

rivo



ARCH BRIDGE

PRODUCT BROCHURE

CS SERIES • OS SERIES

ARCH STRUCTURE

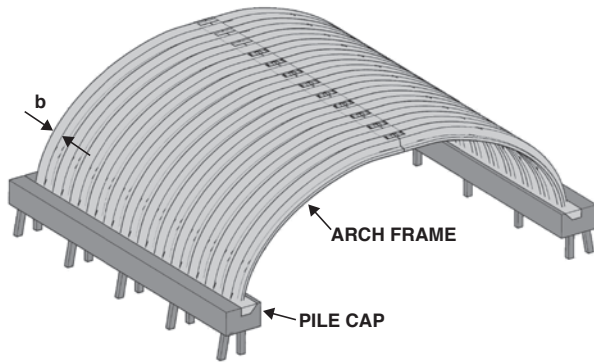
Enchanted by their spectacular outlook, exceptional performance and unbelievable durability, countless arch structures are constructed since time immemorial. In many successful applications, arch bridges of striking aesthetic appearance are being recorded across nearly all continents of the world. Interestingly, many ancient and modern arch structures are found coexist and stand next to one another harmoniously at many prominent locations of the world.



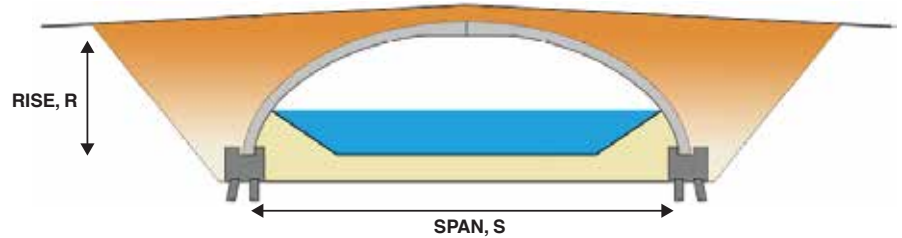
PRODUCT SPECIFICATION

The precast closed spandrel arch bridge (CS) system comprises of a series of precast arch segments assembled side by side to form an arch bridge, enclosed with two end spandrel walls and ancillary wingwalls. The empty enclosure above the arches is then overfilled in compacted layers with suitable granular materials. The stability of the arch structure is maintained through soil-concrete interactions with overfilled soils providing the lateral spring supports to withstand the service loads. Soil-concrete interaction in existence has resulted in superior strength and efficiency of the system being achieved.

Closed Spandrel Arch Bridge



ARCH TYPE	SPAN (S) (m)	RISE (R) (m)	SPAN/RISE RATIO	PANEL WIDTH (b) (m)	UNIT MASS PER HALF LEAF (tonnes)
CS-D18/35	18.37	3.56	5.16	1.50	7.4
CS-D18/60	18.08	6.10	2.97		8.5
CS-D19/40	19.00	4.06	4.68		7.8
CS-D19/53	19.94	5.31	3.76		8.7
CS-D20/55	20.03	5.56	3.60		8.8
CS-D20/73	20.10	7.31	2.75		10.0



APPLICATION



Roadwork / Railway / Highway Construction

Road overpasses and underpasses, Stream Enclosures / Wetland Crossings



Underground Structures

Tunnels, Utility Vaults, Military Bunkers, Aircraft Shelters

RIVO ARCH

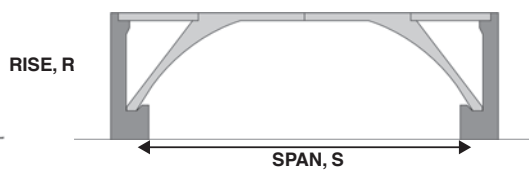
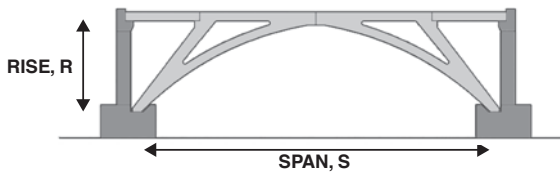
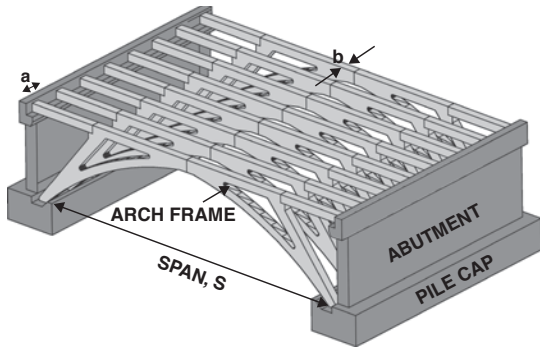
The advent of concrete and precasting technologies have invoked greater creativity for the design and construction of arch bridges. Among them is the emergence of our proprietary RIVO ARCH system involving the use of efficient forms in special designed and profiled geometrical sections, complemented by neat connection and prop-free construction means.

