STANDARD HIGHWAY BRIDGES

REIDsteel
we bridge the world

THE QUEEN'S AWARDS FOR ENTERPRISE:
INTERNATIONAL TRADE 2006, 2008, 2009

Front cover photo:

NEPAL, HIMALAYAS

The 96 metre span PILAUWA KHOLA RIVER bridge is about 200kms north east of Kathmandu and between Chainpur and Mamling in Eastern Nepal. Access is limited to a muddy track and then only in the dry season and until this bridge was built there was only a small pedestrian suspension bridge.

The 233 tonne steel structure was designed and made by *REIDsteel* so that it could all fit into ten 40ft containers which were shipped from the UK to Calcutta and thence by road to the site. The bridge was built by Kalika Construction (P) Ltd, Nepal.

The site is about 90km from Lhotse and Everest and only 70km from Makalu, the fifth highest peak in the world (8463m).

Right: *The pedestrian footways are well separated from the roadways, outside the main steelwork. These features increase the safety and welfare of road users and, importantly, the pedestrian users of the bridges.*

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Standard Steel Through Truss Bridges

FULL TECHNICAL INFORMATION

The Carriageways are 2-lane. They are 7.3m wide between crash barriers.

They will have local Reinforced Concrete decks 0.25m thick, placed on our lost formwork decking with no propping needed. They can have 0.05m of surfacing.

They have three levels of steel crash barrier on both sides of the carriageways so that neither trucks nor their payloads can hit or damage the steel trusses.

The Bridge Decks are carried by 2 trusses at, and above, deck level. These two trusses are stabilised with a bracing system. For bridges above 40m span, this bracing is usually above the carriageway, between the trusses (a closed top through truss). Below 40m span, this bracing is usually from Raker members down to the transoms (open top through truss)

The bridge decks are cambered from side to side using pre-cambered steel transoms; and slightly cambered from end to end using the built in camber of the trusses.

There are two walkways, both outside the main trusses, 1.2m wide, with handrails outside. The pedestrian, handcart and cycle traffic using them is protected from the vehicle traffic by the crash rails and main trusses.

The decks of the walkways are local reinforced concrete 0.125m thick placed on our lost formwork decking.

The bridge steel is entirely bolted together using regular high strength tension and shear bolts. There are no friction grip bolts. Most of the main connections are end-plated. Adjustment is by means of steel packs which can be inserted between end plates.

The bridge steel is all in pieces which can easily be transported in 20ft or 40ft containers, or on regular road vehicles.

The bridges are designed to British Standard BS 5400 for 2 lanes of full highway loading, and for 30 units of HB loading, equivalent to an occasional 120 tonne truck. All the structural design is in house by *Reidsteel*.

All the steel work is hot dip galvanised 85microns, 610gm/m2, for long low maintenance life.

The bridges can be erected in-situ on a temporary causeway or on temporary jackable props; or may be built on the ‘home bank’ and Cantilever Launched across the gap. For the cantilever launch, a ‘Launch Kit’ is needed, consisting of sets of rollers, a steel ‘launching nose’ fitted to the leading edge of the bridge (and removed for re-use after launch), and come-along cable jacks.

The bridges will sit on our elastomeric bearings on your abutments. Expansion joints for the roadway are provided at both ends.

The bridges may be combined with other bridges to make multi-span crossings. Again the bridges can be built in-situ; or they can be cantilever launched. For multi-span bridges which are to be cantilever launched it is necessary to use a ‘Link Kit’ which consists of further sets of rollers, and further jacks, and a set of link steelwork which joins adjacent bridges during the launch and roll-out. As with the Launch Kits, the Link Kits can be used again and again. You will need one Link Kit for a 2-span bridge and 2 Link Kits for a 3-span bridge and so on.

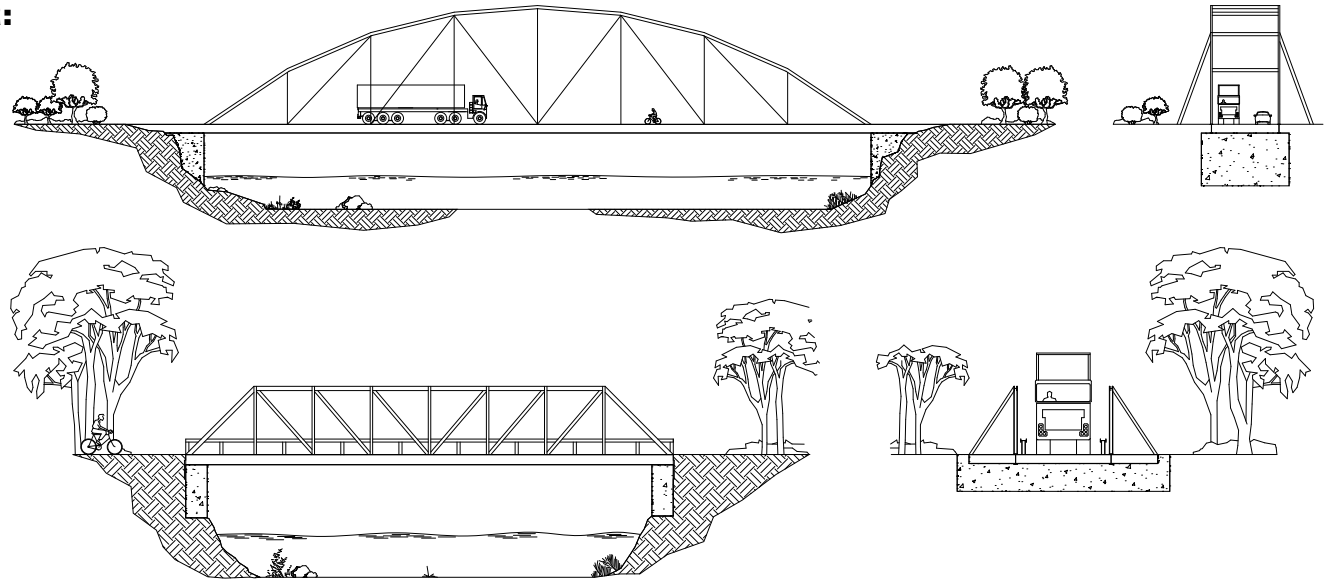
Our work carries a ten year warranty.

