



NATIONAL REPORT ON CONCRETE STRUCTURES IN INDIA

The 7th International *fib* Congress, 2026
Lisbon, Portugal



**INDIAN ASSOCIATION OF
STRUCTURAL ENGINEERS**

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Engineering the Leap into Tomorrow.



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ITM, Kolkata



Karewra Modi Stadium, Motera, Gujarat



Oberoi Garden City, Goregaon



Navi Mumbai International Airport, Maharashtra

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STRUCTURAL ENGINEERS**



Members to the General Assembly of the Indian National Group of the Fédération internationale du béton (*ING-fib*) from IAStructE, India

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- Mr. Alok Bhowmick, President, IAStructE

Deputy Delegate (India), *ING-fib*

- Mr V. N. Heggade, Vice President (West), IAStructE & Chairman, International Collaborations Committee (ICC)

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FOREWORD

This *fib* National Report from India, published on the occasion of the *fib* Congress 2026 in Lisbon, Portugal, in June 2026, by the *ING-fib* of Indian Association of Structural Engineers (IAStructE)—a National Member of *fib*, reflects the overall accomplishment in the area of usage of concrete in the construction sector in India over the four-year period since the earlier Congress held in 2022 in Oslo, Norway.

The International Federation for Structural Concrete (*fib*) is the apex international body dealing with the use of concrete in the structural industry. The primary goals of the body are to:

- *Spread awareness on the latest developments in concrete usage across the world.*
- *Guide the propagation of safe practices in design and usage of concrete structures.*
- *Encourage research for sustainable use of concrete and lowering carbon footprint.*
- *Transfer the findings from research into industry practice through publications, and spread the state-of-the-art knowledge by organising international congresses, symposia and webinars.*

fib comprises more than forty-one national delegations from across the globe and organises the international congress every four years, which provides an excellent opportunity to the users of concrete in structures to make a review of the progress achieved in the field.

IAStructE has collected information on the developments in the field across India, which is today the second-largest manufacturer of cement and the user of structural concrete across the world, and identified projects in various sectors for inclusion of brief data for the benefit of readers in the country, and across the international fraternity.

It is hoped that this compendium will be found useful as a reflection of the enhanced capabilities of the Indian industry over the years and will encourage appropriate and efficient use of concrete in the structures to be built in the future.

Grateful thanks are due to the contributors and the sponsors, without whose help this publication would not have been possible.

V N Heggade
Deputy Delegate (India),
ING-fib

Alok Bhowmick
Head Delegate (India), *ING-fib*
President, IAStructE



About Indian Association of Structural Engineers (IAStructE)

The Indian Association of Structural Engineers (IAStructE) is the national apex body representing structural engineers across India. Established to address the professional needs of structural engineers, IAStructE is a non-commercial, learned society committed to advancing the discipline through knowledge sharing, capacity building, and policy advocacy. IAStructE has become a credible source of expertise on structural engineering and public safety within the built environment. It maintains collaborative relationships through MoUs with international bodies such as *fib*, IStructE (UK), JSSI (Japan), and SEANep (Nepal), and works closely with global institutions like *fib* to promote international cooperation and professional exchange.

IAStructE is a professional learned society dedicated to supporting and safeguarding the structural engineering profession in India. It upholds high professional and ethical standards while promoting skill development, ensuring its members are equipped to practice with excellence, integrity, and competence across all aspects of structural engineering.

IAStructE strives for continued technical excellence; advancing safety and innovation across the built environment. It also strives to make available to the Government, Public Sector and Private Sector - a credible source of well qualified and experienced Structural Engineers.

IAStructE upholds professional standards and ethics while fostering skill development through CPD programs, workshops, and technical events. It promotes safety, innovation, and excellence, and is widely recognized for its quality publications, including the quarterly journal, Structural Engineering Digest (SED), technical guidelines, code commentaries, explanatory handbooks and quarterly newsletter, CROSFALL, which shares lessons from structural failures.

Continuing its commitment to professional growth, IAStructE launched the Accreditation Programme in 2023. This initiative helps practicing engineers assess their competencies, identify growth areas, and build a robust foundation for long-term professional success.

IAStructE is currently operating from four regional / state centres. These regional centres are located in the Eastern, Western, Northern and Southern parts of the country residing/practicing all over the country



Courses Organized Jointly by IAStructE and fib

As part of their continued commitment to professional development and international knowledge exchange, IAStructE and *fib* have jointly organized the following online professional development courses:

1. Online Course on “Strut & Tie Models in Structural Concrete”

Duration: 21 January 2023 – 11 February 2023

This 12-hour Professional Development Course comprised four sessions and was based on the **13 recorded lectures delivered by members of the *fib* Working Party 2.2.4 “Strut and Tie Modelling”**, who are also the authors of *fib* Bulletin 100, **Design and Assessment with Strut-and-Tie Models and Stress Fields: From Simple Calculations to Detailed Numerical Analysis**. The recorded lectures were presented during the sessions, providing participants with direct exposure to internationally recognized expertise in this specialized field.

