

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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GEOQUEST

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GEOQUEST

Precast

TechSpan

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

Geoquest

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www.geoquest-group.com

TechSpan is a precast concrete arch solution designed for earth-overfilled structures. Launched in 1986 after extensive research and development, it offers a three-hinge or two-hinge 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 highways & railways, airports, mining, industrial, risk mitigation and military.

The customized funicular shape of TechSpan arches accommodates **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 vary from 3m to 26m, heights range from 30% to 70% of the span, arch thickness are in range of 200mm to 500mm.

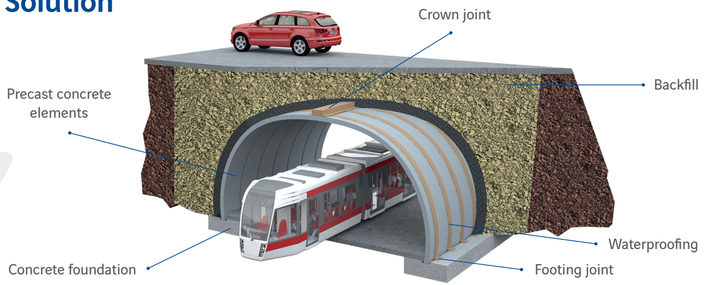
Challenges

Traditional construction methods, such as cast-in-place structures, are increasingly challenged by today's constraints in delivering projects faster and safer.

Extended construction duration, significant on-site labor requirements, complex formwork, scaffolding and bracing, and sensitivity to weather and traffic disruption all contribute to higher risk, cost uncertainty, and environmental impact.

The exposure to variable site conditions, heavy workmanship dependency, and curing under uncontrolled environment can compromise concrete quality, and consequently the performance and long-term durability of the structure.

Solution

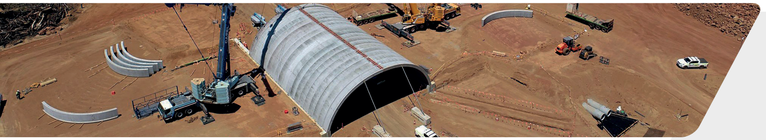


TechSpan is a precast arch with a customized funicular geometry, designed using numerical modeling to minimize tensile stresses and transfer the loads to the foundations predominantly in compression.

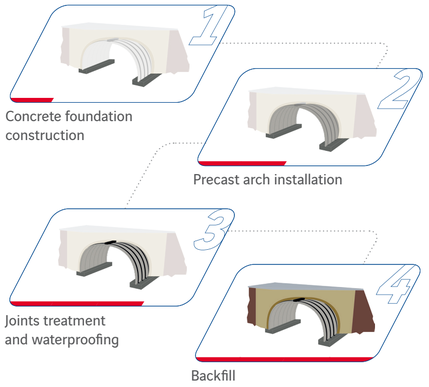
The male and female arch units, either delivered from the precast plant or directly manufactured on site, are assembled on the foundations to form a three-hinged arch, using a single crane for most of the installation process.

Depending on project requirements, the crown joint can be stitched on site to achieve a two-pinned arch configuration. After installation, only simple grouting of the footing joints is required; no bearings or expansion joints are needed. Waterproofing of the vertical joints prevents soil and water ingress.

The backfill forms an integral part of the TechSpan solution, providing lateral confinement to the precast arch. It is designed in accordance with Geoquest specifications and placed in layers, evenly on both sides of the structure.



Fast and robust: installation in 4 steps



Benefits

- Reduced overall project costs by optimizing material quantities and lowering CO_2 emissions.
- Tailored to specific geometric requirements and project constraints.
- Fast installation using one single crane up to 20m per shift.
- High-quality controlled precasting process to extend service life of the structure.
- Minimal maintenance costs over time.
- High resistance to extreme environmental conditions.
- Installation over active infrastructure, minimizing operational disruption.
- Enhanced operational efficiency reducing the risk of construction delays.
- Improved safety and reduced HSE exposure by limiting high-risk activities on-site.
- Reduced environmental impact through the use of low-carbon concrete.

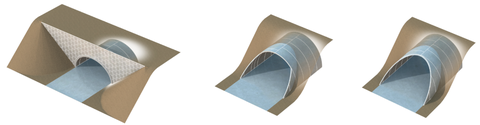


Geoquest supplies the following:

- 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 complement

TechSpan can be easily combined with MSE structures in case of bridges or simply when headwalls and wingwalls are used at the end 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 earth 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.

Thanks to the adaptability of its arch shape, TechSpan enables optimal section design while fully accommodating anticipated water flow. This versatility makes TechSpan well suited for underpasses, culverts, and water crossing structures. Using durable, prefabricated concrete units, TechSpan offers a cost-effective solution that allows construction to proceed without diverting the water flow.

Geoquest design

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

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Housing and Residential | Water Management | Waste Management | Mining

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