



PRECAST CONCRETE SOLUTIONS PROVIDER

OKA ARCH BRIDGE SYSTEM

The Innovative Precast Arch Bridge System

OKA Arch Bridge System ("ABS") is a buried arch system consisting of multiple SINGLE-PIECE precast reinforced concrete ARCH units that are placed together to form a complete bridge or underground structure. The precast arch units are either supported on strip footings founded on rock or piles or alternatively founded on continuous raft footing.

OKA Arch Bridge System offers a fast, cost effective and unrivalled aesthetic solution whether to replace an aging, deficient bridge ; span a creek or river ; build an underpass or tunnel for vehicular traffic.

The design of OKA Arch Bridge System is optimized taking full advantage of the arch's geometry and the soil-structure interaction that is made possible from a planned staged backfilling sequence.

APPLICATION

- Drainage Culvert
- Pedestrian Underpass / Vehicular Underpass
- Utility Tunnel
- Storage Bunker
- Underground storage structure
- Single-Span for short to Medium Span Arch Structure
- Multi-Span Application for longer Span Arch Structure
- Combined Application for Pedestrian + Drainage + Vehicular Traffic



Multi-span ARCH
(Longer Span Structure)

ADVANTAGES

- **Aesthetically Pleasant**
- **Fast Installation** - Single-carriageway arch bridge can be installed in a day
- **Ease of Installation** - Less labour required
- **Wide Clear Span** - increase water flow velocity ; free of debris accumulation problem at inlet that impedes flow and eventually causing blockage
- **No Expansion Joints** - Maintenance free and very smooth ride ; no deck maintenance problems
- **Short to Long Span Arch Bridge** - single or multi-span arch bridge structure can be constructed with ease
- **Superior Strength and Durability** - Precast arch units are manufactured using high strength concrete of low water/cement ratio that warrants durability requirements
- **Quality** - Precast arch units are manufactured under controlled factory environment with stringent ISO 9001 : 2008 quality management system



Single-span ARCH
(Short to Medium Span Structure)



CONSTRUCTION SEQUENCES

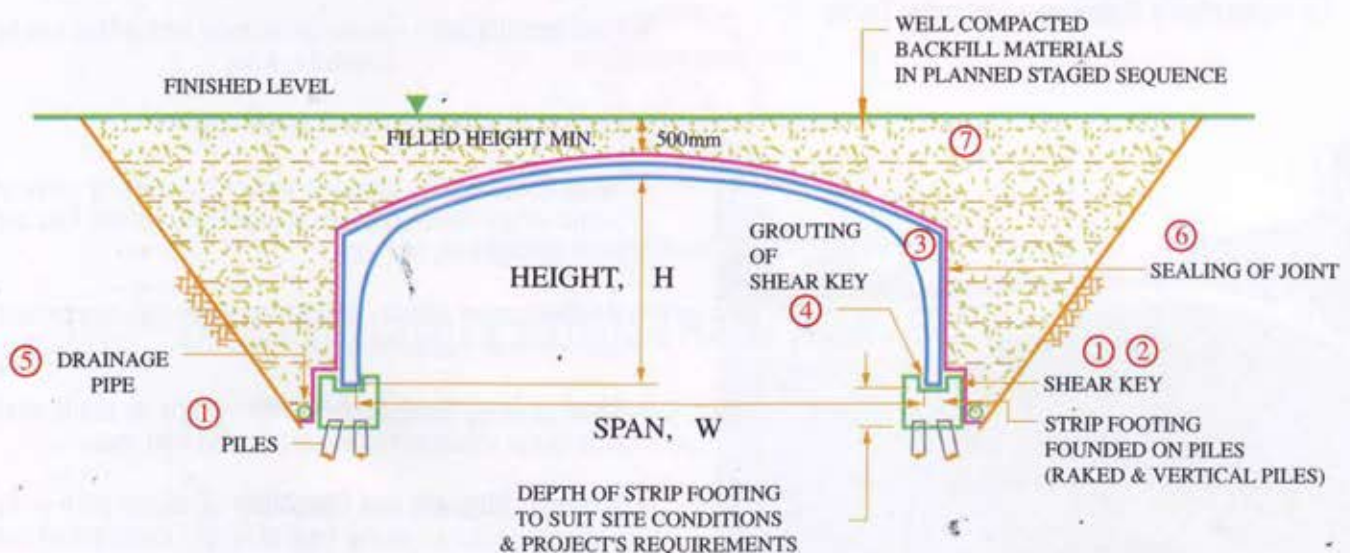
1. Preparation and construction of structural foundation to receive precast Arch units.

Choice of foundation based on Engineer's recommendations :

- (a) Construction of 2 parallel cast in-situ strip footing with "shear key" (on top) on a combination of raked and vertical piles, OR
- (b) Construction of 2 parallel cast in-situ strip footing with "shear key" (on top) on vertical piles and with in-situ horizontal tie-beams/slabs in between, OR
- (c) Construction of 2 parallel cast in-situ "shear key" on in-situ raft or pad footing. *Depth of strip footings depends on site conditions and Project's requirements.