For this, RIVO ARCH of standardized and custom-made profiles are available for selection. Our designs are generally of great versatility in arch span and rise variations to cater for wide ranging applications.



The precast open spandrel arch bridge (OS) system is produced by putting together a series of modularized precast arch frames at 1.0 to 3.0m spacing to the loading requirements. The arch bridge system supports the roadway through a series of precast arch elements connected to the concrete deck without fills. The precast frames are formed with arched bottom chords integrated with horizontal top chords, and with inclined struts where applicable using reinforced concrete sections. Open spandrel arch offers more functional geometry with flatter arch profiles.

Open Spandrel Arch Bridge



PRODUCT CODE	SPAN (S) (m)	RISE (R) (m)	SPAN/RISE RATIO	SPACING (a) (m)	PANEL WIDTH (b) (mm)	UNIT MASS PER HALF LEAF (tonnes)
OS-K12/34	12	3.39	3.52	1.50 / 2.00	350	4.1
OS-K13/40	13	4.04	3.21			4.3
OS-K14/47	14	4.70	2.98			4.6
OS-K15/47	15	4.70	3.19			4.8
OS-K16/47	16	4.70	3.40			5.0
OS-K18/40	18	4.00	4.50	1.50 / 2.00	400	7.6
OS-K19/45	19	4.50	4.30			8.0
OS-K20/45	20	4.50	4.52			8.3
OS-K21/45	21	4.50	4.74			8.4
OS-K22/45	22	4.50	4.89			8.7
OS-M25/50	25	5.00	5.04			17.5

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Recreational and Utility Structures

Golf Card Overpasses and Underpasses, Pedestrian Walkways, Underground Vaults and Containment Systems



Multiple Spans Bridge Construction

2-Span Bridge, 3-Span Bridge

ADVANTAGEOUS FEATURES

Experience shows that our products always have better economical and technical edge over other forms of design. These distinctive benefits can always be reaped and realized by all our clients, Authorities, Developers and Contractors alike.



Environmental/Functional Benefits

- Unique aesthetic and classic beauty of an arch always blend well with its surroundings
- Larger uninterrupted and functional space with big span arch
- Flexible span and rise profile to meet diverse application needs
- Less wastages of materials with prefabrication technique and design
- Precast construction with no timber formworks
- Contribute towards sustainable construction practices

Design Benefits

- Conform to strength and loading requirements of BS5400 and BD37/88 / EC1
- Great durability in compression structure due to its distinctive arch action
- Higher resistance to live loads and impact loads
- Less vulnerable to differential settlements
- Increased capacity to support high fills (Closed Spandrel Arch)
- Flexible to accommodate bridge skews (Open Spandrel Arch)

Economic Benefits

- Efficient arch profile design utilizes less building materials (concrete and steel)
- Lighter structure requires slimmer foundation
- Lower machinery costs with to handle lighter precast units
- Simple and fast installation technique with less labour
- Shorter construction time
- Lower maintenance cost with quality precast concrete and arch design



Design / Specification

- Reinforced concrete design to BS8110 / EC2
- Bridge loading to BS 5400 and BD 37/88 / EC1
- Concrete grade $f_{cu} = 40\text{MPa}$ (for standard design)
- Higher grades or loading specification can be customized to meet specific project requirements

Installation

Work sequence:

- Site clearing, preparation of access and working platform to crane requirements
- Setting out of keyway footing support points, levels and positions
- Lift and rotate the arch panels to installed orientation
- Place units to position, adjust with shim plates where required, and lock the crown joint with T&G recess and curve bolt
- Grout keyway and crown joint to secure precast units permanently in-place

Manufacture

- Cement (OPC) to MS522
- Aggregate (20mm) to MS29
- Steel bar to MS 146
- Admixture to MS922

Rivo Builders (M) Sdn Bhd owns and maintains an ever expanding line of proprietary precast concrete products and construction technologies. Our products are protected by patents granted including several imminent patent pending. We reserve the rights to update the information regarding its varied intellectual property and associated products and patents.

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