

SDI

Specialist In Bridge Building Equipment,
Heavy Lifting and Transportation Equipment



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COMPANY PROFILE

Combined Force

Strukturas DF International Co., Ltd (SDI for short) is a joint venture company formed by New Dafang registered in China and Strukturas AS registered in Norway. The parent companies are both leading global suppliers in the field of bridge building equipment.

Formed in 2010 and combining the resources and experience of its parent companies, SDI is now fully established as a professional and reliable supplier for bridge building equipment and construction services in the international market. Standing on the shoulders of the two giants and focusing on bridge projects, SDI uses its best-fit international resources to service our clients.

In the first six years of operation SDI has delivered 46 sets of bridge erection equipment for various projects across South East Asia, Middle East, South America and Europe, including the world's largest FSLM Launching Gantry with a capacity of 1800 tons.

Unique Value

SDI is a bridge engineering and technically oriented company. We share the same sense of purpose and motivation as the contractor and its site staff.

Aiming to make people's site life easier by providing safe and efficient equipment, we can also establish professional teams to provide site services such as equipment assembly & commissioning, equipment operation and maintenance, and segment erection. No more interface and coordination problems between the equipment supplier and user.

SDI site teams have undertaken assembly & commissioning work and bridge erection work in South Korea, Singapore,

Iran and Kuwait. Over 100 engineers, technicians and skilled riggers have been involved in overseas projects.

We believe our specialized engineering capacity and professional assembly and erection service can bring our clients more value and an easier site life.

Main Products

- Full Span Launching Method Equipment (FSLM)
- Precast Segmental Method Launching Gentries (PSM)
- Movable Scaffolding System Equipment (MSS)
- Segment Lifter & Form Travellers
- Heavy Lifting & Specialised Transportation Equipment

Service Industry

- Construction of Bridge Superstructure
- Lifting, Transportation & Assembly of Large Structures
- Port Construction & Water Conservancy Project
- Ship Manufacturing & Building

Service Scope

- Engineering Consultation
- Equipment Design & Manufacture
- Equipment Assembly & Service
- Equipment Leasing & Construction Operation



DESIGN CAPABILITY

SDI has its own highly experienced design team of over 30 engineers and technicians, and can call upon the resources of its two parent companies NDF and Struktur as which have design teams with 120 and 30 members respectively. These design teams include specialists in the fields of steel structures, machinery, electrical systems, hydraulic systems, bridge construction, heavy lifting and specialised transportation.

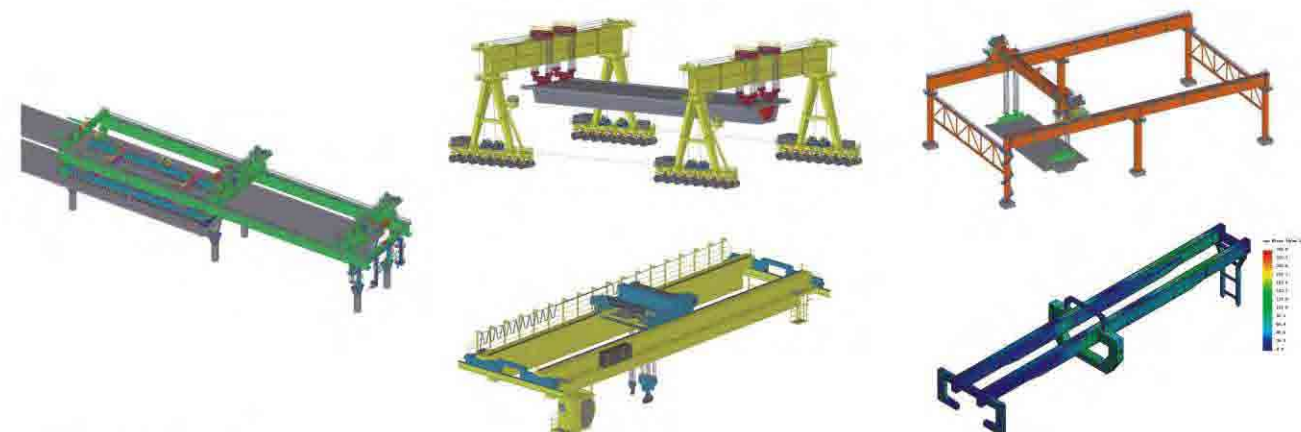
We follow the design concept of "safe, suitable, efficient, economic, environmental friendly" to provide clients with perfect design and high quality services.



Technical Communication With Main Contractor

Advanced Design

We use the most advanced design software, 3D modelling and structural calculation programs available, and for the international market design and calculation work is carried out in accordance to European standards.



Joint-Design

For each significant and specific project, a joint design team would be set up, in which the major design engineers have had years of experience on design and engineering for similar equipment.



