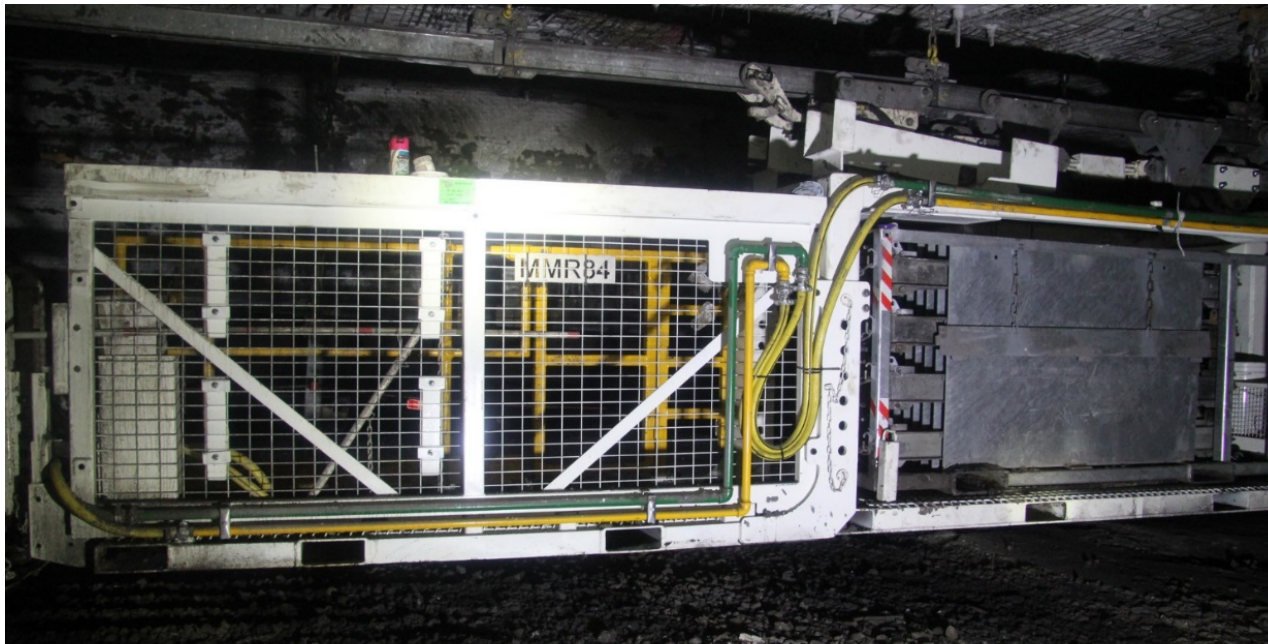
QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



The Solution



OAKY NO.1
UNDERGROUND

GLENCORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



OAKY NO.1
UNDERGROUND

GLENCORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Storage then...



And now...



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au



QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Moving beams with pod loader



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



System build and test

- Workers identified monorail salvage as area of concern
- Safety report review indicated monorail movement High Priority issue
- System development consultative process with workforce, management and OEM contractor
- Longwall mini-build allowed review of potential issues



OAKY NO.1
UNDERGROUND



www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Other issues

- Available workable space identified as issue
- Brainstorming – which equipment could be moved?
- Review times individual equipment used during mining
- Several concepts proposed/ drawn/worked through
- Issues management included moving some hydraulic controls and de-cluttering salvage work area
- High priority task due to Beam retrieval frequency
- Maximum space made available to complete task
- Three versions drawn before fabrication



OAKY NO.1
UNDERGROUND
GLENORE



www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Build

- **Storage pods designed onsite
(Fabricated by Macquarie Manufacturing)**
- **Sled and other structures fabricated on site
- retrofitting shield dragging sled as floating pontoon for storage pod**
- **Storage pod and sled incorporated as part of mini-build**
- **Surface trials and risk assessment with workforce**



OAKY NO.1
UNDERGROUND
GLENCORE



www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Build Issues

- **Minor issues identified and fixed**
 - addition of mesh plates to cover gaps in flooring
 - chain support system limits articulation of floating pod
 - chain system to retain rails in pods
- **Risk Assessment now signed off**
- **System installed underground and deployed June 5th**
- **System *eliminates* carrying hazard completely**
- **Engineering control for lifting hazard**



OAKY NO.1
UNDERGROUND
GLENCORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Benefits / Effects

- System now fully operational
- Significantly improved safety outcomes:
 - 50% reduction of lifting tasks in retrieving each 35kg beam
 - (minimum of 4 to 2 movements)
 - 100% reduction of carrying tasks (40 metres to zero)
- No requirement to manually carry beams
- Reduction in potential for trips and other injuries.



