Project Reference Catalogue
Bridge Design Services

www.wiecon.com.tw Pre-cast Segmental Bridges
South Surra Road Interchange Upgrade, Contract RA256 Kuwait.

Client:
BBE

Project:
RA256 Precast Segment Lifting Device Design.

Services:
Detail Design
Shop Drawings

Services period:
2018-2019

Background:
The project consists of 9 interchange fly over bridges with various spans. The max span being 65 and 85 meters. Our scope of work was to design the lifting equipment to lift the segments for the precast segmental decks. Deck width varies with a max width of 9.8m. Typical segment width is 3m.

The works will include upgrading the roads in the area and creating links to the major highways such as the 6th ring road and King Faisal motorway. The works will also include the diversion, upgrading, and protection of the old utilities connected to the upgraded road networks.

There are a number of elements in the area that will be taken into consideration when planning the roads such as current residential neighbourhoods, governmental zone, Sheikh Jaber Hospital, commercial facilities, and the proposed Siddiq area Development.
West Coast Freeway No. 61, Fangli to Da-an, Taichung Coastal Area, Taiwan. Precast Segmental Bridges.

Client: Ta-Chen Construction & Engineering Corporation.

Project: West Coast Freeway No. 61, Precast Segmental Bridges.

Services: Precast Segmental Launching Equipment Design.

Services period: 2014-2016

Background: The new extension of the west coast freeway number 61 links the districts of Fangli and Daan, Taichung City Coastal Area. The new freeway extension is an elevated expressway and is constructed using the precast segmental method. The elevated freeway has a max span of 55m and a min span of 40m. The deck width is 22.7m and has an overall depth of 2.8m.
Paket ~ Seskoal Precast Segmental Project, JL CMT Metro MRT Project, Jakarta, Republic of Indonesia.

Client:
Dywitech Systems, Indonesia.

Project:
Paket ~ Seskoal Precast Segmental MRT Project.

Services:
Construction Engineering
PT Shop Drawings
Launching Calculation Check
Precast Segmental Equipment Design

Services period:
2015-2016

Background:
The PAKET-SESKOAL MRT bridges consists of pre-cast concrete post tensioned box girders with span configurations as stated in the table on the right. There are a total of 9 units with varying span and pier arrangements. The bridges are constructed using the precast segmental method and erected span by span. The decks have a width of 9m and are 2.6m in depth.
Macau Light Rail MRT. Contract C360 Precast Segmental Bridges, Special Administrative Region of Macau.

Client:
Continental Engineering Corporation.

Project:
Contract C360 Precast Segmental Bridges.

Services:
- PT Shop Drawings
- Construction Engineering
- Independent Checking Engineering for the Launching Girder.

Services period:
2015-2016

Background:
The Macau new light rail MRT project includes the construction of numerous viaducts and 4 LRT stations between Rua do Pai Kok and East Cotai. It will serve the residents of Nova Zona & Taipa as well as enable the public to gain access to the facilities in and around Macau East Asian Games Dome. Wiecon’s Scope of work included the construction engineering and PT shop drawings for 7 precast segmental viaducts (units). The span arrangement varies with a min span of 25m and a max span of 35.5m. The decks have a total width of 9.55m and a total depth of 2.2m. Wiecon also provided the checking engineering services for the precast segmental launching girder.
Pembangunan Jalan Tol Bogor Ring Road Seksi II A Extension Project, West Java, Indonesia.

Client: Wika Construction, Indonesia.


Services period: 2013-2015

Background:

Pembangunan Jalan Tol Bogor Ring Road Seksi II A Extension Project, West Java, Indonesia.

Bogor Ring Road is a precast segmental project with more than 1000 segments. The main launching girder has a total length of 113m & the typical span length is 50m.

The double box concrete deck has a width of 22m and the single box concrete deck has a width of 11m.
The C911 Precast Segmental Project is an extension of the existing main north and south freeway number 1.

Client:
Huang Chung Construction, Taiwan.

Project:
The C911 Precast Segmental Project is an extension of the existing main north and south freeway number 1.