Participation: 223 delegates

2. Online Course on “Forensic Structural Engineering”

Duration: 30 March 2024 – 27 April 2024

This programme consisted of five sessions with a total duration of 12.5 hours and focused on the principles and practices of forensic structural engineering, including the investigation of structural failures and lessons learned from past incidents.

Participation: 160 delegates

3. Online Course on “*fib* Model Code 2020 for Concrete Structures”

Duration: 8 March 2025 – 5 April 2025

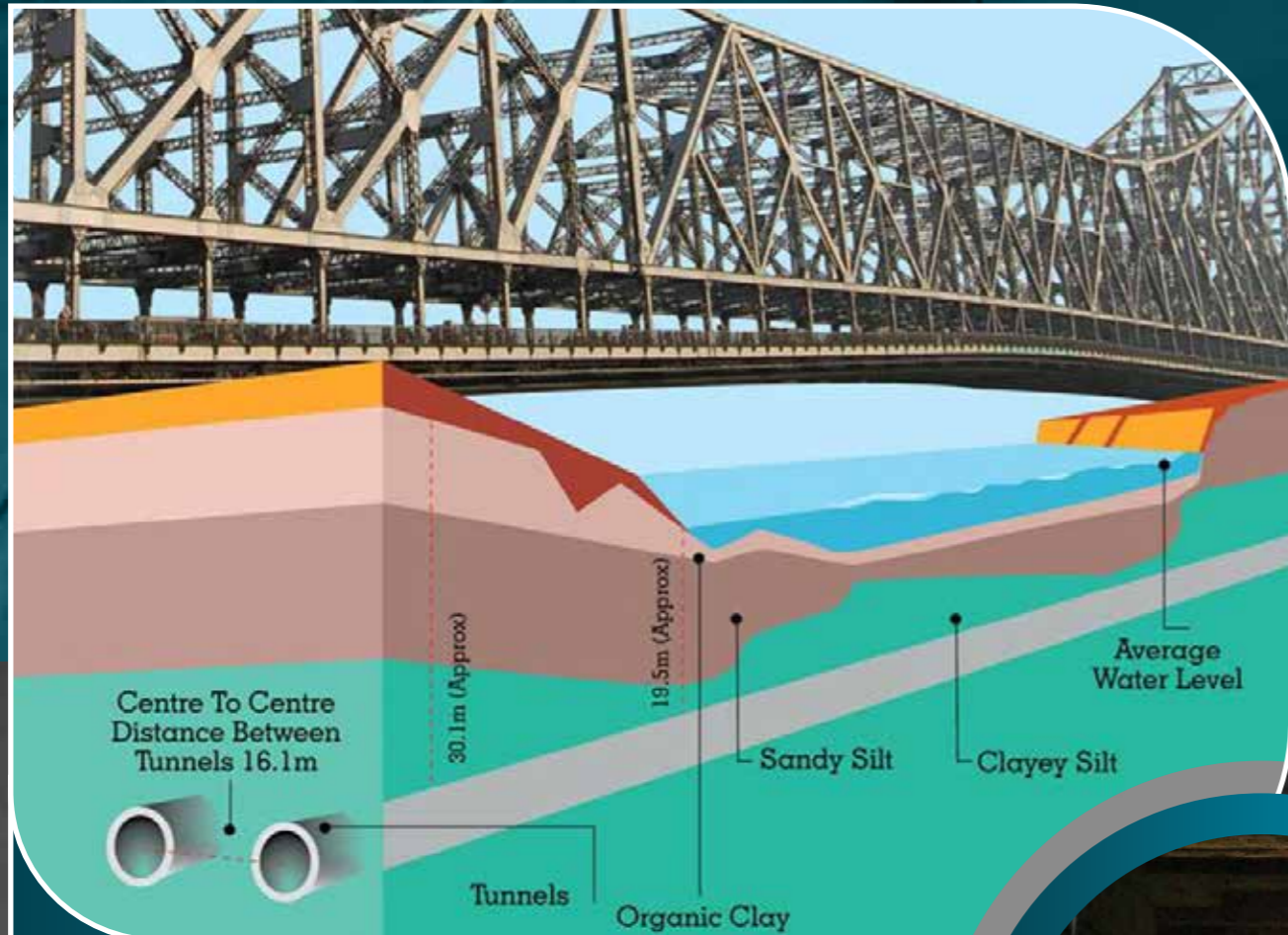
This 12.5-hour Professional Development Course was conducted through five sessions and provided participants with a comprehensive understanding of the provisions, concepts, and practical applications of the *fib* Model Code 2020 for Concrete Structures, one of the most significant recent developments in concrete engineering practice.