MANUFACTURING AND QA/QC

For manufacturing SDI relies on NDF's extensive production resources and well established partnering agreements with several other workshops in China. Using these resources we can complete the processing and manufacturing of equipment and steel structures with an annual capacity of over 50,000 tons.



SDI has abundant experience in manufacturing & production management, and has been awarded with European Union CE Certification for production of steel structure in accordance with EN1090-1:2009+A1: 2011.

SDI has established a comprehensive QA/QC management system in accordance with European ISO 9001 standard.

Independent third-party testing services are used during manufacturing to provide clients with complete confidence in the quality of our equipment.

1 FULL SPAN LAUNCHING METHOD EQUIPMENT

HIGH SPEED RAILWAYS

Full Span Launching Method, using precast bridge segments, is the optimum choice for high speed railway bridge construction. FSLM equipment has already played a significant role in the high speed railway construction of China, South Korea, France, Italy and other countries, and will grow in significance as more and more high speed railways are built around the world.

During China's massive investment in high speed railways in the 1990's and 2000's, SDI's parent company NDF was the leading supplier of FSLM equipment, supplying more than 200 pieces of FSLM equipment. This equipment included Launching Gantries (generally 900Ton), Combination Transportation and Launching Equipment (Special Trolley), Transporters, Straddle Carriers and Rail-mounted Gantry Cranes. The equipment was used for many complex construction conditions including tunnel portal beam erection, small radius curve beam erection and cross station construction, a major contribution to China's high speed railway expansion.

Combining NDF's unrivalled experience of FSLM equipment with Struktur's knowledge of European design and quality standards SDI can offer Clients complete confidence they will get the FSLM equipment they require.

SDI can supply the full range of FSLM equipment for high speed railway, and we can also provide Clients with services such as project consultation, construction planning, FSLM equipment selection, equipment assembly and beam erection service.

In 2011, SDI provided FSLM equipment to SSANGYONG E&C and HYUNDAI E&C for use on the Honam HSR Project in South Korea. This equipment is described in detail in the following pages.



Nose-girder Launching Gantry



Precast Girder Transporter



Special Trolley



Girder-erection at Tunnel Portal



Straddle Carrier



Rail-mounted Gantry Crane

SDI1000 LAUNCHING GANTRY

HO NAM HIGH SPEED RAILWAY PROJECT, SOUTH KOREA

Client: Ssangyong E&C

Equipment Supplied: SDI1000 FSLM Launching Gantry

Main Specification: 35m Span, 1000 Ton

Year: 2011



Honam HSR is a high-speed railway line between Osong and Mokpo in South Korea. The line is a part of Korail's Korea Train Express (KTX) system, improving Seoul-Mokpo and Seoul-Gwangju KTX high speed services which presently use the existing conventional Honam Line.

In the year 2010-2011, SDI delivered FSLM equipment to two South Korean contractors working on this project. A full set of FSLM equipment was supplied to Ssangyong Engineering & Construction Co. Ltd., comprising 1000T Launching Gantry, 1000T Transporter and a pair of 500T Gantry Cranes. A similar pair of 500 Ton Gantry Cranes were supplied to Hyundai Engineering & Construction Co. Ltd.

Design of all the equipment was in accordance with Euro Codes, fabrication of all the equipment was carried out in accordance with a European quality system and the lifting equipment was independently checked and certified by KOSHA.

More than 10Km of the HSR line was built using this FLSM equipment.

The launching gantry is used to erect the precast box beams, it consists of two steel plate box section beams, 2m by 69.5m long, supported by three legs.

This HSR project involves lengths of viaduct separated by long embankments, thus the launching gantry is designed able to be moved and relocated using the Transporter and some special supports. The launching gantry legs have hinged sections that allow the legs to be folded, this enables the launching gantry and transporter to pass through tunnels and other obstacles such as arch bridges without dismantling.

Regardless of transportation, the equipment can finish feeding and erecting one beam, and launching forward to next span in four hours. Three different size spans are used on this part of line-35m, 30m and 25m – and the same equipment can be used for all these spans without the need for any modification in the factory.

DCY1000 SEGMENT TRANSPORTER

HO NAM HIGH SPEED RAILWAY PROJECT, SOUTH KOREA

Client: Ssangyong E&C

Equipment Supplied: DCY1000 Transporter

Main Specification: 16 Axles, 1000 Ton Capacity

Year: 2011

The Transporter is used to carry the 1000Ton pre-cast bridge segments from the pre-casting yard to the Launching Gantry. During placing of the bridge segments the Transporter and Launching Gantry work together to reduce the loadings on the equipment and the bridge deck.

DCY1000 transporter uses 16 axles, and a NDF patented hydraulic driving, braking and suspension system.

As well as carrying the bridge segments, the Transporter can also be used for relocating the Launching Gantry to different bridge locations.



