Project Reference Catalogue
Bridge Design Services

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Advance Shoring Bridges
Sheikh Sabah al-Ahmad al-Sabah Causeway Crossing Project RA140, State of Kuwait

Client: MEPS. Middle East Pre-stressing LLC

Project: Kuwait RA140 Advance Shoring / Movable Scaffolding System Design.

Services: Detail Design, Shop Drawings

Services period: 2015-2016

Background: The Sheikh Sabah al-Ahmed al-Sabah crossing is a new causeway that will make easier access to and from the port improving the underdeveloped infrastructure which have hindered trade and industry. It’s the goal of the new causeway to help improve the neglected north where an urban area called Silk City is planned. This new city area will be part of the trade hub near the planned new port called Mubarak al-Kabeer.

Wiecon scope of works included the detail design and shop drawings of the movable scaffolding system / advance shoring system equipment that is required to cast numerous spans along the route. The span configuration is 35m, 40m and a maximum span of 45m. The deck width is 17m and has a depth of 2.5m.
Access MRT System Construction Project for Taoyuan International Airport

CE01D Advance shoring / Movable Scaffolding Equipment

Client:
Futzu Construction

Project:
CE01D CKS MRT Line

Services:
Equipment detail design
Equipment shop drawings
Major temporary works

Services period:
2009-2011

Background:
The CE01D concrete viaduct includes a typical two span continuous units following a tight curve alignment. Majority of the bridge units are two 60m spans and to be built by advancing shoring method. The distinct feature is to cast the bridge with a minimum radius of curvature 500m.

Futsu has selected MSS equipments to cast the curve bridge 2 span units by advancing shoring method. To realize the requirement, studies had been conducted and the final outcome is to use an under slung MSS which features functions to cater the changes of different tight curvature of concrete deck.
**Access MRT System Construction Project for Taoyuan International Airport**

**CE02 Advance shoring / Movable Scaffolding Equipment**

**Client:**
Kung Shin Construction

**Project:**
CE02 CKS MRT Line MSS

**Services:**
- Equipment detail design
- Equipment shop drawings
- Major temporary works

**Services period:**
2009-2011

**Background:**
This MSS equipment is designed for casting the full span viaducts of construction lot CE02 of the new Taoyuan International Airport MRT line.

The construction procedure method follows the sequential span-by-span method.

The hanging bracket structure supports the MSS main girder during casting and the launching operation. This method also allows the repetitive operation regardless of piers heights and span lengths.

The min span casting length is 20m and the maximum is 35m.
Taiwan High Speed Rail Project,

Advancing Shoring Method

**Client**
Taiwan High Speed Rail Corporation.

**Project**
Over 127 km of 13 wide prestressed concrete viaducts were constructed; and 9 contractors designed and built 75 kms of viaducts using the ASM; Advancing Shoring Method.

**Services**
Independent Checking Engineer and Independent Site Engineer services.

**Services period**
1999 - 2007
Taiwan High Speed Rail Project, Contract C 210,

Movable Scaffolding System

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

Project
Design of two sets of MSS movable scaffolding system equipment for the Obayashi / Futsu JV; Contract C 210, advancing shoring construction.

Services
- Check calculations of an alternative MSS support proposal
- Drawing checks
- Preparing the design package for official submittal to and approval by THSRC
- Construction engineering support

Services period: 2000 – 2003

Background
Services were provided to Obayashi / Futsu; on C 210 for the design of two sets of 88 m long movable scaffolding system equipment.

The MSS equipment was used for the construction of 2,580 m of 40 m full span cast in place concrete box girder units for C 210 Contract.

The services also included engineering support during construction.

The equipment design was carried out in accordance with the THSRC design specifications for bridge structures.

Taiwan is a highly seismic area and subject to severe earthquakes; and the MSS equipment for the elevated structure needed to be designed to withstand such ground movements.
Taiwan High Speed Rail Project, Contract C 215,

Movable Scaffolding System

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

Project
Design of three sets of MSS movable scaffolding system equipment for the Obayashi / Futsu JV; Contract C 215.

Services
- Check calculations of an alternative MSS support proposal
- Drawing checks
- Preparing the design package for official submittal to and approval by THSRC
- Construction engineering support

Services period
2000 – 2003

Background
Services were provided to Obayashi / Futsu on C 215 for the design of three sets of 88 m long movable scaffolding system equipment.

