

Void Fill On Brick Arch

INDUSTRY

Infrastructure

STRUCTURE

Railway Tunnel

PROBLEM

Rock Erosion

LOCATION

Redbank, Australia

DURATION / YEAR

2 Days / 2011

TECHNOLOGY

Structural Grouting

BUSINESS UNIT

Mainmark Australia



Summary

Redbank Tunnel, located along the Main Southern Railway, a brick-lined “horseshoe” tunnel, was reconsolidated. The tunnel is 314m in length. Brick was used for railway tunnels until the 1930s, when the pouring of concrete on-site was introduced.

The tunnel is approximately 6.3m height and 8.3m width. The brick arch is 470mm thick, with hand-packed backfill above and beside against rock. Through the tunnel, the double track consists of welded rails on concrete sleepers.

Objectives

The first objective was to grout fissures in the rock above the brick arch. We were required to work above a 3m height line, working from the soffit of the brick arch.

The second objective was to bind potentially loose rock sections together and reduce water ingress and erosion on this historic rail tunnel.

Solution

There had been concern for the tunnel due to mine subsidence in the area. Prior ground radar investigation suggested a volume of voids in the range from 30m² to 50m², along a section of the tunnel roof 20m long and located towards the northern end of the tunnel. The methodology was to void fill to approximately 500mm above the arch, working at approximately 2-3m centres, over an area of approximately 260m² of tunnel roof. Two pump lines and two Operations Crews were required.

The work was executed over a weekend during a routine track shut-down. The tunnel had to be operational on Monday, on time, and this project was achieved without delay or complication.