Participation: 110 delegates

These programmes attracted enthusiastic participation from practicing engineers, academicians, researchers, and students, and reflect the strong and fruitful collaboration between **IAStructE and *fib*** in promoting excellence in structural engineering through continuing professional development.



EAST-WEST METRO UNDERGROUND TWIN TUNNEL PROJECT, WEST BENGAL, INDIA



TUNNEL SECTION BELOW RIVER HOOGLY

LOCATION OF THE PROJECT : NEAR HOWRAH, WEST BENGAL



Credits

Client: Kolkata Metro Rail Corporation Ltd.
 Contractor: Trans tunnel story Afcons JV

Structural Design Consultant: Lee Harris Pomeroy Architects (LHPA)
 PMC Consultants: SYSTRA INDIA
 A consortium (MYCEL) led by AECOM



HOWRAH UNDERGROUND METRO STATION

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Design and construction of twin Metro tunnels of 3.8 kms each, three underground stations and tunnel ventilation shaft.

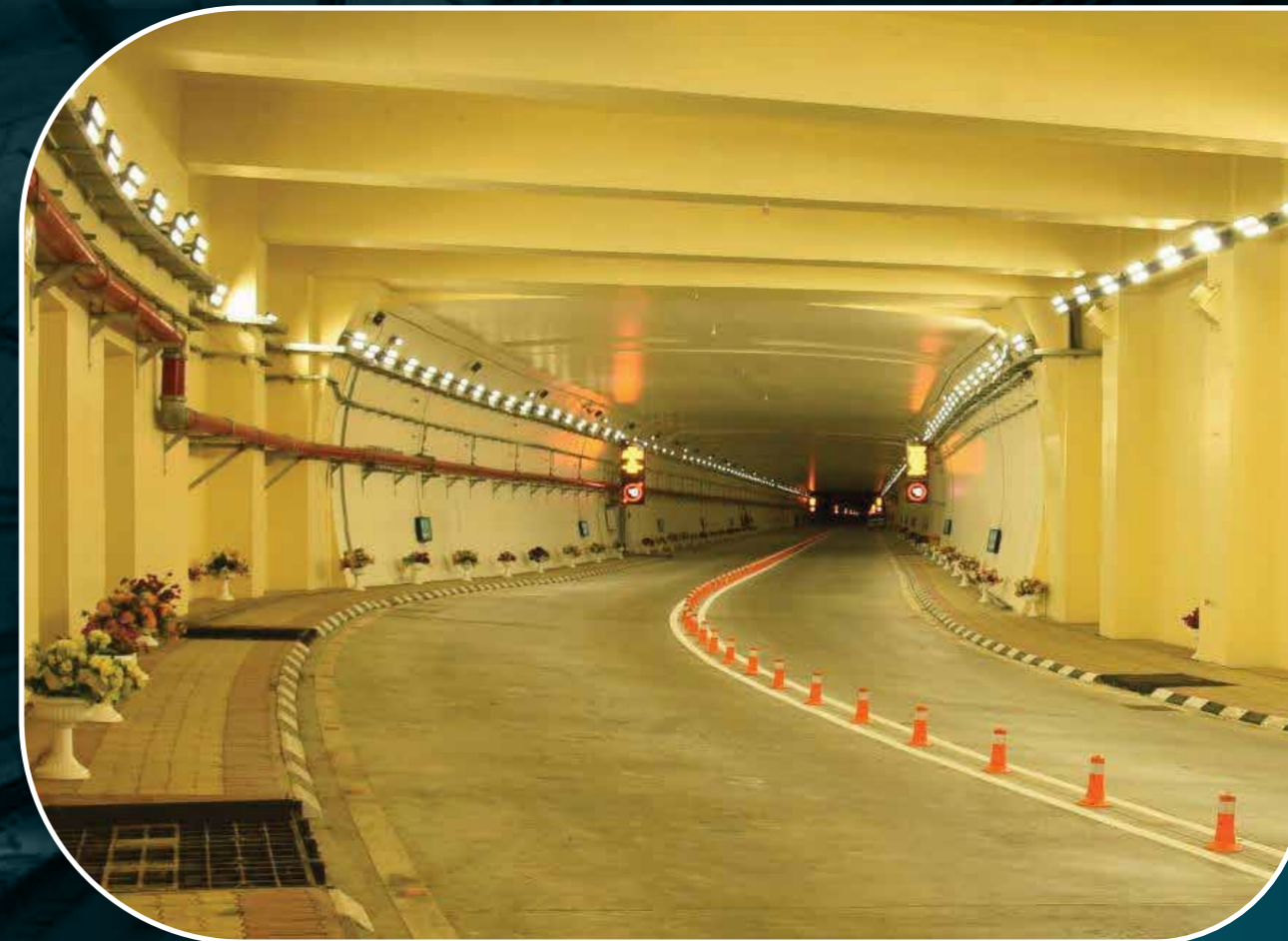
The project included India's first 520 m underwater Metro twin tunnels under any mighty river, 1st MRTS connectivity between two major railway terminals at Howrah & Sealdah. The project has the deepest ventilation shaft in India, spanning from Howrah Maidan to the riverbank.