GANTRY CRANES (2 X 500 TON)

HO NAM HIGH SPEED RAILWAY PROJECT, SOUTH KOREA

Client: Ssangyong E&C and Hyundai E&C

Equipment Supplied: 2 Pair of 500 Ton Rail Mounted Gantry Cranes

Main Specification: 39m Span, 2*500 Ton Capacity/Pair

Year: 2011



SDI supplied both SsangYong E&C and Hyundai E&C with pairs of 500 Ton capacity rail mounted Gantry Cranes. The Gantry Cranes straddle both the bridge and the precast segment production yard. They were used to handle completed segments in the production yard, and to load them onto the Transporter which operates along the already completed sections of bridge deck and embankments.

At the start of the project the Gantry Cranes were also used to install the first three spans of the bridge and to assemble the Launching Gantry and Transporter.

2 FULL SPAN LAUNCHING METHOD EQUIPMENT CAUSEWAY/HIGHWAY BRIDGE

The Sheikh Jaber Al-Ahmad Al-Sabah Causeway Project in Kuwait includes a 36 km long dual highway bridge crossing the Bay of Kuwait, connecting Kuwait City to Subiya, the location for the proposed "Silk City" development.

The bridge is constructed using the Full Span method, with standard pre-cast bridge segments of 60m length for the main and north bridges, and 30-40m long segments for the south bridge and interchange area. The 60m long span segments weigh over 1700 Tons, the largest bridge segments ever constructed using this method. Previously the largest were 1400 Ton segments on Incheon Bridge in Korea and Hangzhou Bay in China.

SDI is proud to have been selected by HYUNDAI E&C to supply the 1800 Ton capacity FLSM Equipment for this prestigious and record breaking project.

The FSLM equipment supplied by SDI includes:

- 2* 900Ton Straddle Carriers for use in the Pre-casting Yard,
- 2* 900Ton Straddle Carriers for use at the Jetty,
- 1 set of 1800Ton Transporter for use on Land,
- 1 set of 1800Ton Transporter for use on the Bridge Deck and
- 1 set of the record breaking 1800Ton Launching Gantry.



This FSLM equipment will complete lifting, transportation and erection of almost 1000 pre-cast box girders for this project.

SDI also supplied Hyundai E&C with other equipment on the Project, including an 1100Ton capacity Overhead Crane used for unloading bridge segments for the south bridge and interchange, and 16 No Gantry Cranes for the pre-casting yard with capacities ranging from 10 to 110 Tons.



2*900T straddle carrier
for China Zhoushan Bay Bridge in 2005



1800Ton Transporter



2*900T Straddle Carrier



Gantry Cranes for PC Yard

LAUNCHING GANTRY

SHEIKH JABER AL-AHMAD AL-SABAH CAUSEWAY PROJECT, KUWAIT

Client: Hyundai E&C Co., Ltd.

Equipment Supplied: SDI1800 Launching Gantry

Main Specification: 60m Span, 1800 Ton capacity

Year: 2015

The Launching Gantry includes two main girders, each 130m long x 4.2m high, 28m long transverse spacer beams at each end, four support structures and two 900 ton capacity winch trolleys. The total weight of the equipment is over 1900 tons.

For the Sheikh Jaber Al-Ahmad Al-Sabah Causeway Project the main spans of the bridge will be erected by floating crane, the Launching Gantry is used on the approach bridges and interchange area where the water depth is shallow. This requires the Launching Gantry be adaptable for different span lengths, different transverse pier spacing, small radius sections, first and last spans at abutments. To meet the construction sequence the Launching Gantry also has to be relocated four times and modified twice during the project.



SEGMENT TRANSPORTERS

SHEIKH JABER AL-AHMAD AL-SABAH CAUSEWAY PROJECT, KUWAIT

Client: Hyundai E&C Co., Ltd.

Equipment Supplied: 2 Sets of DCY1800 Transporter

Main Specification: 1800 Ton Capacity

Year: 2015

There are two sets of DCY1800 Transporters, one set is used to transport the beam from PC yard to jetty, the other set is used to transport beam on deck and to feed beam to launching gantry. The technical focal points include several vehicles linkage synchronization, meanwhile it must adapt to the transportation of different specifications of box girder, 200m curve, side-shift, relocation and carrying SDI1800 launching gantry.



STRADDLE CARRIERS

SHEIKH JABER AL-AHMAD AL-SABAH CAUSEWAY PROJECT, KUWAIT

Client: Hyundai E&C Co., Ltd.

Equipment Supplied: 2 Pairs of 900 Straddle Carriers

Main Specification: 45m Span, 2*900 Ton Capacity/Pair

Year: 2015

SDI supplied Hyundai E&C with two identical pairs of DLT900 Ton Straddle Carriers:

- One pair of Straddle Carriers is used in the Pre-casting yard for handling segments and loading the Transporter.
- The second pair is used at the jetty for unloading the Transporter and transferring segments onto barges.