The MSS equipment was used for the construction of 40 m full span cast in place concrete box girder units for a total length of 7,240 m.

The designs of MSS equipment sets were carried out in accordance with the THSRC design specifications for elevated bridges.

Taiwan is a highly seismic area and subject to severe earthquakes; and the MSS equipment for the elevated structure needed to be designed to withstand such ground movements.

The construction method using the MSS system is where the formwork is assembled; and then advances from one span to the next without the need for reassembly. The MSS is self-propelling and is supported directly off the permanent works.
Taiwan High Speed Rail Project, Contract C 250

Advancing Shoring, Design Unit 03.04

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

Project
Hochtief / Ballast Nedam / Pan Asia: HBP Joint Venture for Contract C 250, Design Unit DU 03.04.

Services
- Contractors consultant
- Equipment design
- Detail Design

Services period : 2001 - 2003

Background
The Design Unit 03.04 alignment was located on the high speed railway line near Taichung. Services were provided to the HBP joint venture for the design of a set of 110 m long movable scaffolding system (MSS) equipment used for the advancing shoring method for the cast in place concreting of 18 x 45 m spans over a total length of 810 m.

The MSS equipment was supported by temporary works directly of the permanent works pier foundation.

The advancing shoring method is a system where the main formwork is assembled and then progressively advances from one deck to the next without the need for reassembly. It is usually self-propelling and supported directly off the permanent columns.

The high speed rail elevated bridge design was carried out in accordance with the THSRC design specifications for the project.

As Taiwan is a highly seismic area, subject to severe earthquakes, the elevated high speed rail structure needed to be designed to withstand severe ground movements.

The dynamic behaviour of the bridge under train loading was checked by carrying out a rolling stock analysis in order to determine that vertical acceleration characteristics of the HSR structure; was well within the THSRC design specifications.
Taiwan High Speed Rail Project, Contract C 250,

Advancing Shoring, Design Unit 14.05

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

Project
Hochtief / Ballast Nedam / Pan Asia; the HBP Joint Venture. The design and construct C 250; DU 14.05.

Services
- Preliminary design
- Detailed design
- Contractors consultant
- Equipment design

Services period
2001 - 2003

Background
The bridge alignment was located on the high speed rail link near Taichung

Services were provided for the detail design and the construction support for the multiple span prestressed concrete high speed railway bridge in Design Unit DU 14.05.

The prestressed concrete box girders were 45 m length and designed to be built by the advancing shoring method of construction.

The advancing shoring method is a system where the main formwork is assembled and then progressively advances from one deck to the next without the need for reassembly. It is usually self-propelling and supported directly off the permanent columns.

The high speed rail elevated bridge design was carried out in accordance with the THSRC design specifications for the project.

The dynamic behaviour of the bridge under train loading was checked by carrying out a rolling stock analysis in order to determine the vertical acceleration characteristics of the structure.

The analysis assured that the HSR elevated structure was well within the requirements of the specifications.

As Taiwan is a highly seismic area, subject to severe earthquakes, the elevated high speed rail structure needed to be designed to withstand severe ground movements.
Taiwan High Speed Rail Project, Contract C 295,

Advancing Shoring Equipment

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

Project
Design and Construct C 295; for the Evergreen Construction / Italian Thai / PEWC; the EIP Joint Venture, for the design of fifteen sets of dual span movable scaffolding equipment.

Services
The equipment incorporated a quick and easy operating procedure and allowed the contractor to achieve the very high production rates necessary to complete the advancing shoring construction of Contract C 295 within the schedule requirements.

Services period
2001 - 2003

Background
Services were provided for the design of fifteen sets of movable scaffolding equipment used for the advancing shoring method to construct most of the rail bridges in C 295.

In order to meet the very exacting construction schedule for the high speed rail elevated line, the design of the equipment was based on the capability to cast two 35 m spans at one time.

Allowing the contractor to achieve the production of 2 x 35 m spans in 10 days for each of the fifteen sets of equipment.

It was essential that the equipment was designed to be as robust as possible to withstand the rigours of the fast rate of construction.