Services:
Precast Segmental Erection Girder Design, Main Deck Formwork System Design & Construction Engineering

Services period:
2010-2013

Background:
The C911 Precast Segmental Project is an extension of the existing main north and south freeway number 1. The Extension of the freeway is located between Chungli and Yungmei, Taoyuan County, Taiwan. The main erection gantry is 160m long and erected deck segments with varying span lengths. The maximum span length is 75m and the minimum span length is 40m. The standard deck segment dimensions consists of a deck width of 11.8m and a casting standard length of 3.3m.
Outer Circular Highway to the city of Colombo Project (Northern Section 1), Republic of Sri Lanka.

Precast “I” Girder Bridge Design for 22 Viaducts.

Client:
Taisei Corporation & The Road Development Authority of Sri Lanka.

Project:
Outer Circular Highway to the city of Colombo Project (Northern Section 1), Republic of Sri Lanka.

Services:
Detailed Design
Shop Drawings
Construction Engineering

Services period:
2012—2014

Background:
The outer Circular Highway (OCH) is located in the Colombo Metropolitan Region and passes through two administrative districts, namely Colombo and Gampaha. This highway runs around 20 km away from the City centre of Colombo, connecting radial routes and has a total length of 29.2 km. The northern end of the highway is located at Kerawalapitiya on Colombo-Katunayake Expressway and the southern end is located at Kottawa on Colombo-Ratnapura-Wellawaya-Batticaloa (A004) road where Southern Expressway meets OCH. Northern Section 1 consists of 22 viaducts constructed using the precast “I” girder system. The bridge lengths vary with the shortest length being 42m and the longest bridge length being 1505m. The bridges widths vary from 8.7m to 16m. Span lengths vary from a minimum of 13m to a max span of 40m.

The bridges cross various geographic situations from rivers, existing road intersections, national road intersections, wetlands, road intersections and general urban areas.

Client:
MK4, MEPS, Republic of Kuwait.

Project:

Services:
Detailed Design
Shop Drawings
Construction Engineering
Deck Segment Lifting Equipment Design

Services period:
2012—2013

Background:

RA184: 5 Precast Concrete Segmental Viaducts: (INCLUDING CASTING FORMWORK & CASTING YARD)
IC1A, IC3A, IC3B: 32m+47+32m Spans = 111m bridge lengths.
IC1B: 32m+42+32m Spans = 106m bridge length
IC4N, IC4S: 32m+44m+32m Spans = 108m bridge lengths.

RA186: 3 Precast Concrete Segmental Viaducts:
IC1A: 28m+39m+39m+28m = 134m bridge length
IC1B: 25m+35m+35m+25m = 120m bridge length
IC11: Total bridge length is 761m consisting of 16 spans with a maximum span of 55m and a minimum span of 32.5m. The average deck width is 12m and the depth varies from 2m to 2.7m.
Islamic Republic of Afghanistan, Ministry of Public Works.

Construction and Rehabilitation of The Road From Qaisar to Laman, Badghis Province, Afghanistan.

Client:
Mega Yapi Construction & Trading Company, Turkish republic.

Project:
Construction and Rehabilitation of The Road From Qaisar to Laman, Badghis Province, Afghanistan.

Services:
Detailed Design
Shop Drawings
Construction Engineering

Services period:

Background:
The Rehabilitation of the road between Qaisar to Laman situated in Badghis Province Afghanistan consists of 8 bridges constructed using the precast “H” beam method for the decks.

Each Bridge Configuration is Listed Below.

Bridge 1: 20m+20m+20m = 60m Total Bridge Length
Bridge 2: Box culvert
Bridge 3: 20m+20m+20m = 60m Total Bridge Length
Bridge 4: 22.5m+22.5m = 45m Total Bridge Length
Bridge 5: 22.5m+22.5m = 45m Total Bridge Length
Bridge 6: 22.5m+22.5m = 45m Total Bridge Length
Bridge 7: 22.5m+22.5m = 45m Total Bridge Length
Bridge 8: 20m+20m+20m = 60m Total Bridge Length
Bridge 9: 20m+20m+20m = 60m Total Bridge Length

All bridges have a total deck width of 11m that consists of two side walks and two traffic lanes.
AFGHAN NATIONAL ARMY (ANA)
3/207th GARRISON CHASHMA-E-DOSAKH BADGHIS PROVINCE, AFGHANISTAN

U.S. Army Corps of Engineers
Afghanistan Engineering District (USACE-AED)

Client:
Mega Yapi Construction & Trading Company, Turkish republic.