By using special lifting beams the Straddle Carriers at the jetty could also be used for other lifting tasks such as removing marine equipment from the jetty for maintenance and repairs.



STRADDLE CARRIERS

Temburong Bridge Package CC2 Project, Brunei

Client: KWANSOO (B) SDN BHD

Equipment Supplied: 1 set of Straddle Carrier

Main Specification: 900t Lifting Capacity, 64.5m Span

Year: 2015

The Brunei Temburong Bridge Project was to build a bridge to link between Brunei-Muara District and Temburong District with a total length of approximately 30km. The Project was implemented under a series of construction packages.

In earlier 2015, SDI was awarded the contract to design, manufacture and deliver one set of 900t capacity for the package CC2, playing an important role for handling of the precast girders.

The Straddle Carrier was assembled and completed commissioning in early 2016.



3 SEGMENTAL LAUNCHING GANTRIES

PRE-CAST SEGMENTAL CONSTRUCTION METHOD (PSM)

Bridge construction using pre-cast segments erected with a Launching Gantry is widely used for both highway and railway bridges, and often referred to as PSM (Precast Segment Method).

NDF and Strukturas, the two parent companies of SDI, have considerable experience of Launching Gantries, between them they have supplied over 40 sets of PSM Launching Gantries for bridge construction.

In 2010 and 2013 SDI supplied several sets of PSM Launching Gantries for projects in Taiwan and in Iran, and also took part in site assembly and construction operations.



Underslung Launching Gantry



Overhead Launching Gantry



Combo Launching Gantry



Overhead Launching Gantry



In-filled Launching Gantry



Launching Gantry For Donguan Mrt, P.R.C

COMBO LAUNCHING GANTRIES

WUGU-YANGMEI ELEVATED EXPRESSWAY, TAIWAN

Client: Continental E&C Co., Ltd.

Equipment Supplied: 3 Sets of Combo Launching Gantries

Specifications: 50m Whole Span By Span Erection Method,
75m Span Balanced Cantilever Assembly Method

Year: 2010

SDI supplied 3 sets of Combo Launching Gantries to Continental E&C for use on the C910 bid section of Taiwan Wugu-Yangmei Elevated Expressway project.



This project adopted the span by span method (sometimes called infill span method) for spans under 50m and balanced cantilever method for larger spans up to 75m. The Combo Launching Gantries supplied by SDI were capable of constructing both kinds of span configuration and were successfully used to erect a total of 2962 No of pre-cast segments.



LAUNCHING GANTRIES

SADR ELEVATED EXPRESSWAY, TEHERAN, IRAN

User: Shahid Rajaei Group

Equipment Supplied: 4 Sets of 1000 Ton Launching Gantries

Main Specification: 50m Span By Span Erection Method

Year: 2012

SADR Elevated Expressway was built directly above the existing SADR highway, an extremely congested major road in the northern suburbs of Teheran. The expressway is almost 6 km long with twin decks, consisting of 110 spans with a typical span length of 50m.



Forced to follow the existing highway alignment the combination of 6.6% longitudinal slope, transverse slope of 5.2% and a tightest curve radius of 380m was a technical challenge for the Launching Gantry design. The limited workspace was also a challenge for the Launching Gantry assembly methods.

SDI supplied 4 No Launching Gantries for the project and were later awarded a separate contract for the LG operation and bridge deck erection on the western half of the project (see pages 46~47).



4 MOVABLE SCAFFOLDING SYSTEM CAST IN SITU

The MSS construction method was originated from Europe in the 1960's, and the system has since then been developed and successfully used in various major bridge projects worldwide.

Strukturas As, one of the two SDI parent companies, is one of the main pioneers and practitioners of MSS construction method. MSS design has been improved and optimized over the years, based on a wealth of experience from over 100 projects worldwide.

NDF, the other parent company of SDI, pioneered the MSS construction method in China. NDF

has designed and delivered more than 120 sets of MSS equipment for highway, railway, MRT and aqueduct projects. NDF was the first to use the MSS system for the construction of rectangular and U-shape aqueducts for China's massive south to north water diversion project. SDI, combining the experience and techniques of both parent companies, successfully delivered MSS equipment for Taiwan Wuguyangmei Expressway Project in 2010 and South Korea Ho Nam High Speed Railway Project in 2011.



Overhead MSS



MSS for Building U-shape Aqueduct



MSS for Building Rectangle Aqueduct



Underslung MSS



MSS for Railway Bridge



MSS for Yellow River Bridge

MOVABLE SCAFFOLDING SYSTEM

WUGU-YANGMEI SECTION, NATIONAL EXPRESSWAY NO. 1
WIDENING PROJECT BID C905&C908 , TAIWAN

Client: Far Eastern Engineering Corp.