The advancing shoring construction in C 295 was 15.5 km in length.
Second Freeway, Contract WH 48 - 2, Taiwan

Advancing Shoring Equipment

**Client**
Black Stone Construction.

**Project**
Modification designs to one set of movable scaffolding system (MSS) equipment; for advancing shoring construction of the Second Freeway Contract WH 48 - 2.

**Services period**
2001 - 2002

**Services**
- Detail static calculations for the MSS equipment
- Drawings for modifications to the MSS equipment
- Discussion and meetings with the fabricator and contractor
- Inspection during the fabrication
- Final inspection of the assembled equipment in the fabrication yard
- Inspection of the assembled MSS equipment on site
- Construction engineering support

**Background**
Services were provided to Black Stone for modifications to the MSS movable scaffolding system equipment used for the advancing shoring construction of the 2 km long viaducts on Contract WH 48 - 2 near Chiayi.

Services also included the provision of construction engineering support to Black Stone during the advancing shoring construction.
Second Freeway, Chourn - Linbien, Contract C 384,

Advancing Shoring Equipment

Client
Raito Construction Company.

Project
The design of the advancing shoring equipment for the construction of cast in place, single cell, box girder units; 13 m wide, 2.5 m deep, and 1,860 m in overall length; with spans varying from 40 m to 43 m.

Services
The services were provided to Raito Construction for the design of 5 types of advancing shoring equipment used in the construction; and for engineering services during the construction of the Second Freeway, Contract C 384.

Services period
2000 – 2001

Background
Existing advancing shoring equipment used on an earlier Freeway Contract needed to be modified and required the provision of:
- static calculations and drawings of the equipment
- mechanical and electrical drawings for the advancing shoring equipment
- detailed calculations and drawings of the pier brackets
- meetings and inspections during the fabrication process
- final inspection at the fabrication yard of the assembled equipment
- operating manual; including detailed operating instructions
- inspection of equipment assembled on site

Construction engineering services were provided including:
- detailed calculations of all erection stages
- calculation of the stresses at each construction stage
- precamber for each construction stage
- calculations of the effects of creep and shrinkage on the stresses
- calculate final stage stresses of the completed structure
- drawings for all concrete dimensions giving all information for construction
- shop drawings for all prestressing
- prestressing instructions given all information for stressing
- providing the preset values for the bearings
- technical assistance and problem solving during the construction
Second Freeway, Contract C 321, Taiwan

Advancing Shoring Construction

Client
Pan Asia Corporation.

Project
Engineering services provided for the construction of Contract C 321; by the advancing shoring method.

Services
One set of MSS; movable scaffolding equipment for the advancing shoring construction was designed and the services included overseeing all the construction engineering works.

Background
Engineering services were provided to Pan Asia for the advancing shoring and balanced cantilever construction on the Second Freeway C 321.

The services included modifications to an MSS equipment set, which was suitable for the construction all the advancing shoring bridges in C 321; and included:
- detail static calculations
- structural detail drawings
- mechanical drawings
- static calculations for the pier brackets
- structural drawings for the pier brackets
- discussion and meetings with the fabricator and contractor
- inspection during the fabrication process
- final inspection of the assembled equipment in the fabrication yard
- operating manual including detailed operating instructions
- inspection of the assembled MSS equipment on site

The project required the calculation of advancing shoring and balanced cantilever units; including the:
- detail calculations of all erection stages
- calculation of the stresses at each construction stage
- precamber for each construction stage
- the effects of creep and shrinkage on the stresses
- levels at all segment locations
- check of final state stresses of the completed structure
- drawings for all concrete dimensions
- shop drawings for all prestress cables
- prestress instructions
- check of the design and installation procedure for the bearings and expansion joints
- preset values for the bearings
- technical assistance during the construction

Services period: 2000 - 2001
Second Freeway, Contract C 318, Taiwan

Advancing Shoring Equipment

Client
Kung Shin Contractors, Taiwan.

Project
Second Freeway, Contract C 318, near Taichung, Taiwan.

Services
- Advancing shoring equipment design, fabrication
- Construction stage calculations
- Formwork and temporary works design
- Camber calculations and bearing presets
- Project planning, consulting and supervision
- Shop drawings

Services period
1999 – 2001

Background
The advancing shoring method ASM was selected for the construction of the 2,025 m long bridge in C 318.