BRIEF OVERVIEW

THROUGH TRUSS BRIDGES ARE GOOD FOR:

- **Spans 15m to 100m**
- **Maximum clearance underneath the roadway.**
- **Building in situ or cantilever launch**
- **Single or Multiple Spans**

But: can only be widened by building another bridge.



Far Left: *One of our 50 metre clearspan, two lane roadway bridges on the Aweil Road, Southern Sudan.*

Left: *Old making way for the new. A 50 metre span Reid bridge being launched in Sudan.*

Standard Composite Beam Bridges

FULL TECHNICAL INFORMATION

The Carriageways are supported by pairs of beams at 1.7m centres. A carriageway may therefore be 5.1m overall wide, with 1.2m walkways both sides. The carriageways may be wider in increments of 3.4m; and may always be extended widthways in increments of 3.4m. There is an element of choice in the marked carriageway widths and the widths of the walkways. The minimum bridge will be single lane with a 4m marked roadway.

They will have local Reinforced Concrete decks 0.250m thick, placed on our lost formwork decking with no propping needed. They can have 0.05m of surfacing. The concrete will become composite with the steel via shear connectors.

They have steel crash barriers on both sides of the carriageways. The walkways will be outside the crash barriers and will have handrails on the outside. The Bridge Decks are carried by 2 or more pairs of beams below deck level. There is no steel above the deck other than barriers. Please note that the roadway will have to be at a height well above the flood level: as a guide the depth of the beams is about 6% of the span, and the roadway is above this truss.

The bridge decks are cambered from side to side by offsetting the beam heights; and slightly cambered from end to end using the built in camber of the beams. All spans are simply supported.

There are two walkways, both outside the main trusses, 1.2m wide, with handrails outside. The pedestrian, handcart and cycle traffic using them is protected from the vehicle traffic by the crash rails.

The decks of the walkways are local reinforced concrete averaging 0.125m thick placed on our lost formwork decking.

The bridge steel is entirely bolted together using regular high strength tension and shear bolts. There are no friction grip bolts. Most of the main connections are end-plated. Adjustment is by means of steel packs which can be inserted between end plates.

The bridge steel is all in pieces which can easily be transported in 20ft or 40ft containers, or on regular road vehicles.

The bridges are designed to British Standard BS 5400 for any number of lanes of full highway loading, and for 30 units of HB loading, equivalent to an occasional 120 tonne truck. All the structural design is in house by *Reidsteel*.

All the steel work is hot dip galvanised 85microns, 610gm/m2, for long low maintenance life.

The bridges can be erected in-situ by simply lifting beams individually into position or may be built on the ‘home bank’ and Cantilever Launched in pairs across the gap. For the cantilever launch, a ‘Launch Kit’ is needed, consisting of sets of rollers, a steel ‘launching nose’ fitted to the leading edge of the pair of beams (and removed for re-use after launch), and come-along cable jacks.

The bridges will sit on our elastomeric bearings on your abutments. Expansion joints for the roadway are provided at both ends.

The bridges may be combined with other bridges to make multi-span crossings. Again the bridges can be built in-situ; or they can be cantilever launched. For multi-span bridges which are to be cantilever launched it is necessary to use a ‘Link Kit’ which consists of further sets of rollers, and further jacks, and a set of link steelwork which joins adjacent bridges during the launch and roll-out. As with the Launch Kits, the Link Kits can be used again and again. You will need one Link Kit for a 2-span bridge and 2 Link Kits for a 3-span bridge and so on.

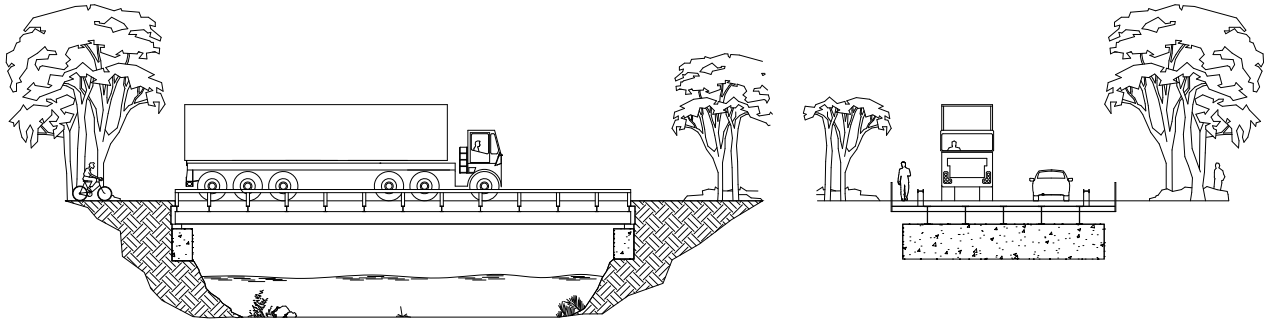
Our work carries a ten year warranty.