Equipment Supplied: 4 Sets of Underslung MSS

Year: 2010



Wugu-Yangmei elevated expressway is the second elevated expand section of Taiwan No.1 National highway, starting from Wugu to Yangmei. The total length is 40km. It cost 88.2 billion TWD, which is the most expensive road in Taiwan.

SDI together with its parents companies supplied 8 sets equipment (4 sets MSS for Bid C905&C908 and 4 sets PSM launching gantries for C910 - see page 26~27) to different contractors on this project.

Bid C905 Guishan Taoyuan section is about 4.3km, and Bid C908 Luzhu Zhongli section 6.1km, awarded to the contractor Far Eastern Engineering Corp.; bridge span of the two sections range from 45 to 55m, totally 139 spans, all constructed by 4 sets of under-slung MSS supplied by SDI smoothly and efficiently.

Bridge Information:

Max. Span:	55M
Long. Slope:	+2%
Deck Width:	16.05m
Bottom Width of Box-girder:	6.7m
Height of Box-Girder:	2.8m
Pier Section:	4.0m long X3.8m Wide



MOVABLE SCAFFOLDING SYSTEM

HO NAM HIGH SPEED RAILWAY PROJECT, SOUTH KOREA

Client: VSL

Equipment Supplied: 1 Set of Underslung MSS

Main Specification: 40m Bridge Span

Year: 2010



MOVABLE SCAFFOLDING SYSTEM

31960 BRIDGE 205, SLOVAKIA

Client: Vahostav

Equipment Supplied: 1 Set of Underslung MSS

Main Specification: Max. Span 60m

Year: 2015



In year 2015, Strukturas As(STK), SDI's parent company, was awarded to supply one set of underslung MSS for 31960 BRIDGE 205 Project in SLOVAKIA, designed by STK. SDI provided steel structure fabrication of the MSS according to the EN 1090 at CE certified workshop of SDI

5 OTHER BRIDGE CONSTRUCTION EQUIPMENT

SDI ALSO SPECIALIZES IN THE DESIGN, MANUFACTURING AND SUPPLY OF OTHER BRIDGE CONSTRUCTION EQUIPMENT:

- Beam Launchers (for erection of I-beam, T-beam, small Box-beam, U-beam, etc)
- Precast Beam Trolleys (rail-mounted or tyred-type, for transportation of precast beam and feeding the beam to the Beam Launcher)
- Transporters (for transportation of precast full span girder, pre-cast segment or other structures)



Beam Launcher for building Railway Station, Korea



Beam Launcher, Russia



Beam Launcher for Building Railway & Highway Bridge



Single Girder Beam Launcher



Beam Launcher for U-Girder Erection



Precast Beam Trolley (Rail-mounted)



Precast Beam Trolley (Tyred)



Transporter for Transporting Precast Girder



Transporter for Transporting Precast Girder

- Straddle Carriers
- Gantry Cranes
- Form Travellers (for in-situ balanced cantilever construction)
- Derrick Cranes (for pre-cast segment balanced cantilever construction)



Station Straddle Carrier



Straddle Carrier for Precast Yard



Gantry Crane for Precast Yard



Derrick Crane



Underslung Form Traveller



Overhead Form Traveller

6 HEAVY LIFTING AND TRANSPORTATION EQUIPMENT

Besides development and technique service in Bridge construction equipment, based on parent company NDF, SDI also supply equipment used for lifting and transportation in other industries. These equipment that are widely used in shipyard, water conservancy project, port and wind power industry, includes:

- Groove Cranes and Groove Launching Gantries for Water Conservancy Project
- Carriers for Larger-scaled Structure
- Hydraulic Module Carriers



Groove Launching Gantry



Groove Launching Gantry



Carrier for Shipyard



Carrier for Furnace Factory



Hydraulic Model Carrier for Shipyard



Hydraulic Model Carrier

- Gantry Cranes for Shipyard/Port
- Straddle Carriers for Shipyard
- Yacht Carriers
- Wind Turbine Assembly Cranes