The moveable scaffold system of the ASM was assembled and advanced progressively from one deck to the next without need for reassembly. It was self propelling and supported directly off the permanent columns.

Two sets of the moveable scaffold system equipment were designed for the Second Freeway Contract C 318. Each set weighing 670 tons.

The services also included:
- construction engineering
- construction supervision
- construction consultant
- design of all the construction stage calculations
Second Freeway, Chourn - Linbien, Contract C 385,

Advancing Shoring Construction

Client
Wan Chi Steel Industrial Company.

Project
The design of three sets of movable scaffold equipment (MSS); for the advancing shoring construction of Second Freeway, Contract C 385.

Services
- Design of the movable scaffolding system equipment
- Technical services
- Inspection during the fabrication
- Operating Manual
- Equipment check before the first launch
- Construction engineering services
- final inspection of the assembled equipment at the fabrication yard
- operating manual
- inspection of the assembled MSS equipment on site
- checking the equipment before the first launching operation
- detailed delivery schedule

Construction engineering services were provided as a consultant to Wan Chi Steel Corporation.

Three sets of movable scaffolding system equipment; MSS; were provided; having an approximate weight of 620 metric tons per set; used for C 385 construction.

The Second Freeway viaducts were two parallel, single cell, prestressed girders, 13 m wide and 2.5 m deep.

Construction engineering services were provided for the C 385 section which was 2,014 m long; with spans varying from 40 m to 45 m.

Services period
1999 - 2001
Second Freeway, Contract C 323, Taiwan

Incrementally Launched Bridge

**Client**
Taiwan Area National Expressway Engineering Bureau, (TANEEB).

**Project**
Second Freeway, Contract C 323.

**Services**
- Special construction method
- Launching equipment design and fabrication
- Construction planning
- Consultant to TANEEB
- Construction supervision
- Detail Design

**Services period**: 1997 – 2000

**Background**
Services were provided to TANEEB for the Second Freeway Contract C 323 constructed by the ILM; the Incrementally Launching Method.

Services were also provided for the:
- design and fabrication of the bridge launching equipment
- supervision during the bridge launching operations
Kao Ping Hsi Bridge Approach Viaducts, Taiwan

Second Freeway, Contract C 381

Advancing Shoring Equipment

Client
Taisai, Kawada, Raito and Pan Asia Joint Venture Contractors.

Project
The Kao Ping Hsi Bridge Approach Viaducts; Contract C 381.

Services
- Advancing shoring equipment detail design and fabrication
- Construction stage calculations
- Formwork design
- Camber calculations
- Project planning
- Specialist consultant to the joint venture contractors
- Site supervision
- Shop drawings

Services period: 1996 - 2000

Background
Advancing shoring equipment was designed for the construction of the two prestressed concrete approach viaducts to Kao Ping Hsi Cable Stay Bridge on the C 381 Second North - South Freeway.

Each equipment set weighed 700 tons and the superstructure had a combination of spans with a 3.2 m deep and 16.25 m wide deck.

The services were provided as the specialist consultant to the Taisai, Kawada, Raito and Pan Asia Joint Venture Contractors.

The bridge is located on the border of Kaohsiung and Pintung Counties crossing the Kao Ping River; and this section of the Second North - South Freeway was opened to the freeway traffic in January 2004.

Three sections of twin viaducts were constructed; being separated by an expansion joint, namely:
- Abutment A to P29: 389.5 m long, 36.2 m + 7 x 45.3 m + 36.2 m
- P29 to P21: 344.2 m long 36.2 + 6 x 45.3 m + 36.2 m
- P21 to P13: 353.3 m long 7 x 45.3 m + 36.2 m

Project Reference Catalogue
Bridge Design Services
Advance Shoring Bridges
Highway Contract E 811, Kaohsiung, Taiwan

Advancing Shoring Equipment

Client
BES Contractors, Taiwan.

Project
Provincial Highway Contract E 811, Kaoshiung, Taiwan.

Services
- Advancing shoring equipment design
- Construction stage calculations
- Temporary works design
- Camber calculations and bearing presets
- Project planning, consulting and site supervision
- Shop drawings

Services period
1997 – 1999

Background
Provincial Highway E 811 included the construction of four advancing shoring bridges with a total length of 980 m; and one 165 m long free cantilever viaduct having spans of 45 m + 70 m + 45 m.