Project:
The Badghis Bridge is a precast pre-tensioned I-girder bridge.

Services:
Detailed Design
Shop Drawings
Construction Engineering

Background:
The Badghis Bridge is a precast pre-tensioned I-girder bridge which spans the Qalai river situated in Badghis Province. The bridge is required to provide access to the newly constructed ANA main site facility. A summary of the bridge data is given below and it has a deck width of 8.7m consisting of two lanes of traffic. All spans are 22m in length.

<table>
<thead>
<tr>
<th>BADGHIS BRIDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMMARY OF MAIN BRIDGE DIMENSIONS (METERS)</td>
</tr>
<tr>
<td>10 SPAN @ 220m = 220 BRIDGE LENGTH</td>
</tr>
<tr>
<td>AXIS No.</td>
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<tr>
<td>VERTICAL DIMENSIONS</td>
</tr>
<tr>
<td>OVERALL DECK DEPTH (INCLUDING ASPHALT, SLAB, I-GIRDERS)</td>
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</tbody>
</table>

[Diagram and map showing the bridge location and surrounding area]
Gautrain High Speed Rail Project, South Africa

Viaduct Design Services

Client
The Bombela Consortium and Vela VKE a section detailed designer.

Project
Gautrain HSR Viaduct Section Design Services.

Services
- Detailed design
- Specialist consultant

Services period
2006 - ongoing

Background
Gautrain is an 80 km double track high speed railway system in South Africa that will link Pretoria Station and Johannesburg Park Station to OR Tambo International Airport.

The BOT concession was awarded to the Bombela Consortium; a JV between Bombardier, Bouygues and Travaux Publics of France, and Murray & Roberts, a South African engineering & contracting company.

The BOT rail project started in May 2006 and the initial planning is to be ready for the 2010 FIFA World Cup.

Bombardier will supply a fleet of 24 Electrostar four car emus of similar design to their rolling stock vehicles used in the United Kingdom; and the overall project has been estimated to be 3.3 billion US$.

Vela VKE; a section detail designer; appointed Pöyry Infra as a specialist consultant for five precast concrete segmental viaducts along the double track HSR route between Midrand and Marlboro Stations.

The services includes the preliminary and detail design of the five viaducts; performing specialized rolling stock calculations and providing consulting services support for precast concrete segmental construction.

The precast concrete box segments are all 10.1 m wide and 3.5 m deep in cross section; and the five viaduct spans and lengths are:

- V01 5 spans, 230 m long
- V03 13 spans, 638 m long
- V11 5 spans, 230 m long
- V13 10 spans, 444 m long
- V14 15 spans, 638 m long
Taipei Rapid Transit System, Neihu Line, Taiwan

Mucha Line Extension, Precast Segmental

Client
Kung Shin Contractors, Taiwan.

Project
Taipei Rapid Transit System, Mucha Line, is being extended to the district of Neihu, and called the Neihu Line.

Services
- Precast pier cap mould design
- Precast segmental mould design
- Design of the equipment for the segmental cantilever erection
- Design of the erection equipment for full span precast girders

Services period
2004 - 2006

Two long bed casting moulds were designed for production of over 400 precast segments, and the maximum segment weight was about 65 tons.

Four precast moulds were designed to produce 227 precast pier caps; and the design of equipment for construction also included:
- four balanced cantilever erection girders
- full span precast U girder erection equipment
Taiwan High Speed Rail Project, Contract C 250
Overpass Bridges, Design Unit 04.06 & 04.07

Client
THSRC; the Taiwan High Speed Rail Corporation; the BOT concessionaire company responsible for the 345 km high speed rail project between Taipei and Kaoshiung.

Project
Design Construct Lot C 250; Hochtief / Ballast Nedam / Pan Asia; the HBP Joint Venture for 2 road bridges over the high speed railway alignment.

Namely bridges in Design Unit 04.06 and 04.07.

Services
- Preliminary design
- Detailed design
- Contractors consultant
- Construction engineering

Services period
2001 - 2003

Background
Services were provided for detailed design and construction support for two overpass road bridges across the high speed rail alignment near Taichung.

Overpass bridge 04.06 consisted of seven spans of 25 m each; in total 175 m, with a deck width of 8 m.

The bridge had a cast in place slab 0.285 m thick supported by 4 precast concrete I beams, 1.7 m deep and 0.7 m wide for each span.

