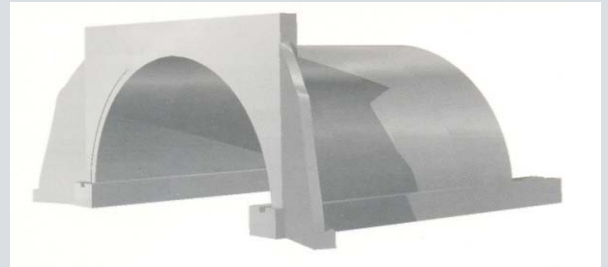
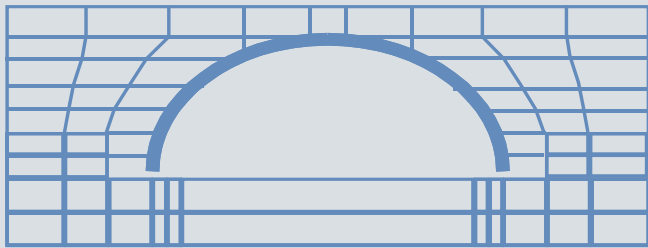


TechSpan

Prefabricated Concrete Arch Structures



PRODUCT

TechSpan is the three hinge arch system (can be modified to two hinge) developed by Reinforced Earth Company. The units are precast in reinforced concrete and are delivered to site as curved pre-cast elements ready for immediate, rapid and predictable erection. TechSpan Arches provide solutions for:

- underpasses
- access culverts
- small to medium span bridges
- hydraulic culverts

Quality

TechSpan is an innovative technological solution resulting from decades of research and development gained in design and construction.

Manufacture is carried out to strict quality specifications. TechSpan is the only arch system that defines the optimum shape for each structure and then uses sophisticated finite element methods of design to produce safe yet economic arches.



TechSpan precast arches provide all the benefits of precast concrete structures plus a number of additional advantages over other culvert, bridge or arch systems:

- Simple, rapid, predictable construction without scaffolding or formwork requiring only a small crew and conventional equipment.
- Unique precasting methods conforming to any shape without being limited by set precast form sizes.
- State of the art design selects the best arch shape to minimize in-service bending moments and reduce costs.
- Comprehensive technical design service, high quality materials and professional construction assistance.

These advantages have translated into the most reliable, cost effective, precast arch system with more than 500 installations worldwide. Ideally suited for the construction or replacement of:

- water Culverts
- rail bridges
- road bridges / underpasses
- mining / industrial access tunnels



Economy, Speed of Erection and Safe Reliable Design Method

Construction: TechSpan's advantages of simple and predictable erection makes it an ideal solution for structures over traffic. Railways in particular may be bridged without the need for long track possessions.

Cost Savings: Many TechSpan arch bridges are in successful service around the world, and more engineers and contractors are choosing TechSpan solutions for bridging problems. They are benefiting from the Group's expertise and experience, and TechSpan's proven track record as a cost effective solution.

Professional

Services:

Our specialized engineering staff will guide your scheme through design approval. They will provide construction planning and erection advice. We will ensure on-site assistance at the start of erection to ensure the successful completion of your structure.

DESIGN AND ENGINEERING

Arch optimisation

- ü Length (directrix), clearance envelope/hydraulics
- ü Transportation
- ü Zero moment (funicular arch)

Lifting/Erection/Handling

- ü Statically determinate spreadsheet calculations

Backfilling/Permanent/Live Loads

- ü FEM Analysis
- ü Live load applied as BD37/01 / IRC-6

Reinforced Concrete Design

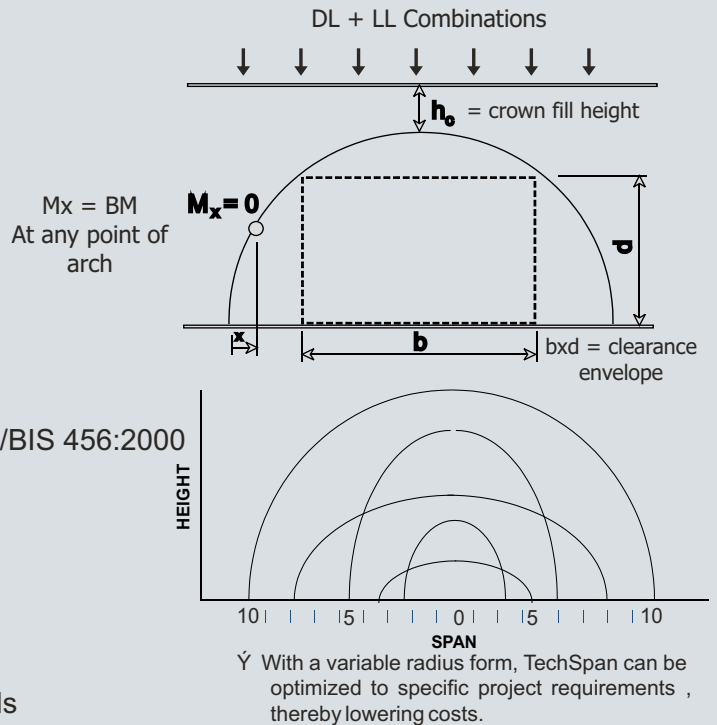
- ü Critical load effects analysed at SLS/ULS to BS5400:Pt 4/BIS 456:2000