BRIEF OVERVIEW

COMPOSITE BEAM BRIDGES ARE GOOD FOR:

- **Spans 10m to 24m (but larger spans are possible).**
- **Easy Widening**
- **Low visual impact.**
- **Building in situ or cantilever launch.**
- **Single or multiple spans.**

But: become more expensive as spans get longer.



Far Left: *Composite bridge, preparing to launch in Uganda.*

Left: *Continuous composite beam bridge, Maphutsaneng Bridge, on the Mohales Hoek-Mekaling road, Lesotho - Africa.*

Standard Steel Over-Truss Bridges

FULL TECHNICAL INFORMATION

The Carriageways are supported by pairs of trusses at 1.7m centres. A carriageway may therefore be 5.1m overall wide, with 1.2m walkways both sides. The carriageways may be wider in increments of 3.4m; and may always be extended widthways in increments of 3.4m. There is an element of choice in the marked carriageway widths and the widths of the walkways. The minimum bridge will be single lane with a 4m marked roadway.

They will have local Reinforced Concrete decks 0.250m thick, placed on our lost formwork decking with no propping needed. They can have 0.05m of surfacing. The concrete will become composite with the steel via shear connectors.

They have steel crash barriers on both sides of the carriageways. The walkways will be outside the crash barriers and will have handrails on the outside. The Bridge Decks are carried by 2 or more pairs of trusses below deck level. There is no steel above the deck other than barriers. Please note that the roadway will have to be at a height well above the flood level: as a guide the depth of the trusses is about 8% of the span, and the roadway is above this truss.

The bridge decks are cambered from side to side using pre-cambered steel transoms; and slightly cambered from end to end using the built in camber of the trusses. All spans are simply supported.

There are two walkways, both outside the main trusses, 1.2m wide, with handrails outside. The pedestrian, handcart and cycle traffic using them is protected from the vehicle traffic by the crash rails.

The decks of the walkways are local reinforced concrete 0.125m thick placed on our lost formwork decking.

The bridge steel is entirely bolted together using regular high strength tension and shear bolts. There are no friction grip bolts. Most of the main connections are end-plated. Adjustment is by means of steel packs which can be inserted between end plates.

The bridge steel is all in pieces which can easily be transported in 20ft or 40ft containers, or on regular road vehicles.

The bridges are designed to British Standard BS 5400 for any number of lanes of full highway loading, and for 30 units of HB loading, equivalent to an occasional 120 tonne truck. All the structural design is in house by *Reidsteel*.

All the steel work is hot dip galvanised 85microns, 610gm/m2, for long low maintenance life.

The bridges can be erected in-situ on a temporary causeway or on temporary jackable props; or may be built on the ‘home bank’ and Cantilever Launched across the gap. For the cantilever launch, a ‘Launch Kit’ is needed, consisting of sets of rollers, a steel ‘launching nose’ fitted to the leading edge of the bridge (and removed for re-use after launch), and come-along cable jacks.

The bridges will sit on our elastomeric bearings on your abutments. Expansion joints for the roadway are provided at both ends.

The bridges may be combined with other bridges to make multi-span crossings. Again the bridges can be built in-situ; or they can be cantilever launched. For multi-span bridges which are to be cantilever launched it is necessary to use a ‘Link Kit’ which consists of further sets of rollers, and further jacks, and a set of link steelwork which joins adjacent bridges during the launch and roll-out. As with the Launch Kits, the Link Kits can be used again and again. You will need one Link Kit for a 2-span bridge and 2 Link Kits for a 3-span bridge and so on.

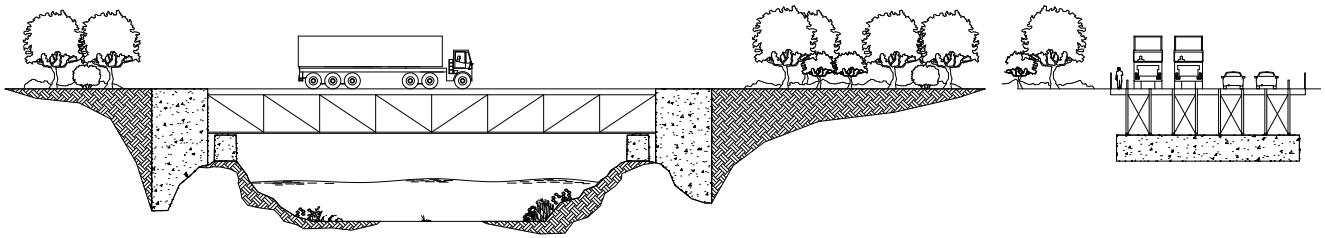
Our work carries a ten year warranty.

BRIEF OVERVIEW

OVER-TRUSS BRIDGES ARE GOOD FOR:

- **Spans 25m to 100m.**
- **Easy widening.**
- **Building in situ or cantilever launch**
- **Single or Multiple Spans**

But: clearance under the trusses might mean higher approaches and bigger embankments.



Left: *Southern highway Belize.*

Standard Steel Stayed Bridges

FULL TECHNICAL INFORMATION

The Carriageways are 2-lane. They are 7.3m wide between crash barriers.