Shipyard Gantry Crane



Shipyard Gantry Crane



Shipyard Straddle Carrier



Wind Turbine Assembly Crane



Port Crane

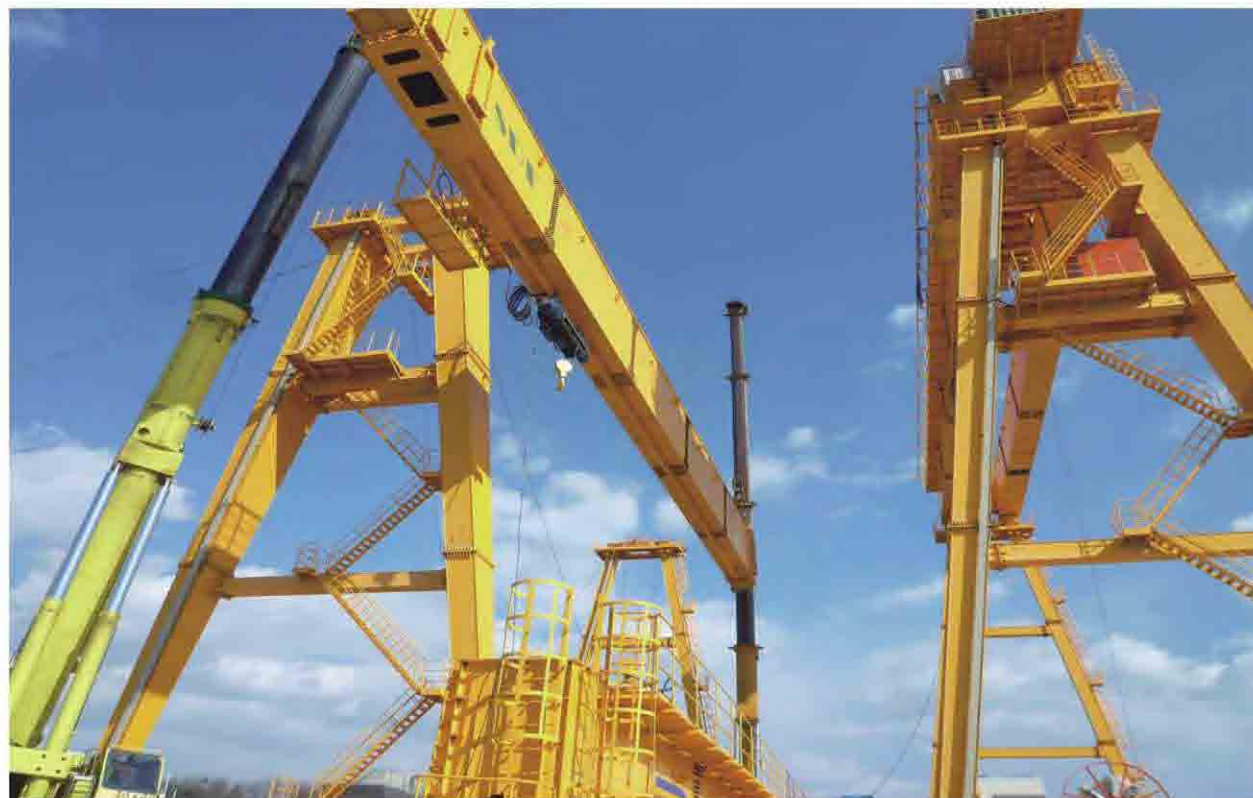


Yacht Carrier

7 QUALIFIED AND EXPERIENCED SERVICES TEAM

For Main Contractors, purchasing increasingly sophisticated and technically complex bridge construction equipment that will be operated by their own workers, or by other sub-contractors, presents a challenge and a risk. SDI can help to reduce these worries by providing:

- Technical Consulting Services and or Equipment Operation Supervision
- Equipment Onsite Services (assembly, modification, relocation, maintenance, operation, dismantling and or maintenance.)
- Subcontracting Works for Girder Erection with Skilled Technicians and Workers
- Equipment Rental



A specialized site team with over 160 technicians and professional workers is available.

Key Staffs including project management staffs, foremen/team leaders and key technicians have worked on over 200 sets of bridge building equipment in over 20 countries and regions.

Many of these workers have been transferred from NDF, SDI's parent company, who have successfully accomplished over 80 subcontracts for China High Speed Railway Projects (Operation of 900ton FSLM Equipment and PC box girder erection).



ONSITE SERVICE EXPERIENCE

1000T FSLM EQUIPMENT ASSEMBLY AND COMMISSIONING HO NAM HIGH SPEED RAILWAY PROJECT, SOUTH KOREA

Two of the first projects undertaken after SDI's formation were for the supply of FSLM equipment for use on the Honam High Speed Railway in South Korea.

SDI supplied two sets of FSLM equipment to SsangYong E&C and Hyundai E&C, each of which included assembly, commissioning and initial operation of the equipment.



In 2011, SDI mobilised a construction team with more than 30 skilled workers to carry out the assembly, commissioning and operation work of one 1000 ton Launching Gantry, one 1000 ton Transporter and two pairs of 500 ton Gantry Cranes at the worksites in South Korea.

A record to assembly and commissioning one pair of 500 ton Gantry Cranes for Hyundai E&C within 25 days was created and highly praised by client.