Finite Element Analysis

- ü Soil – structure interaction
- ü Soil stiffness model :- Duncan & Chang (non-linear)

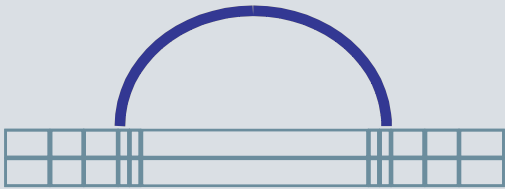
AZTECH software features

- ü Automatic mesh generator
- ü Phased construction modelled
- ü Live loads modelled as UDL's or Line Loads

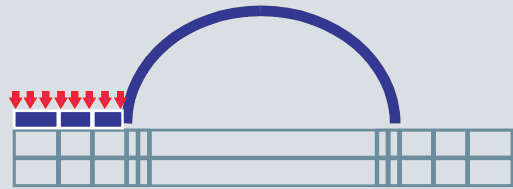


Phases

▷ Initial Phase : Arch erected, no fill placed



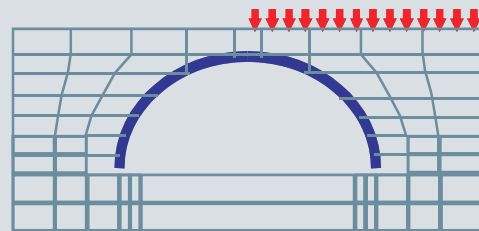
▷ Phase One : 1st Layer of fill placed & Compacted



▷ Phase Two : 2nd Layer of fill placed & Compacted



▷ Final Phase : Backfill complete, traffic loading applied

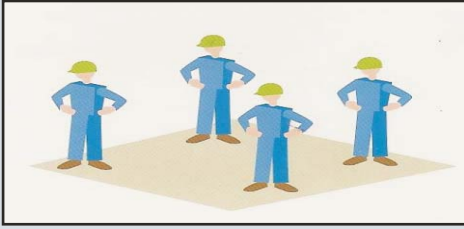


We offer one source design and supply services from our on-staff Professional Engineers. In addition, we can provide technical expertise on footings, wingwall and headwall construction. Full design and product liability insurance is provided on all projects by Reinforced Earth Company.

- ü DESIGN SERVICES - Feasibility studies: Written estimates : Drawings
- ü CONSTRUCTION SERVICES - Construction drawings : Timely delivery to site : Onsite guidance
- ü CONSULTATION SERVICES - Available anytime from our on-staff Professional Engineers

CONSTRUCTION

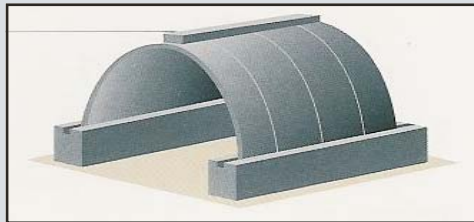
Procedure



A team of workmen can place 15 to 20 linear metres of arch structures per day without the need for false work, scaffolding or specialized personnel.



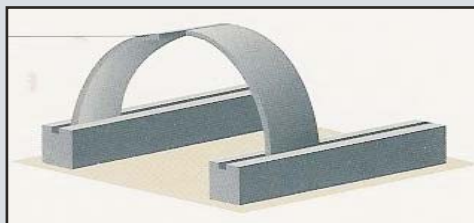
Each segment is lifted by crane and its foot placed onto the Keyway.



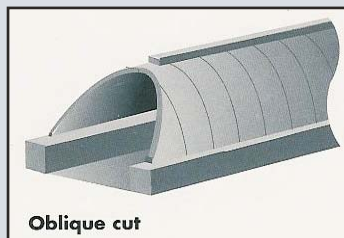
After all the segments have been placed a small reinforced concrete beam is cast on the crown to provide a longitudinal tie between units. Lateral joints may be backed by simple geotextile or a waterproof membrane band, depending on application.



Each foot of the arch may be supported by independent concrete strip foundations or a concrete slab. The foundation size will be dependent upon soil conditions, size of structure and height of backfill above arch. The arch segments are placed in simple keyways approximately 100mm deep cast into the top of the foundations. These locate the arch feet and provide alignment during construction.