They will have local Reinforced Concrete decks 0.25m thick, placed on our lost formwork decking with no propping needed. They can have 0.05m of surfacing.

They have three levels of steel crash barrier on both sides of the carriageways so that neither trucks nor their payloads can hit or damage the steel stays.

The Bridge Decks are carried by a series of sloping stays from a tower at the 'home' end of the bridge; or from towers at both ends. Several stays at different angles go from the top of the tower down to the deck. These towers are stabilised with a bracing system between them above 6m clear of the carriageways. The bridge stay loads are resisted by stays on the land side of each tower going down to substantial anchor blocks

The bridge decks are cambered from side to side using pre-cambered steel transoms; and slightly cambered from end to end using the adjustment of the stays.

There are two walkways, both outside the main trusses, 1.2m wide, with handrails outside. The pedestrian, handcart and cycle traffic using them is protected from the vehicle traffic by the crash rails and main trusses.

The decks of the walkways are local reinforced concrete 0.125m thick placed on our lost formwork decking.

The bridge steel is entirely bolted together using regular high strength tension and shear bolts. There are no friction grip bolts. Most of the main connections are end-plated. Adjustment is by means of steel packs which can be inserted between end plates.

The bridge steel is all in pieces which can easily be transported in 20ft or 40ft containers, or on regular road vehicles.

The bridges are designed to British Standard BS 5400 for 2 lanes of full highway loading, and for 30 units of HB loading, equivalent to an occasional 120 tonne truck. All the structural design is in house by *Reidsteel*.

All the steel work is hot dip galvanised 85microns, 610gm/m2, for long low maintenance life.

There are two arrangements possible: either the towers and the anchor block are on one side only, with a stayed bridge stayed only from one side of the gap and with a short simply supported link at one end: or there can be towers and anchor blocks at both ends, with a simply supported link at the centre of the span. The first step is the erection of the abutments, anchor blocks, towers and back-stays. Then the first segment of deck is erected, and the first transoms bolted between them. A railway is built on these transoms, and on the railway an erection gantry. The erection gantry permits the addition of the steel stays and then further extensions of the bridge deck, and further stays.

For a bridge with towers at both sides, two erection gantries may be used at the same time.

The bridges will sit on our steel bearings on your abutments. Expansion joints for the roadway are provided at both ends of the simply supported link section.

The erection gantries are re-usable on other bridges of the same span.

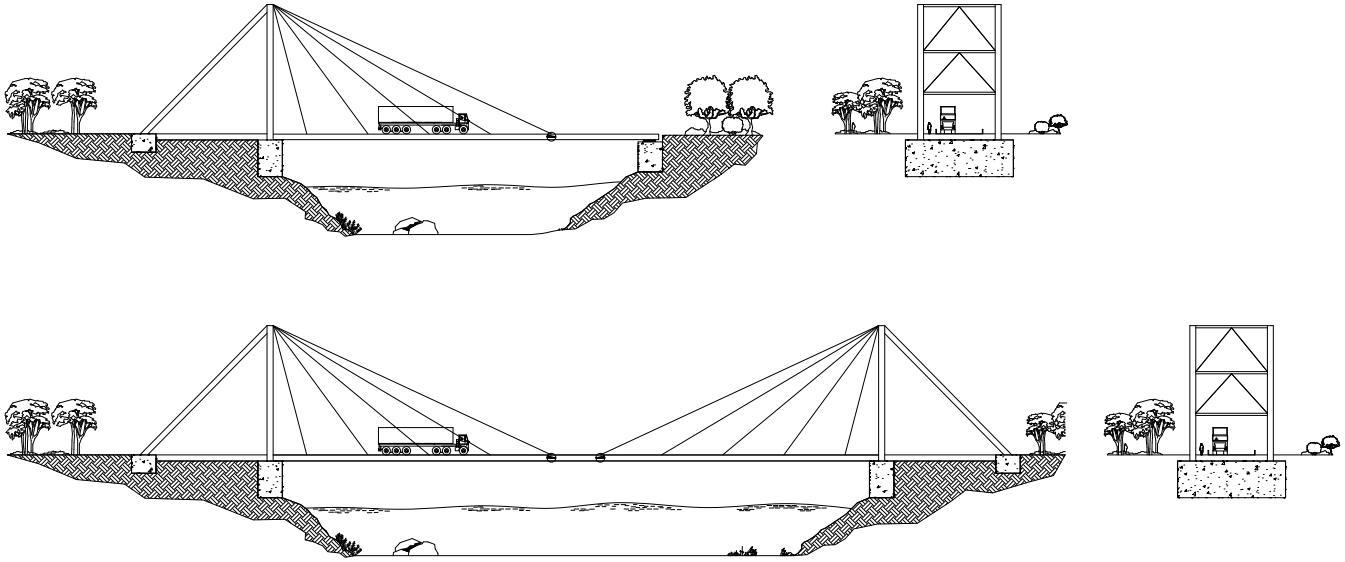
Our work carries a ten year warranty.

BRIEF OVERVIEW

STAYED BRIDGES ARE GOOD FOR:

- **Long spans up to 200m.**
- **Where building in situ or cantilever launch is not possible.**
- **Where access to the far side is difficult.**
- **Where a big visual impact is required.**

But: can only be widened by building another bridge alongside.



Standard Steel Decked Relocatable Bridges

FULL TECHNICAL INFORMATION

There is a frequent need for relocatable bridges. A concrete deck is not relocatable, so on these we use a thick anti-skid galvanised steel deck. These deck panels are bolted to joists and are easily replaceable.