The advancing shoring formwork was assembled and progressively advanced from one deck to the next without the need for any reassembly. The system was self propelling and supported directly off the permanent works column.

Services included the construction engineering, the equipment design, for the supervision and construction consulting and for design checking during construction.

Two sets of the advancing shoring equipment; each weighing 580 tons, were used for the construction of E 811 prestressed concrete viaduct.

The viaduct deck was a double cell prestressed concrete box girder with a rounded deck shape; 22.8 m wide for a maximum span of 56.6 m.
Nanking River Bridge, Nanking, China

Advancing Shoring Equipment

Client
Nanking City Government, China.

Project
Nanking River Bridge, Nanking.

Services
- Moving scaffolding system, MSS equipment design
- Construction stage calculations
- Formwork design

Services period
1997 – 1999

Background
The advancing shoring method was selected for the construction of the Nanking River Bridge.

The method is a system where the main formwork is assembled and advances progressively from one deck to the next without the need for reassembly. It is self-propelling and supported directly off bridge columns.

One set of 109 m long (MSS) moving scaffolding system equipment was designed for the advancing shoring construction of the prestressed viaducts of the Nanking Bridge.

The weight of the equipment was 710 tons and the superstructure consisted of 12 x 50 m spans with a deck width of 12.4 m.

The equipment was designed with a special hanging bracket configuration to allow for ease of construction over the Nanking River.
Expressway No. 5, Contract C 220, Taiwan

Advancing Shoring, Tanbian Bridge

Client
Hsin Shung Construction, Taiwan.

Project
Taipei - Ilan Expressway Tanbian Bridge, Taiwan.

Services
- Construction stage analysis of the erection sequence
- Camber calculation
- Pretressing instructions

Services period
1998 - 1999

Background
The 30.8 kilometer Expressway is from the eastern suburbs of Taipei City to Ilan on the eastern coast of Taiwan; included 30 bridges.

The 480 m long Tanbian Bridge comprised of 3 x 40 m + 39 m + 6 x 43 m + 40 m + 23 m spans; all constructed by advancing shoring.
Second Freeway, Contracts C 325 A & B, Taiwan

Advancing Shoring Method

Client
Taiwan Area National Expressway Engineering Bureau; (TANE EB).

Project
The Second North - South Freeway Contracts C 325 A & B constructed by the advancing shoring method.

Services
- Project management
- Evaluation of the bridge type and construction method
- Preliminary and detailed designs

Services period
1996 - 1998

Background
The Second North - South Freeway Contracts C 325 A & B consisted of 15 bridges; namely:
- 12 advancing shoring bridges
- 2 balanced cantilever bridges
- 1 simply supported bridge

All the bridge types were single cell prestressed concrete box girders; 16.1 m wide.

The Wu Second Bridge spans from the west bank of the Wu River then turns southeast across the river and enters Wu Town in Taichung from Kuaiguan in Changhua City.

The Bridge was 3,320 m long and had standard spans of 45 m. Some spans were 60 m long and the bridge was constructed by the advanced shoring method.
Second Freeway, Contract C 398, Taiwan

Advancing Shoring Equipment

Client
Taiwan Area National Expressway Engineering Bureau, (TANEEB).

Project
Second Freeway, Contract C 398.

Services
- Advancing shoring equipment design and fabrication
- Construction stage calculations
- Formwork design
- Camber calculations and bearing presets
- Project planning, consulting and supervision
- Shop drawings

Services period
1995 – 1998

Background
The advancing shoring method was selected for the construction of the Second Freeway, Contract C 398.

Main forms were assembled and progressively advanced from one deck to the next without the need for reassembly. The forms were self propelling and were supported on the permanent works columns.

Two sets of the advanced shoring equipment were designed for the construction of C 398 prestressed concrete viaducts.

Each set of equipment weighed 700 tons and the superstructure consisted of a standard 45 m span with a deck width of 12.45 m. The overall length of Contract C 398 was 2.88 km.