OAKY NO.1
UNDERGROUND
GLENCORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015

Benefits / Effects



- Monorail beam retrieval previously least preferred task
- Positive feedback from underground personnel
 - may become a favoured task
- Beams slide easily into compartments of storage pod
- Once end engaged, load halved immediately, further reducing as beam slid fully into position



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Health, safety and COST

- Health/safety improvements AND storage pods provide cost-saving advantages:
 - system prevents damage to beams
 - audit time reduced, end brackets accessible for inspection
- Inspection Go/No-Go tool chained to pods for checking beam compliance
- Dedicated storage area for chains, brackets, roof mounts



OAKY NO.1
UNDERGROUND
GLENCORE



www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Transferability

- **Monorail Beam Installation and Salvage System can be transferred to any Longwall mine**
- **Solution easily adapted by any component manufacturer**



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Innovation

- Developed in consultation with workers who are performing tasks- credibility
- Main innovation is in its *simplicity*
- Removes equipment and controls that aren't used frequently
- Makes room for a system that makes a frequently-performed and potentially hazardous task easier/safer.
- Use machinery rather than people to carry equipment



OAKY NO.1
UNDERGROUND
GLENORE

www.qldminingsafety.org.au

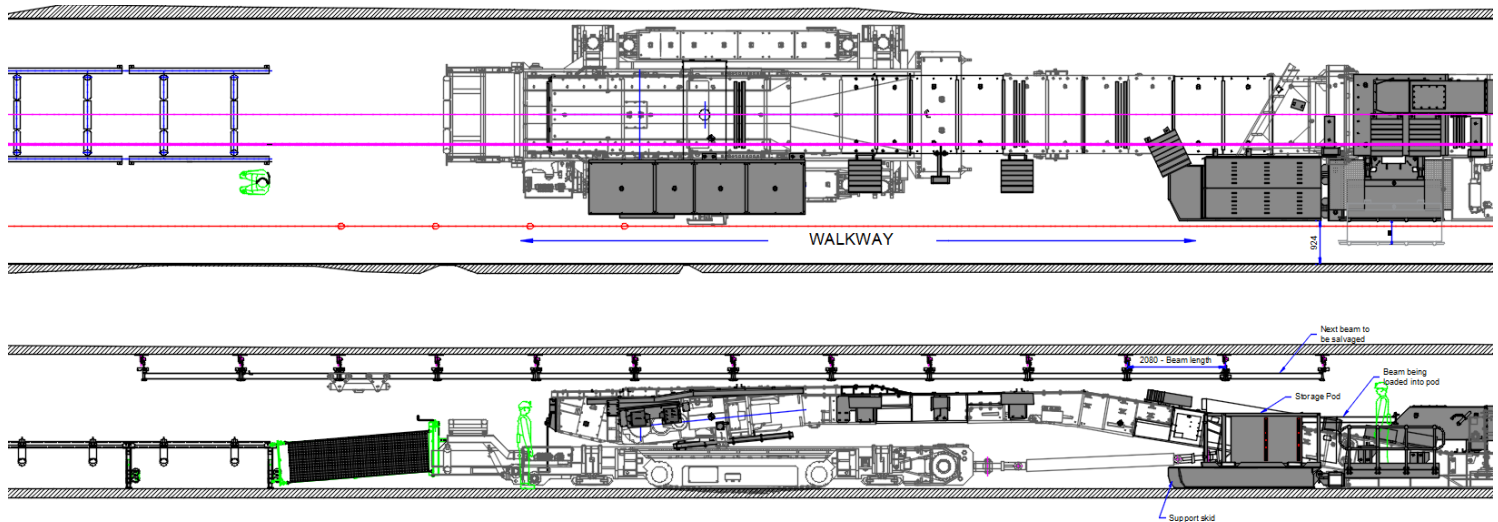
QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Innovation



OAKY NO.1
UNDERGROUND
GLENCORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Costs

Components	Approximate cost
Storage Pods x 10	\$45,000
Mounting Sled/Structure	\$10,000
Installation platform	\$45,000
Total	\$100,000

- **Lost brackets \$130,000 previous 2 years**
- **Innovation already cost positive**
- **Other cost/time savings through reduced manual handling**



OAKY NO.1
UNDERGROUND
GLENCORE

www.qldminingsafety.org.au

QUEENSLAND MINING INDUSTRY

HEALTH & SAFETY CONFERENCE

2015



Questions?



OAKY NO.1
UNDERGROUND

GLENCORE

www.qldminingsafety.org.au