

CASE STUDY

Reverse Stoping Using Wireless Initiation

Metals Acquisition Limited, CSA Mine, Cobar

Site Profile

CSA Mine is located 11 kms north-west of Cobar, in central western New South Wales. With workings 1900m below the surface, it is one of Australia's deepest and highest-grade underground mines, producing 40,000 tonnes of copper each year.

The Situation

CSA's standard modified Avoca and shrink stoping method involved firing production rings against waste fill (Figure 1). This approach created dilution and required waste material rehandle to backfill the mined stopes. The method uses a high proportion of tele-remote bogging (mucking) which is less productive than conventional bogging.

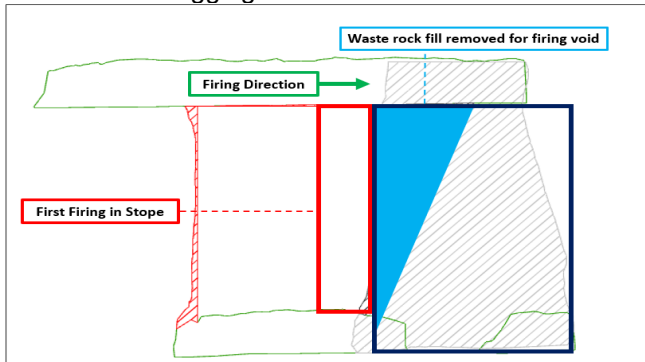


Figure 1 Firing ore against waste fill causes dilution in the standard Avoca mining method.

Recognising the need for improvement, CSA successfully demonstrated a novel mining method using blastholes pre-charged with the WebGen™ wireless initiating system. CSA revolutionised its stope design and blasting process by firing stopes in reverse to achieve lower dilution, better recovery and higher productivity.

Technical Solutions – Temporary Rib Pillar method

The Temporary Rib Pillar (TRP) method uses a pre-charged Temporary Rib Pillar to hold back waste fill in a previously mined stope (Figure 2). The pre-charged pillar is blasted after most of the ore is mined, without sending anyone into the stope to charge or connect blastholes. It is enabled by the WebGen™ wireless blasting system.

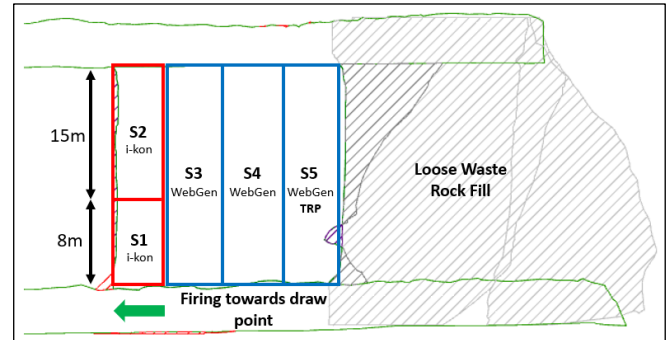


Figure 2 A temporary rib pillar holds back waste fill in a previously mined stope.

The Temporary Rib Pillar method offers significant advantages over conventional mining techniques. These include:

1. Enhanced Personnel Safety:

Pre-charging with WebGen™ reduces personnel exposure to open voids and damaged brows. This crucial safety measure ensures a safer working environment for mining personnel.

2. Improved Efficiency:

WebGen™ streamlines the drilling and blasting process, reducing the number of visits required to blast each stope.

3. Waste Fill Reduction:

The TRP eliminates waste rehandling and shrinking volume by 30 per cent.

4. Manual Bogging:

Reverse firing throws ore back towards the drawpoint where it can be mined with much less slow tele-remote bogging. This significantly improves productivity of the stope.

5. Waste Fill Dilution:

The Temporary Rib Pillar creates a barrier between waste fill and ore, significantly reducing mining dilution.

6. Safe Extraction of Ore Pillars:

The pillar remains in place for longer, and is recovered without exposing personnel to backfill, voids or brows.

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Results - Temporary Pillar Recovery

The TRP method, enabled by WebGen™, has many advantages of the conventional modified Avoca method.

The conventional method requires 30 per cent of the adjacent waste rock fill to be removed to create a void for blasting ore. A baseline stope used for comparison rehandled 3215 tonnes with 147 bucket loads, using 4 trucks. The TRP method eliminates rehandle of waste fill.

By reversing the direction of firing towards the drawpoint, manual bogging increased by 5.8 per cent. The TRP and waste rock fill dilution reduced by 8.8 per cent. Pre-charging eliminated operator exposure to open stopes and damaged brows. By reducing the number of drill and blast crew visits for each stope, the whole mining cycle was made more efficient.

The trial TRP stope required 23 per cent more drilling and blast consumable costs increased by \$1.53/tonne of ore. Unfortunately, a failure in the eastern wall of the trial stope caused by an unidentified parallel shear zone running impaired the reconciliation results.

Technical Solutions - Central Diminishing Pillar method

Once reverse stoping was established in modified Avoca stopes at CSA, two TRPs were implemented in challenging ground conditions in the QTS Central region. The TRPs were used to extract a central diminishing pillar (CDP) in a four-way retreating intersection, to close the level (Figure 3).

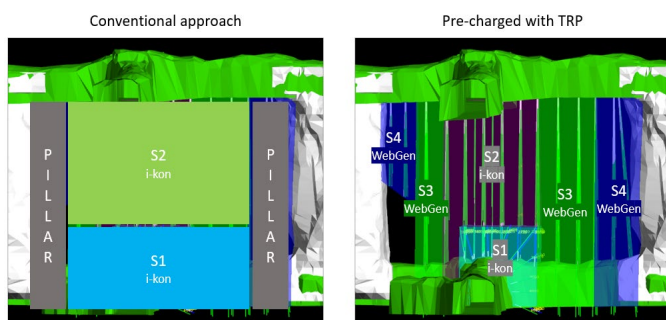


Figure 3 Central Diminishing Pillar (CDP)

Results - Central Diminishing Pillar Recovery

The CDP stope was in one of CSA's most geologically difficult areas. Overbreak reduced the grade of the 8721_QC1_352 stope by 1.1 per cent. Despite the decrease in grade, the WebGen™ enabled method recovered an extra 249 tonnes of copper, valued at \$3,102,683 AUD. This ore would otherwise have been left behind.

CDPR	Conventional (Theoretical)	With TRP (Actual)
Volume	7,591	9,901
Tonnes	23,381	30,553
Cu Grade (%)	8.07	6.99
Cu (T)	1,887	2,136
Cu (\$AUD)	23,530,047	26,632,730

The implementation of WebGen™ at CSA has led to a host of benefits, including improved safety, increased efficiency, reduced waste handling, enhanced production cycle times, and the ability to extract metal from challenging stope geometries. These advancements have positively impacted stope performance, costs, and overall operational effectiveness.

Testimonial

"WebGen wireless initiating systems enabled the Temporary Rib Pillar methods, which has proven reliable, with consistently good results."

Ben Small Technical Services Superintendent, Metals Acquisition Limited, CSA Mine, Cobar.

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