Projects

George Street Bridge, USA

Heads of Valley, UK

Suwon-Kwang Myeong Motorway (SKM) tunnel, South Korea

North Kiama Bypass, Australia

Regional road 14, Canada

Wadi Stormwater Bridge, Saudi Arabia

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Geotechnical engineering, innovative solutions to

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GEOQUEST

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Precast

TechSpan

The precast concrete arch solution custom-engineered to enhance performance and durability

TechSpan is a precast concrete arch solution designed for earth-overfilled structures. Launched in 1986 after extensive research and development, it offers a three-hinges or two-hinges segmental arch configuration, depending on the project requirements, that combines **structural efficiency** with ease of installation. TechSpan is widely used in most of the sectors such as roadways & railways, airports, mining, industrial, risk mitigation and military.

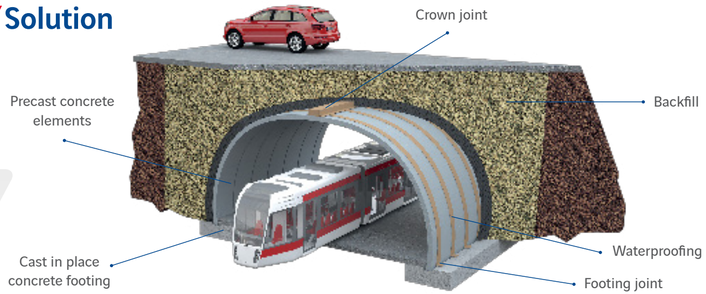
The customized funicular shape of TechSpan arches accomodates **high fills and heavy live loads**, and can be installed over existing roads, live rail or other services with minimal disruption. The solution is suitable for most applications such as bridges, tunnels, culverts, offering long service life with minimal maintenance.

Geoquest brings **60+ years of experience** in Reinforced Earth and soil-structure interaction solutions with **over 1700** TechSpan structures designed and supplied worldwide. Spans varies from 3m to 26m, heights ranges from 30% to 70% of the span, arch thickness is in range of 200mm to 500mm.

Challenges

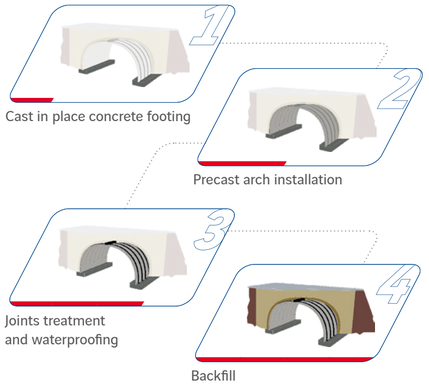
- Accelerate on-site operations with fast, reliable and predictable installation timelines
- Reduce construction site complexity removing scaffolding and bracing
- Minimize the disruption operations to active roadways, railways and waterways
- Customize the solution to accommodate unique site geometries and project constraints
- Enhance long-term performance and durability, extending the service life of the structure
- Improve safety and minimize QSE exposure by reducing high-risk activities such as caging and casting

Solution



- Fast installation using one single crane up to 20m per shift
- Customized funicular arch geometry which minimizes tensile stresses
- Reduced number of components (no bearings or expansion joints)
- High-quality controlled casting process to extend service life with minimal maintenance
- Finite element modeling (FEM) to minimize horizontal reactions at the base, reducing footing costs
- Ensured conformity to geometric and material specifications

Fast and robust: installation in 4 steps



Benefits

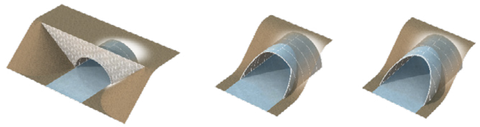
- Made from high-quality precast concrete for long service life
- Customized funicular arch geometry which minimizes tensile stresses, improving durability
- Minimal maintenance costs over time
- Resistant to extreme environmental conditions
- Reduced overall project costs, labor and equipment needs during installation with faster construction timelines
- Eliminates need for complex formwork, scaffolding and bearings
- Streamline project coordination and construction
- Enhances operational efficiency reducing the risk of construction delays
- Installation over active infrastructure, minimizing disruption

Geoquest supplies the following:

- Design of the concrete TechSpan arch
- Manufacture and supply of the TechSpan arch elements
- Delivery of construction materials to the job site FOT (Free On Truck)
- On-site services with technical advice and guidance or site assembly (depending on project and location)

TechSpan combinations

TechSpan can be easily combined with MSE structures in case of bridges or simply when headwalls and wingwalls are used at the ends of the tunnels. Alternative solutions can also be implemented such as “bamboo cut” or “special cut”.



Headwalls and wingwalls | Bamboo cut | Special cut

TechSpan is suitable for a wide range of applications

TechSpan arches are frequently used for the construction of rail and road tunnels beneath earthen embankments. They can be constructed over existing railway tracks without closing the line.

The arches are also widely used in the mining industry, with capabilities to support heavy live loads, and efficient and effective installation with minimal site disruption.

The adaptability of the arch shape allows optimization of the section while respecting the anticipated water flow, this makes suitable TechSpan also in underpasses and culverts, and other water crossings. TechSpan is the solution of choice for these applications, as the prefabricated durable concrete units used are cost-effective and construction can take place without diverting the water flow.

Geoquest design

Get your 3D TechSpan preliminary design on www.geoquest.design

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