Overpass bridge 04.07 consisted of three spans of 23.26 m + 29.313 m + 8.572 m; in total 61.145 m.

The deck width was 6 m and was supported by three precast I beams 2 m deep by 0.7 m wide for each span, with a cast in place concrete deck 0.285 m in thickness.
Second Freeway, Contract C 327, Taiwan

Precast Segmental Bridge

Client
Hwang - Chang Contractors, Taiwan

Project
4.9 km of Second Freeway Viaducts, in Contract C 327, Taiwan.

Services
- Design of the precast segmental erection equipment.
- Design of the precast segmental takeover tower.
- Construction stage calculations
- Camber calculations and adviser for the geometry control
- Project planning, consulting and supervision
- Shop drawing preparation

Services period
2001 - 2003

Background
The 4.9 km and 32 m wide precast concrete segmental viaducts were a part of the Taiwan Second Freeway Contract C 327 near Taichung; with spans varying from 40 m to 45 m.

Responsible for C 327 construction engineering and planning services of the:
- construction engineering & planning
- construction equipment design
- steel girder fabrication
- heavy lifting equipment
- precast segment transport

The equipment included:
- above lying erection girders 2 No
- segment takeover tower 2 No

Also served as the consultant to the C 327 contractor during the viaduct construction
Expressway No. 5, Contract C 511, Taiwan

Precast Casting Moulds

Client
Sinotech Engineering Consultants.

Project
Design of precast concrete moulds for Contract C 511. The weight of one precast mould was 70 tons.

Services
- Precast mould designs
- Drawings and specifications
- Fabrication inspection
- Operating manual preparation
- Precast yard design

Services period
2001 – 2002

Background
The 30.8 km Expressway from Taipei to Ilan on the east coast of Taiwan exits the Snow Mountain Tunnel and continues on the 1,140 m elevated section of Contract C 511 towards Luodong and Suao.

Services were provided to Sinotech Engineering for the design of 7 sets of short bed casting moulds to cast the 24 m x 2 m precast segments. Also for the design of the site casting yard layout which was used during the construction of C 511 elevated viaduct.

The scope of services included:
- design of the casting moulds for the regular segments
- design drawings for the casting moulds for fabrication
- specifications of the moulds
- inspecting the moulds in the workshop
- inspection of the moulds after assembly on site
- foundation design for the moulds
- operations manual

Following factory fabrication of the casting moulds an inspection was carried out on the preassembly and function of the test prior to delivery of the moulds to site.
Second Freeway, Contract C 383 A, Taiwan

Precast Segmental Bridge

Client
Pan Asia Contractors, Taiwan.

Project
The Second Freeway Viaducts
Contract C 383 A; 7.45 km long.

Services
- Design of precast segmental moulds and erection equipment
- Construction stage calculations
- Casting yard layout design
- Camber and segment casting control calculations
- Project planning, consulting and site supervision
- Shop drawings

Services period
1999 – 2002

Background
7.45 km long and 24 m wide precast concrete segmental viaducts were used to construct 40 m spans on the Second Freeway C 383 A.

Responsible for the construction engineering and planning of the:
- construction equipment design
- precast segment moulds
- steel girders
- heavy lifting
- transportation

Also serving as the consultant to the Pan Asia Contractor during the construction of the viaducts.

The equipment design included:
- below lying erection girders 4 No
- long bed casting moulds 8 No
- short bed casting moulds 10 No
- 80 t segment placing gantry 4 No
- rebar fixing jigs 5 No
Second Freeway, Contact C 383 B, Taiwan

Precast Segmental Bridge

Client
Guo Teng Contractors, Taiwan.

Project
The 6.8 km long Second Freeway Viaducts Contract C 383 B.

Services
- Design of precast segmental moulds and erection equipment
- Construction stage calculations
- Casting yard layout and design
- Camber and segment casting control calculations
- Project planning,
- Consulting and site supervision
- Shop drawings

Services period
1999 – 2002

Background
The 6.8 km long, 24 m wide precast segmental concrete viaducts were used to construct 40 m spans on the Taiwan Second Freeway C 383 B.

Responsible for the construction engineering and planning of the :
- construction equipment design
- precast segment moulds,
- steel girders
- heavy lifting
- Transportation

Also serving as the consultant to the Guo Teng Contractor during the construction of the viaducts.