ONSITE SERVICE EXPERIENCE

50M, 1000T PSM LAUNCHING GANTRY ASSEMBLY AND GIRDER ERECTION SADR ELEVATED HIGHWAY PROJECT, MIDDLE EAST

In 2012, SDI supplied four PSM Launching Gantries for use on the SADR Elevated Expressway Project in Teheran, Iran. The supply contract included the assembly and commissioning work of this equipment. In 2013, SDI was awarded an additional contract for the operation of two Launching Gantries.

SDI mobilised a team with more than 60 managers, technicians and skilled workers. The team finished construction of 108 spans of box girder in 6 months.

The Sadr Elevated Expressway Project Had Many Challenges:

- Assembly of the Launching Gantries in very restricted workspaces and during overnight road closures.
- Simultaneous operation of the Launching Gantries on the left and right spans to reduce pier loadings.
- Combinations of maximum longitudinal slope of 6.6%, maximum transversal slopes of 5.2% and 380m minimum radius curved sections provided a big challenge for Launching Gantry operation.
- Close co-operation with Client and OVM, the pre-stressing sub-contractor.
- Operation over live traffic, which required high standards of management and safety.
- Construction works were carried out for 24 hours. SDI worked a 3 shift system with many critical operations carried out during overnight road closures.



Congested Assembly Area



Installation of Winch Trolley



LG Operation In Winter



LG Operation With Live Traffic



Girder Erection At Small Curve Section

ONSITE SERVICE EXPERIENCE

SUBCONTRACTING, GIRDER ERECTION TURAS WEST EXTENSION, C1688 MRT, SINGAPORE

Client: Land Transport Authority Singapore / Shanghai Tunnel Engineering Co Ltd.

Span Length: 48m + 55m + 48m(special); 41.5m(typical)

Max. Weight For 41.5m Span: 415 Ton

Total Length Of The Bridge: 5.64 Km

Launching Gantry Quantity: 2 Sets

Construction Method: Infill Span - Precast Segmental

Multi Levels Station - Precast Segmental And Precast Beam.

Year: 2014~2015

Singapore MRT Turas West Extension Project involved the construction of a twin level interchange station EW30 and 6 Km of elevated twin viaducts connecting to the existing Boon Lay extension.

In 2013 NDF, SDI's parent company, supplied two Overhead Launching Gantries for the project, one for the approach viaducts, one specially adapted for the station area. In 2014 Shanghai Tunnel awarded SDI a subcontract for assembly, relocation, operation (segment and beam erection), maintenance and dismantling of both Launching Gantries.

Commencing in January 2014, SDI mobilized a team over 40 staffs and workers for the project. SDI completed erection of over 200 spans and multiple relocations of the launching gantries within 18 months with no major incidents or reportable accidents.