The segments are placed staggered by a distance equal to half a unit width and thus one segment leans against half of the opposite segment placed beforehand leaving the other half free as support for the next one.

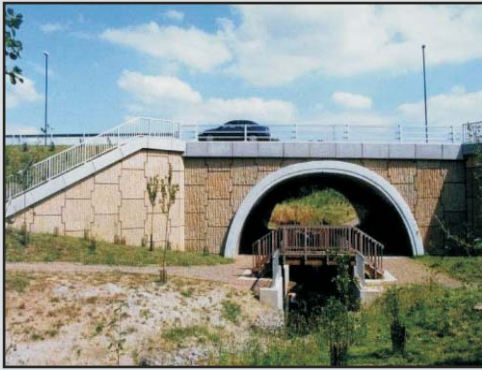


The arch is now backfilled up to the planned height. Precast concrete headwalls and wing walls from the front elevation. Reinforced Earth Structures can be easily integrated in the arch profiles.

PROJECT REFERENCES



✓ **Bangalore Mysore Infrastructure Corridor Project, India**
Structures consisting of culverts, cattle pass, underpass and Minor bridges



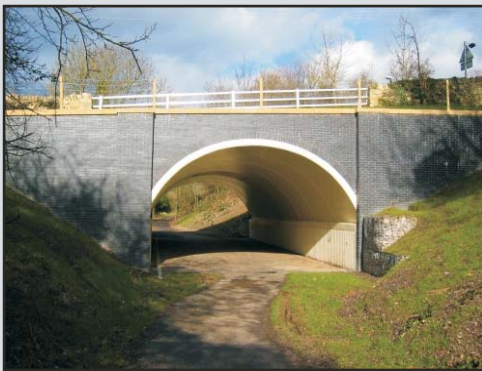
✓ **Gloucester Business Park, UK**



✓ **Shrub Hill Canal Bridge - Worcester, UK**



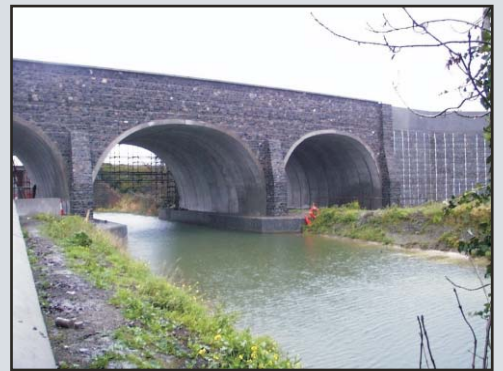
✓ **A1 Haddington to Dunbarter, UK**



✓ **Dudbrige Hill Strengthening, UK**



✓ **Welcome Roundabout Underpass Heathrow Terminal 5, UK**



✓ **Millenium Canal Bridge - Naas, UK**



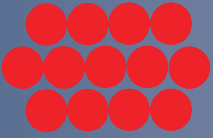
✓ **Millennium Coastal Park -Llanelli, UK**



✓ **Vehicle Underpass, UAE**



✓ **CTRL Contract 420, UK**



Cost Effective Solutions

- ◆ Durability of precast concrete gives long service life with low maintenance
- ◆ No maintenance of bearings or joints
- ◆ Cost savings increase as height of fill increases

Cost Benefit over conventional bridges

Prefabricated concrete segmental arch has proved its advantages over conventional bridge construction in terms of direct and indirect cost i.e., material/manpower saving and time/maintenance saving respectively.

Since the concept in designing the system is based on funicular curves theories i.e., the bending moment at any points is zero, a slender section is developed and significant material and manpower is saved. A direct representative comparison for construction of a two-lane bridge is shown in the table below over the conventional bridge construction.

Advantages

- ◆ Simple and Rapid Construction
- ◆ No scaffolding or bracing
- ◆ Significant Material Savings
- ◆ More efficient shape
- ◆ Consistent Quality
- ◆ Reduces bridge icing
- ◆ Increased Aesthetic Effects
- ◆ No bearing pads or joints
- ◆ Low Maintenance Requirements
- ◆ Less Complexity hence Less Risk
- ◆ Cost Savings
- ◆ Less disruption of traffic



By combining the TechSpan precast arch system with Reinforced Earth retaining walls, you can enjoy the aesthetics of a truly arch-shaped opening with headwalls and wing walls that provide a natural and pleasing look. The interface of these two systems is accomplished through precise panel details and accurate panel fabrication, which marry each panel to the shape of the arch. Precise cast-ing of each arch ensures a proper fit between units. Variety of looks are available to customize a structure that meets your needs regarding opening sizes and choices of architectural form liners. Available services include feasibility studies and cost estimates, as well as providing digital files of proposed arch shapes for your hydraulic evaluations. **Contact us for your upcoming projects.**

Sustainable Technology



Terre Armee

Reinforced Earth India

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