The joists span onto transoms which themselves span onto two trusses. These bridges are open top through trusses (OTTT) up to 30.5m; the longer ones are closed top through trusses (CTTT). The decks are 4.2m or 7.3 m wide between the crash barriers as a standard.

The design is for AASHTO loads HS 25; this is for a 41 ton truck.

The bridges can be single span, or multispan on piers. As with our standard highway bridges, the trusses are protected by substantial steel crash rails at different levels (unlike many other emergency type bridges). These crash rails protect the trusses against the truck chassis and the payload higher above the roadway.

All the steel is hot dipped galvanised for long low maintenance life. The bridges have a small end to end camber. All of its component parts are containerised and the bridges can be built in situ or cantilever launched; launch kits are available with a nose, rollers and cable jacks. The standard bridges have no walkways.

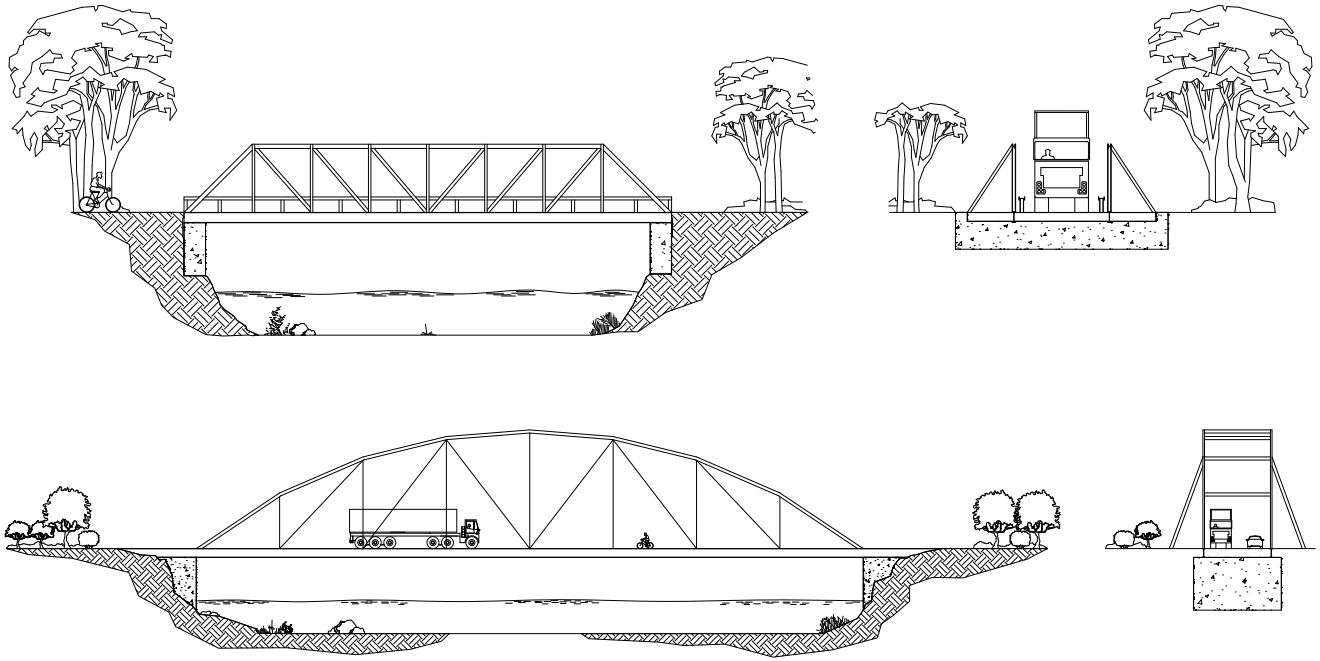
Range of Standard Steel Decked Relocatable Bridges

Span	Type	Width	Load	Launch Kit
12.9m	OTTT	4.2m/7.3m	AASHTO to HS 25	Type 1
15.24m	OTTT	4.2m/7.3m	AASHTO to HS 25	Type 1
18.29m	OTTT	4.2m/7.3m	AASHTO to HS 25	Type 2
21.34m	OTTT	4.2m/7.3m	AASHTO to HS 25	Type 2
24.38m	OTTT	4.2m/7.3m	AASHTO to HS 25	Type 3
27.43m	OTTT	4.2m/7.3m	AASHTO to HS 25	Type 3
30.48m	OTTT	4.2m/7.3m	AASHTO to HS 25	Type 3
40.4m / 50.4m / 60.4m	CTTT	4.2m/7.3m	AASHTO to HS 25	Type 4
70.5m / 80.5m / 90.5m	CTTT	4.2m/7.3m	AASHTO to HS 25	Type 4

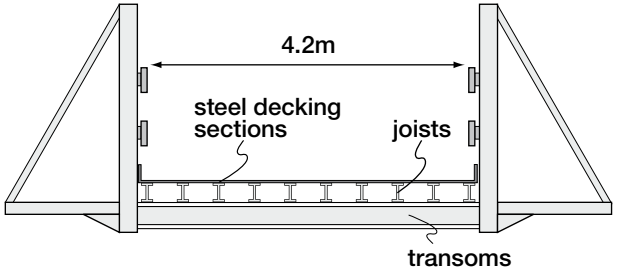
BRIEF OVERVIEW

RELOCATABLE STEEL DECKED BRIDGES:

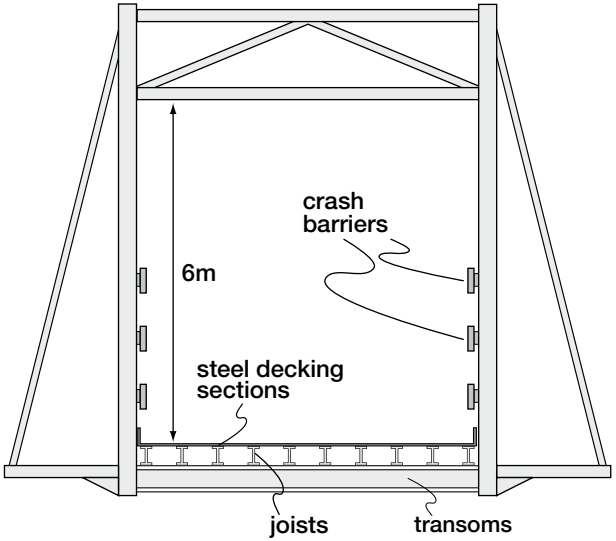
- **When you may need to take them down and re-build elsewhere.**

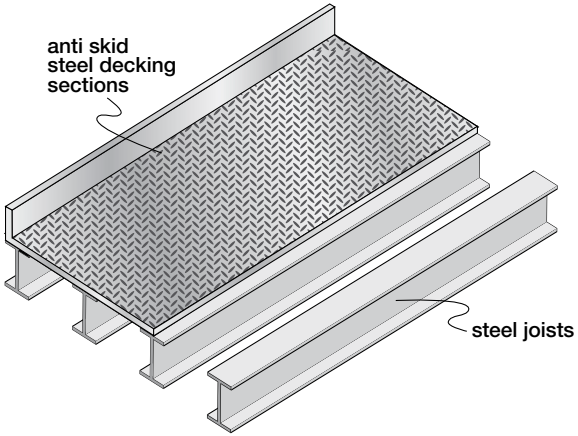


Open Top Through Truss



Closed Top Through Truss





Enquiry Form

PLEASE COPY OR PRINT, ONE FOR EACH BRIDGE

Type of Bridge	Quantity	Width between crash barriers	Span centres of abutments (please circle)	Clear height on carriageway	Loading HA, HB
Composite beam		7.30m	10, 12, 15, 18, 21, 25, 30m	*not applicable*	HA + 30 units HB
Non-standard composite beam			*not applicable*		
Standard through truss		7.30m	30, 40, 50, 60, 70, 80, 90, 100m	6.00m	HA + 30 units HB
Non-standard through truss					
Standard over truss		7.30m	25, 30, 40, 50, 60, 70, 80, 90, 100m	*not applicable*	HA + 30 units HB
Non-standard over truss			*not applicable*		
Standard 2 Tower stayed		7.30m	70, 90, 110, 130, 160, 200m	6.00m	HA + 30 units HB
Non standard 2 tower stayed					
Standard 1 tower stayed		7.30m	35, 45, 55, 65, 80, 100m	6.00m	HA + 30 units HB
Non standard 1 tower stayed					

HELP! Please describe:

Name:

Company:

Deck Type (please circle)	**Number of Walkways**	**Width of Walkways** (please indicate)	**Number of Spans** (please indicate)	**Build Method**	**Protection**
0.25m RC on lost formwork	2	1.2m	1 – 10	Build in situ or cantilever launch	Hot dip galvanised
Steel or Concrete					
0.25m RC on lost formwork	2	1.2m	1 – 10	Build in situ or cantilever launch	Hot dip galvanised
Steel or Concrete					
0.25m RC on lost formwork	2	1.2m	1 – 10	Build in situ or cantilever launch	Hot dip galvanised
Steel or Concrete					
0.25m RC on lost formwork	2	1.2m	*not applicable*	Build out from both sides	Hot dip galvanised
Steel or Concrete					
0.25m RC on lost formwork	2	1.2m	*not applicable*	Build out from one side	Hot dip galvanised
Steel or Concrete					

Address:

Email:

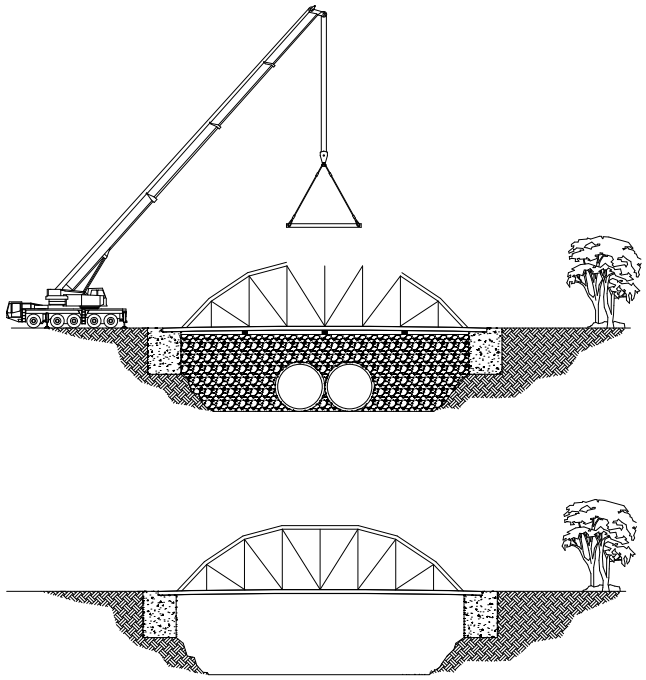
Scan and Email to **sales@reidsteel.co.uk** or fax to: **+44 1202 470103**