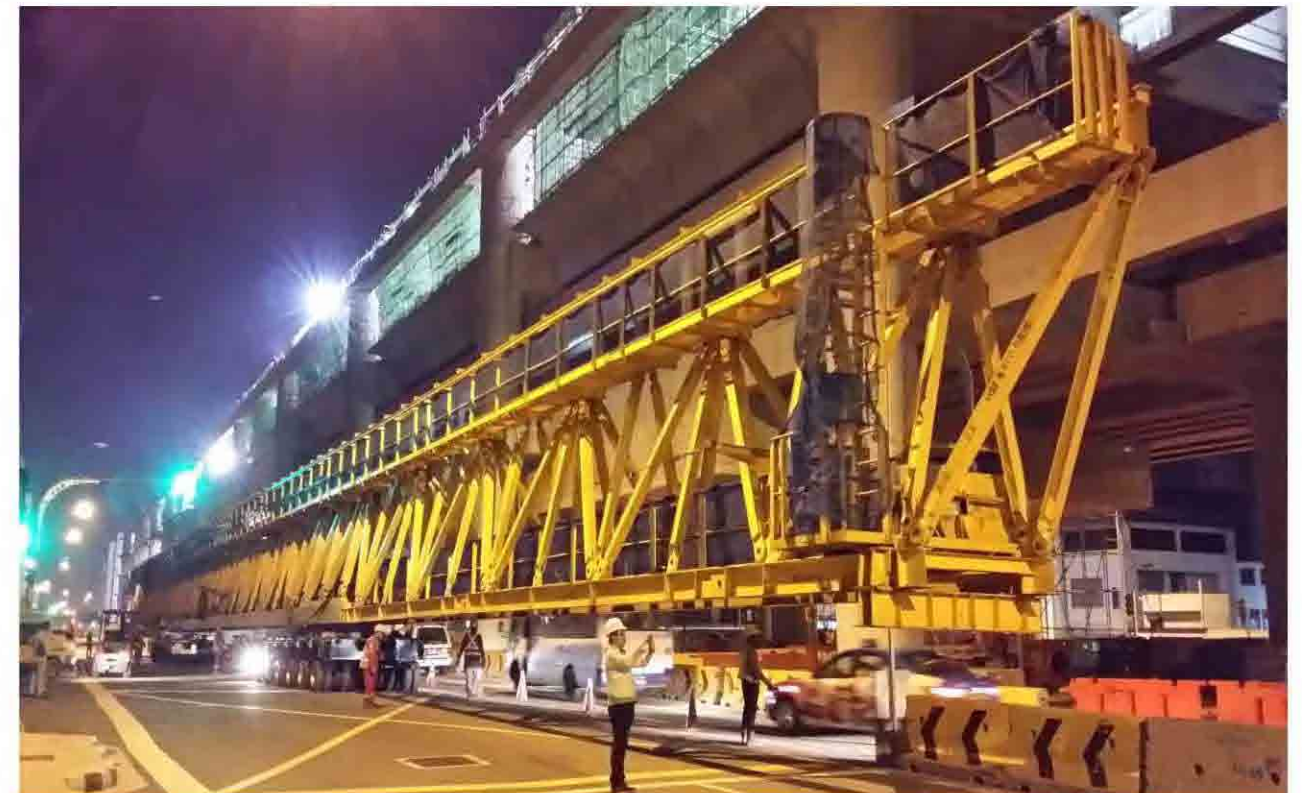


OPERATION CHALLENGES:

- Launching Gantry must adapt to erect double deck and triple deck spans.
- Erection of double deck spans with different levels at station approaches.
- Construction above the PIE expressway, the highest section of MRT ever built in Singapore.
- Erection of segments, T-beams and I-beamson three levels in the station concourse area.
- Split level piers requiring additional temporary supports.
- Operation above and adjacent to heavily trafficked roads.
- 24 hours operation with two or three shift systems.



Relocation of the launching gantry - Unloading 98m main girder from deck onto ground transporter, this is the first time even done in Singapore



ONSITE SERVICE EXPERIENCE

1800T FSLM EQUIPMENT ASSEMBLY AND COMMISSIONING SHEIKH JABER AL-AHMAD AL-SABAH CAUSEWAY PROJECT – MAIN LINK, KUWAIT

SDI is supplying a range of equipment to Hyundai for use on the Kuwait Sheikh Jaber Al-Ahmad Al-Sabah Causeway Project, including 16 Gantry Cranes for use in the pre-casting yard, a full set of FSLM Equipment for the causeway construction, and an 1100 ton Overhead Crane for segment unloading at a temporary jetty.

The FSLM equipment supplied by SDI includes one pair of 900Ton Straddle Carriers for use in the Pre-casting Yard, one pair of 900Ton Straddle Carriers for use at the Jetty, one 1800Ton Transporter for use on Land, one 1800Ton Transporter for use on the Bridge Deck and the record breaking 1800Ton Launching Gantry.

The Supply Contract For The Equipment Includes The Following Site Services:

- Site assembly, load testing and commissioning.
- Initial operation of the equipment during handover and training of Clients workers.
- Relocation of the Launching Gantry to different sections of the project.
- Modification of the Launching Gantry from 60m span to 45m span configuration.
- Maintenance of the equipment for the full contract period exceeding 3 years.
- Dismantling of the equipment at project completion.

SDI is providing teams of engineers, technicians and skilled workers for the onsite services, with numbers peaking at over 40 during the equipment assembly stage.



The Gantry Cranes were assembled, tested and commissioned in late 2014 and first used by Hyundai to install the moulds into the pre-casting workshops.

The Straddle Carriers and Transporters were assembled in early 2015, then tested and commissioned in summer 2015 after the first bridge segment was cast.

The Launching Gantry was assembled and commissioned in middle 2015. The pre-assembled parts have to be transported by barge and finally assembled on the bridge deck using a 2000 ton capacity floating crane.



Onsite Service Experience

1800T FSLM Equipment Operation

SHEIKH JABER AL-AHMAD AL-SABAH CAUSEWAY PROJECT – MAIN LINK, KUWAIT

The Sheikh Jaber Al-Ahmad Al-Sabah Causeway Project in Kuwait includes a 36 km long dual highway bridge crossing the Bay of Kuwait, connecting Kuwait City to Subiya, the location for the proposed "Silk City" development.

Following the supply of the record breaking 1800 Ton FSLM equipment, SDI was later awarded a separate contract for the FSLM Equipment operation and bridge deck erection of the project in earlier 2016.



SDI provides a team of 55 experienced and professional engineers, technicians and skilled workers for the operation and maintenance of the full set of FSLM equipment.

SDI shows their expertise by breaking the record to erect 2 spans / 4 PC girders within 3 days to help the contractor to meet the project schedule, while the design requirement is to erect 1 span / 2 PC girders every 2 days.



