

Case Study: Pre-Consolidation of Faults with StrataLock® at an Underground Mine

BACKGROUND

In Longwall mining maintaining face stability is critical, especially when dealing with faults. Pre-consolidation is an essential geotechnical engineering tool used to mitigate ground instability. Traditional polymeric chemical methods require large exclusion zones, halting production to ensure safety. This had historically led to operational delays and production downtime.

THE CHALLENGE

Faulted zones along the longwall face posed a significant risk to stability. Pre-consolidation through ground injection was required to prevent ground movement during longwall retreat. Traditionally, this meant halting operations due to safety concerns associated with hazardous chemicals and the large exclusion zones.

THE SOLUTION

StrataLock® was used to pre-consolidate the faulted areas along the longwall face. Unlike traditional polymeric chemicals, StrataLock® is non-hazardous and does not require these large exclusion zones. This enabled its application in the main gate belt road of the operating longwall without delaying production.

A key advantage of StrataLock® is its superior migration along discontinuities and fractures, with coverage distances of 6-10 meters, far exceeding the usual 2.0-meter hole spacing. Staggered hole and packer lengths were optimised to maximise resin distribution, ensuring better coverage through the faulted zone and creating a stable mining environment.

RESULTS

Improved Coverage: StrataLock®'s ability to travel through discontinuities and fractures provided superior coverage, ensuring that faulted zones were stabilised more effectively than with traditional methods.

Continuous Production: Unlike traditional chemical methods, StrataLock® allowed pre-consolidation to occur without halting longwall operations. The longwall remained in production while StrataLock was pumped outbye, with no exclusion zones required.

Enhanced Stability: The effective pre-consolidation with StrataLock® helped maintain longwall face stability, reducing the risk of ground failure during retreat and ensuring uninterrupted mining operations.

CONCLUSIONS

The use of StrataLock® at the Underground Mine significantly improved the pre-consolidation process in faulted zones, providing superior stability without the need for production stoppages.

Its ability to travel through fractures and without the need for large exclusion zones marked a major advancement over traditional polymeric chemicals, leading to both operational and safety improvements.



“The leadership to develop this product rises above with the potential for industry-wide impact. Reducing long-term health risk is also an excellent outcome”

“The cost reduction and environmental impact in their solution was impressive, with long-term cross-industry applicability”



Queensland Mining Awards Judge's Comments