The equipment design included:
- below lying erection girders 4 No
- long bed casting moulds 8 No
- short bed casting moulds 8 No
- 80 t segment placing gantry 4 No
- rebar fixing jigs 5 No
Second Freeway, Contract C 336, Taiwan

Precast Segmental Equipment

Client
Taiwan Area National Expressway Engineering Bureau; (TANEEB); and BES Contractors, Taiwan.

Project
Contract C 336, for a 2 x 2.5 km section of the Second Freeway.

Services
- Equipment detail design and fabrication
- Construction stage calculations
- Casting mould and casting yard design
- Camber calculations and casting geometry control
- Construction planning, consulting and supervision
- Shop drawings

Services period
1996 - 2000

Background
Services were provided to BES for the detail design, construction and engineering planning; and all the construction equipment design.

Including the design of precast segment moulds, and the steel girder heavy lifting and transport.

Services were also provided as the consultant to BES during the construction for the 2 x 2.5 km section of the Second Freeway.

The deck width was 16.1 m and the equipment comprised of:
- below lying erection girders 3 No
- long bed casting moulds 8 No
- 120 t segment placing gantry 2 No
- rebar fixing jigs 4 No
Second Freeway, Contract C 376, Taiwan

Precast Segmental Gantry

Client
Taiwan Area National Expressway Engineering Bureau; (TANEEB); and Hwang Chang Contractors.

Project
Contract C 376, the 4.3 km long section of the Second Freeway. 3.66 km were built using a precast segmental prestressing method with standard spans of 45 or 50 m; and 640 m were built as two balanced cantilever sections with a maximum span of 105 m.

Services
- Design of precast segmental erection girders and moulds
- Construction stage calculations
- Casting yard layout design
- Camber and segment casting control calculations
- Project planning
- Shop drawings

Services period: 1996 - 2000

Background
The Contract C 376 Viaduct crossed mudstone badlands with numerous pools, depressions, eroded ravine slopes and other unique geological formations.

Services were provided to Hwang Chang for the design of 4 gantries for the erection of C 376 single cell precast box segments that covered 45 to 50 m for the 3.66 km freeway section.

Responsible for the design of placing equipment for the precast segments as well as for the long and short bed casting moulds.

Service were also provided as the consultant to TANEEB during the construction activities.

The responsibilities included:
- construction engineering
- consultant and designer of all the equipment
- designer of the precast segmental casting and the erection methods
Second Freeway, Contract C 376, Taiwan

Short Bed Casting Moulds

Client
Taiwan Area National Expressway Engineering Bureau; (TANEEB); and Hwang Chang Contractors.

Project
3.66 km were built using a precast segmental prestressing method with standard spans of 45 or 50 m; and 640 m were built as two balanced cantilever sections on C 376.

Services
- Construction engineering
- Design of precast segmental moulds and erection equipment
- Construction stage calculations
- Casting yard layout design
- Camber and segment casting control calculations
- Project planning, consulting and site supervision
- Shop drawings

Services period: 1996 - 2000

Background
Eight short bed casting moulds were designed for the production of over 1,800 single cell precast segments erected on Contract C 376.

The casting yard layout and the entire erection process was also planned and designed.

Services were also provided as the consultant to TANEEB during the construction activities.

Responsibilities also included:
- construction engineering
- consultant and designer of all the precasting, transporting and erection equipment
Second Freeway, Contract C 376, Taiwan

Long Bed Casting Moulds

Client
Taiwan Area National Expressway Engineering Bureau; (TANEEB); and Hwang Chang Contractors

Project
3.66 km were built using a precast segmental prestressing method with standard spans of 45 or 50 m; and 640 m were built as two balanced cantilever sections on C 376.

Services
- Design of precast segmental erection girders and moulds
- Construction stage calculations
- Casting yard layout design
- Camber calculations and bearing presets
- Project planning, consulting and site supervision
- Shop drawings

Services period: 1996 - 2000

Background
Eight long bed casting moulds were designed for the production of single cell precast box segments; and over 2,300 units were precast.

Responsibilities included the planning and design of the casting yard layout as well as the entire precast segment erection process.

Services were also provided as the consultant to TANEEB during the construction activities.

The responsibilities included:
- construction engineering
- consultant and designer of all the equipment
- designs for the precast segmental casting and the erection method