Construction Techniques

BASIC CONSTRUCTION TECHNIQUES IN STEEL BRIDGE BUILDING

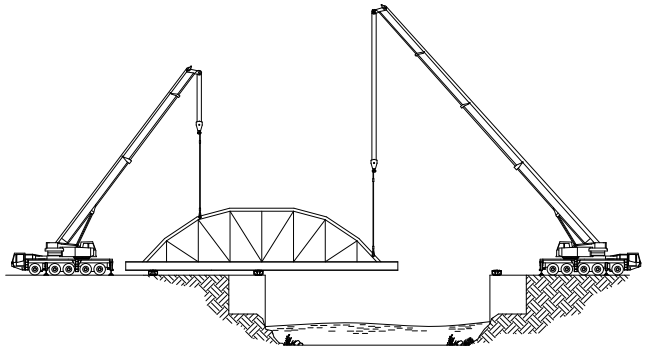
THROUGH TRUSS

The easiest construction technique is in situ during the dry season, over causeway and culverts. We advise too much camber, leaving gaps in the top chord, which close when the causeway is removed.



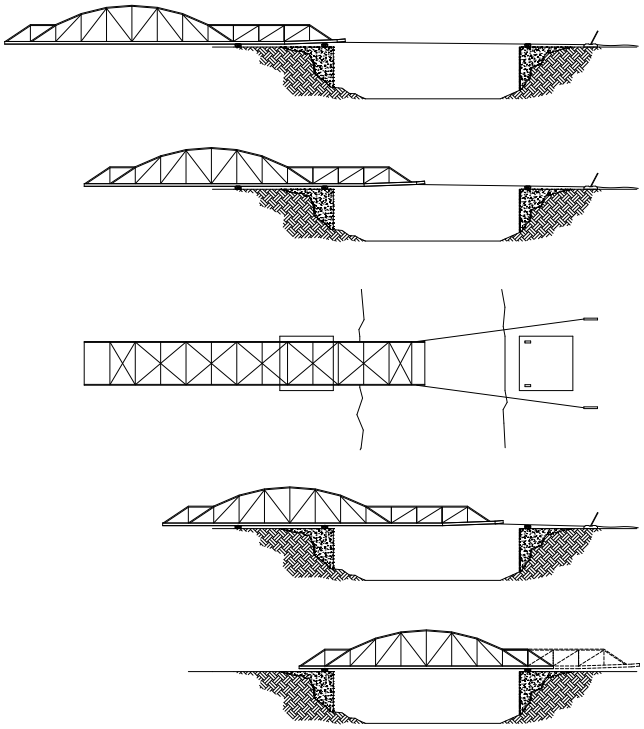
THROUGH TRUSS

Truss built in situ on home bank, then craned to half way. The entire bridge is then lifted into position with large cranes on both banks. Good for small, light bridges when large cranes are also available.



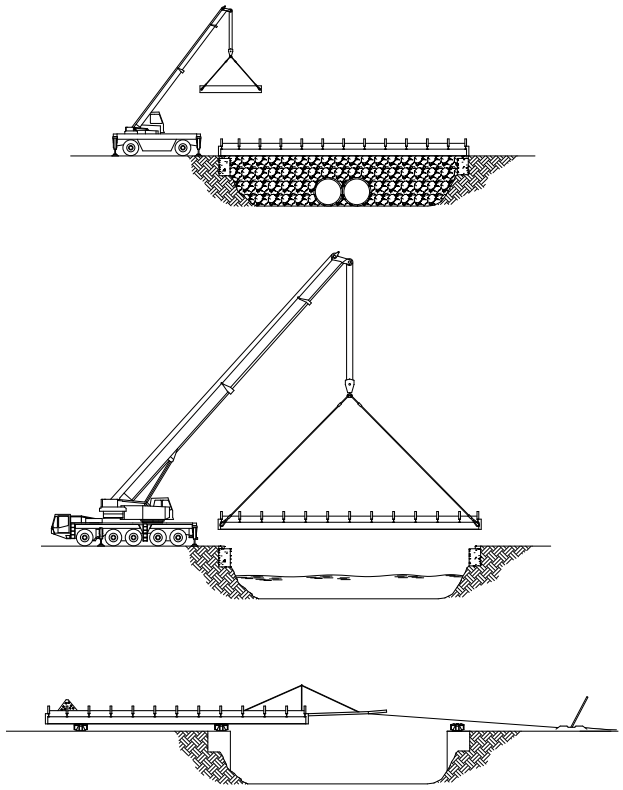
THROUGH TRUSS

Roller launch method. The bridge is constructed in situ and then jacked across the span using rollers and cantilever technique. A temporary nose section is used this is removed once the bridge is in place.