The responsibilities included the:
- construction design
- advanced shoring equipment design and fabrication
- construction engineering
- consulting services
- construction supervision
Second Freeway, Contract C 330, Taiwan

Advancing Shoring Equipment

Client
Taiwan Area National Expressway Engineering Bureau, ( TANEEB ).

Project
Second Freeway, Contract C 330.

Services
- Equipment design and fabrication
- Construction stage calculations
- Formwork design
- Construction planning, consulting and supervision

Services period
1995 – 1997

Background
The advancing shoring method was selected for the construction of Contract C 330 on the Second Freeway.

The main formwork was assembled and advanced progressively from one deck to the next without the need for reassembly. It was self propelling and supported directly off the permanent columns.

This was considered to be the fast construction method for the cast in place concrete viaduct which had 45 m repetitive spans.

Two sets of the advancing shoring equipment were designed for the construction of this prestressed concrete viaduct for the Second Freeway near Taichung.

Each set of equipment weighed 700 tons and the superstructure consisted of a standard 45 m span and a deck width of 16.1 m.
Seoul – Busan High Speed Line, Korea

Station Safety & Viaduct Design

Client I
Korea High Speed Rail Construction Authority.

Project I
New underground station in Daegu for the new high speed train service from Pusan to Busan.

Services
- Identification of hazards
- Recommendations on control and mitigations measures
- Recommendations on design modifications
- Tunnel layout design
- Ventilation studies

Services period
1996

Background
The Korea High Speed Rail Authority commissioned a study of the safety implications of the concept design of the new underground Daegu Station. Daegu Station was to be located 50 m underground and served by 6 tracks. Studies were undertaken to estimate the ventilation requirements needed during the underground construction activities.

An important factor for achieving a satisfactory level of safety for the passengers and railway employees at the station; was the configuration of the trackwork and tunnels, and particularly whether a twin rail track or a single rail track tunnel system should be adopted.

International best practices for the tunnel layout design were appraised, providing the recommendations to achieve satisfactory levels of safety.

Client II
Kumgang Construction, Korea.

Project II

High Speed Rail Viaducts, Korea.

Services
- Advancing shoring equipment design
- Formwork design
- Consulting services

Services period
1995 - 1998

Background
Three sets of advancing shoring equipment (movable scaffolding systems MSS) were designed for construction of the high speed rail elevated viaduct contract.

The services included the:
- design of MSS launching girders
- design of formwork systems
- equipment specifications
- factory inspections
- consulting and supervision
Taiwan Railway Administration, Miaoli, Taiwan

Advancing Shoring Bridge

Client
J & S Contractors, Taiwan.

Project
Preliminary and detailed design for the 1.5 km Miaoli Railway Bridge for the Taiwan Railway Administration.

Services
- Preliminary design
- Detail design

Services period
1993 – 1994

Background
Services were provided to the civil works contractor responsible for the construction of the elevated section of dual rail track thorough Miaoli City.

The project was undertaken for the Taiwan Railway Administration to remove the at grade narrow gauge trackwork and provided for grade separated rail and road services in Miaoli City center.

The new elevated railway has:
- provided a grade separated rail system for the Taiwan Railway Administration (TRA)
- improved the TRA’s operations through the city center
- improved the road and pedestrian circulations in the city center
- provided an improved environment for the citizens of Miaoli
West Coast Freeway No. 61, Fangli to Da-an, Taichung Coastal Area, Taiwan.
Precast Segmental Bridges.

Client:
Ta-Chen Construction & Engineering Coorporation.

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 precast 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: 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.
Maintenance of the Interchanges for the 6th & 7th Highway in the South Jahra & West Jleeb Ashuyoukh Areas, Republic of Kuwait.

Client: MK4, MEPS, Republic of Kuwait.

Project: Maintenance of the Interchanges for the 6th & 7th Highway in the South Jahra & West Jleeb Ashuyoukh Areas, Republic of Kuwait.

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

Services period: 2012—2013

Background:

Maintenance of the Interchanges for the 6th & 7th Highway in the South Jahra & West Jleeb Ashuyoukh Areas, Republic of Kuwait.

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.
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

Project Reference Catalogue  
Bridge Design Services  

Pre-cast Segmental Bridges
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.

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 Services

**Client**
Taiwan Area National Expressway Engineering Bureau; (TANEED); 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 TANEED 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