SHOTCRETE

CASE STUDY

The Gibraltar Tunnels are twin road tunnels carrying the A40 trunk road near Monmouth. The project involved targeted structural maintenance to the tunnel linings using dry sprayed concrete to address deterioration and extend the asset's service life.

The works were carried out within the Gibraltar Hill twin-bore tunnels on the A40, a key trunk route connecting South Wales with the English Midlands. The tunnels form a constrained section of carriageway with limited diversion options, making traffic management a critical part of the scheme.

CLIENT
Griffiths

LOCATION
Monmouth

COMPLETION DATE
14/5/2025

SECTOR
Concrete Repair

THE PRINCIPAL SCOPE INCLUDED:

- Condition surveys and mapping of defective tunnel lining
- Installation of ‘tanking’ to the entire tunnel in order to capture the contaminated water from hydro demolition
- Removal of delaminated or loose concrete from the soffit using phased hydro demolition
- Application of sprayed concrete to reinstate structural integrity
- Finishing, curing, and surface profiling to match existing geometry
- Post-works inspection and quality assurance testing

CHALLENGE / SCOPE

The tunnels are adjacent to the River Monnow and this meant close attention was required to ensure all arisings from the works were carefully controlled, especially the water. Approximately 20,000L of water was used and captured daily during the Hydro demolition works.
Due to the close proximity of the defects, the works in each bore were planned in 3 phases in order to reduce the area of soffit opened up at any one time in a given area.

This meant the whole process was repeated end to end, in each bore 3 times with the tanking to the road surface reinstated each time.

CHALLENGES

- Restricted working space within the tunnel bores
- Managing ventilation and dust control during overhead concrete removal
- Maintaining structural safety while removing deteriorated lining sections
- Tight possession windows requiring efficient cycle times
- Coordination of multiple trades within a confined environment

PROCESS

Works were undertaken using a cyclical maintenance approach, working in phased closures. The sprayed concrete was applied using Dry sprayed shotcrete techniques to ensure controlled build-up and adhesion in overhead applications.

KEY STEPS INCLUDED:

- Hammer tap survey and marking out
- Cutting of the perimeters prior to Hydro demolition
- Surface preparation (high-pressure water jetting and mechanical removal)
- Layered application of sprayed concrete to achieve design thickness
- Curing under controlled conditions to prevent early-age shrinkage cracking
- Final inspection using laser profiling and visual checks

TRAFFIC MANAGEMENT

Given the strategic importance of the A40, traffic management was a major constraint:

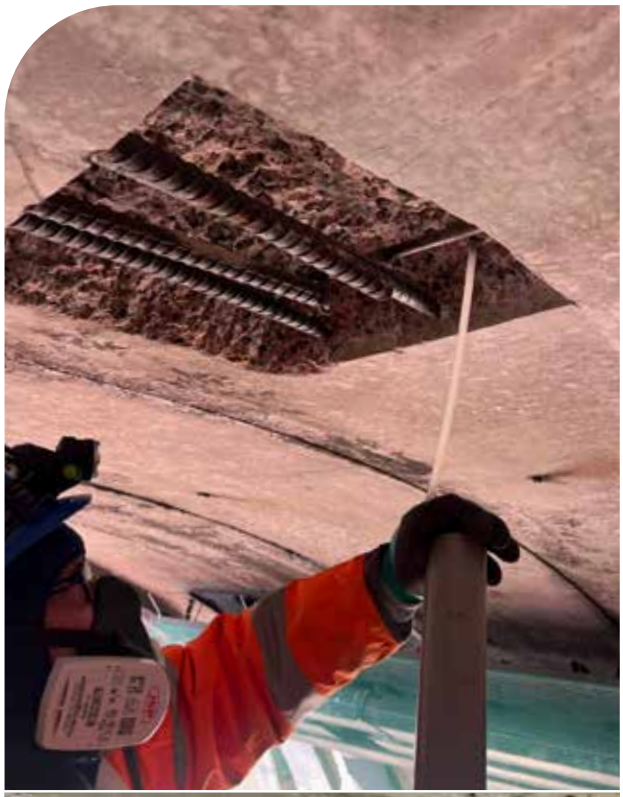
- Contraflow operation through one tunnel bore while the other was closed
- Overnight closures for switching traffic management phases
- Reduced speed limits and controlled convoy systems during peak activities
- Clear signage and advance diversion information to minimise disruption

OUTCOMES

- Restoration of damaged tunnel linings to a safe and durable condition
- Improved long-term resilience against water ingress and carbonation
- Extended service life of the tunnel asset with reduced future maintenance demand
- Minimal disruption to strategic traffic flow through phased working
- Enhanced inspection records and updated
- condition assessment data for future asset management

MATERIALS USED

- SIKA 401 rapid dry spray
- Curing agent



THANK YOU

FOR YOUR INTEREST IN SHOTCRETE.

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