2. Levelling pads are set up at 1.2m centres along the "shear key".
3. Lifting and hoisting of precast ARCH units to sit into preformed "shear key" on pre-set levelling pads.
4. Grouting of "shear key" after placement of precast ARCH units.
5. Install drainage pipes along bottom of ARCH wall on earth faces.
6. Sealing of joints in between Arch units on the earth face using backer rod, cement mortar, geotextile or waterproofing material to Engineer's approval.
7. Backfilling with suitable materials approved by the Engineer to finished level in planned staged sequence.

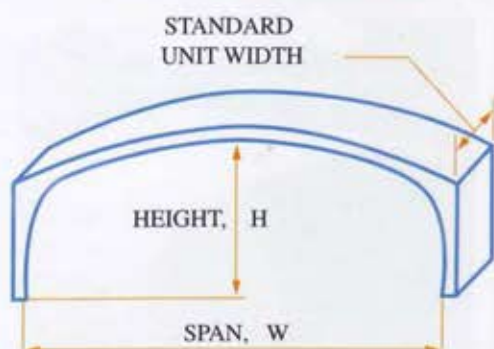


TYPICAL METHOD OF CONSTRUCTION

(ARCH UNITS SIT ON STRIP FOOTINGS FOUNDED ON COMBINATION OF RAKED & VERTICAL PILES)

OKA STANDARD ARCH BRIDGE SYSTEM SECTIONS

- Nominal standard span available from 6.0m - 12.0m, at 500mm increment.
- Standard width of 1200mm for arch unit span from 6.0m - 10.5m.
- Width of 1000mm for arch unit span from 11.0m - 12.0m.
- Internal height from 2.5m - 3.5 to suit site conditions.



- * Class L :
Fill height from min. 500mm to 2000mm
- * Class M :
Fill height from 2001mm to 4000mm
- * Class H :
Fill height above 4000mm
(Special design subjected to site conditions)

Product Code	Strength Class	Span W (mm)	Height H (mm)	Product Weight (ton)
ABS 60/25 x 1.2m	CLASS L CLASS M	6014	2468	7.8
ABS 65/25 x 1.2m		6514	2486	8.1
ABS 70/25 x 1.2m		7014	2496	8.5
ABS 75/25 x 1.2m		7514	2500	8.8
ABS 80/25 x 1.2m		8010	2488	9.9
ABS 85/25 x 1.2m		8510	2497	10.3
ABS 90/25 x 1.2m		9010	2500	10.7
ABS 95/25 x 1.2m		9504	2490	12.4
ABS 100/25 x 1.2m		10004	2497	12.8
ABS 105/25 x 1.2m		10504	2500	13.2
ABS 110/25 x 1.0m		11004	2483	14.5
ABS 115/25 x 1.0m		11504	2490	15.0
ABS 120/25 x 1.0m		12004	2500	15.4
ABS 60/30 x 1.2m	CLASS L CLASS M	6022	2968	8.4
ABS 65/30 x 1.2m		6522	2986	8.8
ABS 70/30 x 1.2m		7022	2996	9.1
ABS 75/30 x 1.2m		7522	3000	9.4
ABS 80/30 x 1.2m		8020	2988	10.6
ABS 85/30 x 1.2m		8520	2997	11.0
ABS 90/30 x 1.2m		9020	3000	11.3
ABS 95/30 x 1.2m		9517	2990	13.2
ABS 100/30 x 1.2m		10017	2997	13.6
ABS 105/30 x 1.2m		10517	3000	14.0
ABS 110/30 x 1.0m		11017	2983	15.4
ABS 115/30 x 1.0m		11517	2990	15.8
ABS 120/30 x 1.0m		12017	3000	16.3
ABS 60/35 x 1.2m	CLASS L CLASS M	6030	3468	9.0
ABS 65/35 x 1.2m		6530	3486	9.4
ABS 70/35 x 1.2m		7030	3496	9.7
ABS 75/35 x 1.2m		7530	3500	10.0
ABS 80/35 x 1.2m		8030	3488	11.3
ABS 85/35 x 1.2m		8530	3497	11.7
ABS 90/35 x 1.2m		9030	3500	12.0
ABS 95/35 x 1.2m		9530	3490	14.0
ABS 100/35 x 1.2m		10030	3497	14.4
ABS 105/35 x 1.2m		10530	3500	14.8
ABS 110/35 x 1.0m		11030	3483	16.2
ABS 115/35 x 1.0m		11530	3490	16.7
ABS 120/35 x 1.0m		12030	3500	17.1

DESIGN CONSIDERATION

- OKA-ABS is designed to (a) BS5400 : Part 2 : 1990 (b) BS8110 : Part 1 : 1997
- Hydrostatic pressure are eliminated by the provision of drainage system at the back of walls
- Characteristic concrete cube strength at 28 days : Grade 40
- Concrete cover to reinforcement : 50 mm on inner arch face ; 40 mm on outer arch face
- Minimum Fill Depth : 500 mm
- Backfill material : sand / suitable soil material approved by the Engineer with angle of internal friction not less than 30°
- Soil-structure interaction approach is adopted in the structural analysis of the ARCH units

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OKA CONCRETE INDUSTRIES SDN. BHD. (67634-M)