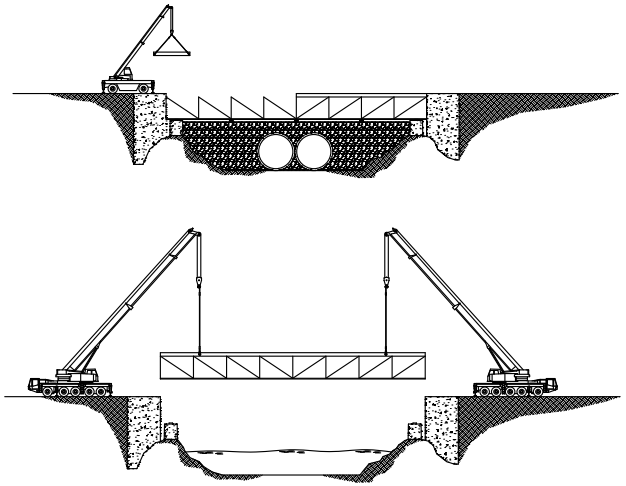
COMPOSITE BEAM

The easiest construction technique is in situ during the dry season, over causeway and culverts. Beams can often be lifted in, single or joined in pairs, by one crane from one side or beams can be joined in pairs then roller launched or cantilever launched; then jacked down into place. Once in position it simply remains to bolt in remainder of diaphragms, add flashings, add rebar and then pour concrete finish and cure.



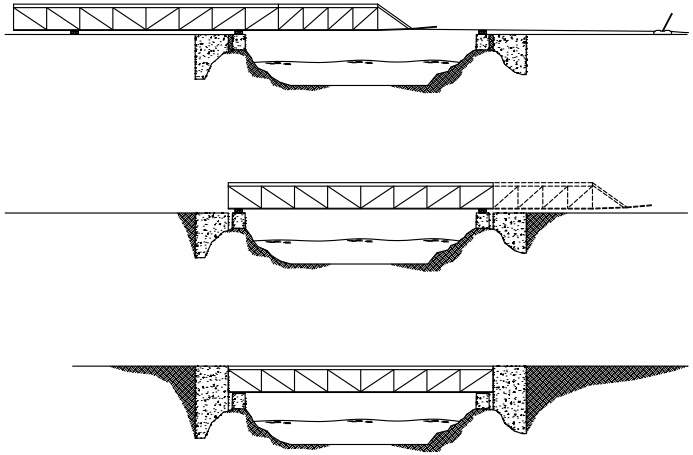
OVER TRUSS

The easiest construction technique is in situ during the dry season, over causeway and culverts. Or 2 -3 beams can often be lifted in, singly or joined in pairs, by cranes on each bank.



OVER TRUSS

Roller launch method. The bridge is constructed in situ and then jacked across the span using rollers and cantilever technique. A temporary nose section is used this is removed once the bridge is in position. The bridge is then simply lowered into place.



REIDsteel Company Profile

Founded in 1919 by Colonel John Reid, *REIDsteel* is still family owned and occupies a 4 acre site at Christchurch in Dorset, England.

We have been making steel bridges since the 1930s. We are able to design, manufacture, ship all over the world and erect almost every type of steel bridge, including beam bridges, over truss bridges, through truss bridges, bow-string bridges, cable stayed bridges and pedestrian bridges. Our bridges are designed and made to British Standard 5400 Highway Bridge Loading Specification. We have vast experience and knowledge with construction in remote regions, tropical climates, and in earthquake and hurricane design.

One company covers all

What makes us so unique is that we cover everything from the design to the erection process itself, all within our 4 acre site in Christchurch.

We have our own unique computer software which has been developed by us for us, which allows us to design and price a building or bridge in minutes rather than months. The machines in our works use the latest CAM systems which have been programmed just metres away in our drawing office. If one of our workmen has a question about a design, they can walk straight up to our offices and ask the designer himself. Using different companies to do different jobs creates a lot of confusion, wastes time and money, and causes endless arguments. With *REIDsteel*, one company is responsible for everything.

From design to erection in 3 months

Choosing *REIDsteel* to construct your steel bridge allows it to go from design to construction within 3 months, and be in use and fully functional within 6 months. We also make all types of industrial and commercial buildings, including aircraft hangars. Going from architect to engineer to contractor means it could be a year or even longer just to get to the manufacturing stage. This traditional route will usually involve using more than one contractor – one for the frame, one for cladding, one for windows, one for doors etc. We can supply all of the accessories needed for the complete structure without the fuss.

Made to the highest standards by an 'A' rated company

We use Corus Steel rolled to British Standards, which is used by us almost exclusively. We are registered Qualified Steelwork Contractors, having been subjected to a Capability and Capacity AUDIT by the British Constructional Steel Association, which takes into account our assets, plant, skills, experience, turnover, financial status, contract references, product and public liability insurances etc. We received an A rating (highest), which qualifies us to design and make every form of structural steelwork, from multi-span bridges to the largest aircraft hangars to the lightest architectural work.

We have received the Queens Award for Enterprise four times, in 1985, 2006, 2008 and 2009. This is the highest honour that can be bestowed on a UK company.

REIDsteel through truss highway bridges have two lane roadways so that even large lorries can be driven on either side with plenty of space to spare. There are three lines of heavy duty steel protector bars on each side of the carriageway to prevent collisions with the main steelwork.
◄ ▼

Hot dipped galvanised steelwork ensures superb protection and long life.
◄

REIDsteel's own specially designed and made bridge launch rollers. ►

THE BRIDGE BUILDERS
Rollo Reid, Technical Director of REIDsteel (far right) with the team from ***Kalika*** *of Kathmandu, who erected this bridge.*

REIDsteel

we bridge the world

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BASEA British Airport Services & Equipment Association

BCSA

RQSC Registered Qualified Steelwork Contractor

SCI Member Steel Construction Institute

THE QUEEN'S AWARDS FOR ENTERPRISE:
INTERNATIONAL TRADE 2006, 2008, 2009