The tunnel portion under river Hooghly is situated 13 metres below the riverbed and 33 metres below ground level.

The alignment of the metro was along route having some of the caentury old and dilapidated buildings and few structures protected by archaeological survey of India. Significant efforts were put to map, repair and strengthen the buildings before the tunnelling was executed in these areas.



ATAL TUNNEL, ROHTANG, HIMACHAL PRADESH, INDIA



HOWRAH UNDERGROUND METRO STATION

METRO TUNNEL UNDER RIVER HOOGHLY

LOCATION OF THE PROJECT : NEAR MANALI, HIMACHAL PRADESH

Credits
Client:
Contractor:

Border Roads Organisation (BRO)
AFCONS Infrastructure Ltd.

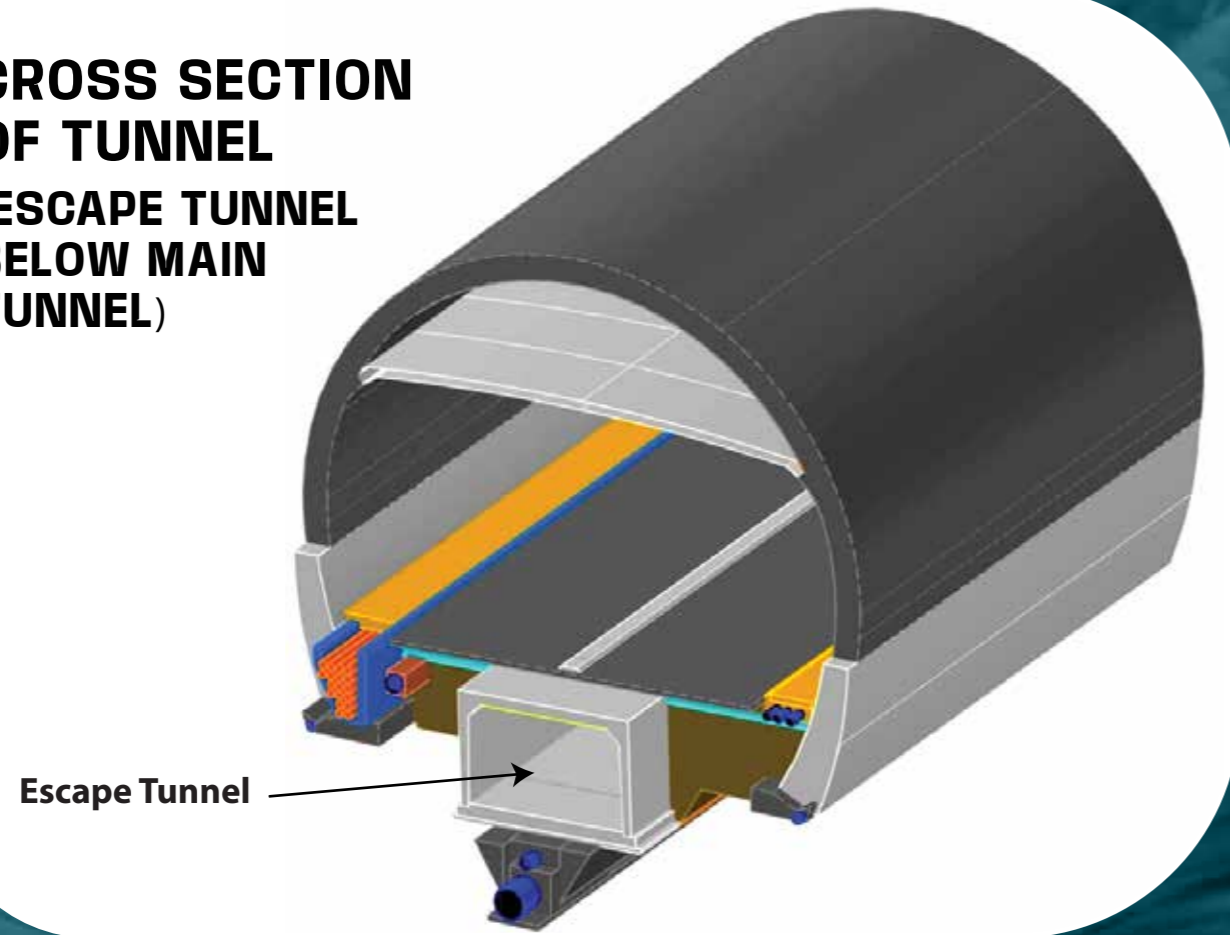
Structural Design Consultant
PMC Consultants:

SMEC International Pvt. Ltd.
D2-ITC-PEMS



CROSS SECTION OF TUNNEL

(ESCAPE TUNNEL BELOW MAIN TUNNEL)



The selection of equipment and machinery was such that, the works could be carried out even during sub-zero temperature conditions. Special boilers were installed to heat the water and aggregate to produce concrete above 5 °C even during severe winter conditions.

The most unique equipment used was Rowa Tunnelling Logistics AG system comprising of mobile crusher and series of conveyor belts. Excavated material is transported from the rock face to a mobile jaw crusher. The crushed material is then moved by a long conveyor belt system to the tunnel portal. This allowed parallel activities to be carried out without interruption.

The escape tunnel in Atal Tunnel is located under the main carriageway against the conventional method of having a parallel tunnel.

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Atal Tunnel (formerly Rohtang Tunnel) is a 9.02 km long, horseshoe-shaped single-tube highway tunnel situated at over 10,000 feet (3,048 m) in Himachal Pradesh, India. Inaugurated on October 3, 2020, it connects Manali to Lahaul-Spiti valley, cutting travel time by 4–5 hours and providing year-round, all-weather connectivity.

Key Details and Features:

Location: Built under the Rohtang Pass in the eastern Pir Panjal range, connecting Manali to the Lahaul Valley.

Dimensions: It is 9.02 km long, making it the world's longest single-tube highway tunnel above 10,000 feet.



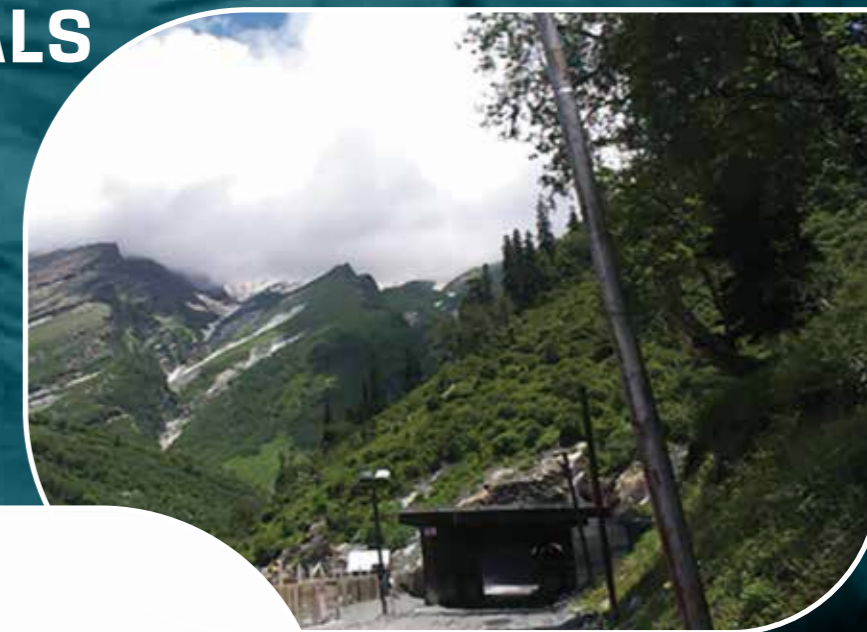
ENTRY TO ATAL TUNNEL FROM MANALI END

ESCAPE TUNNEL SECTION



Tunnelling conditions were extremely poor in the Seri Nalla zone. Difficulties increased exponentially characterized by heavy flow of slurry from crown area to tunnel face. Slurry consisted of riverbed material, including sand, clayey materials, leading to frequent loose-fall of materials along with high ingress of water lead to frequent disruption of execution of works. Significant efforts to mitigate the problem were undertaking including pipe roofing and shot creting.

ENTRY PORTALS DURING SUMMER AND WINTER SEASONS



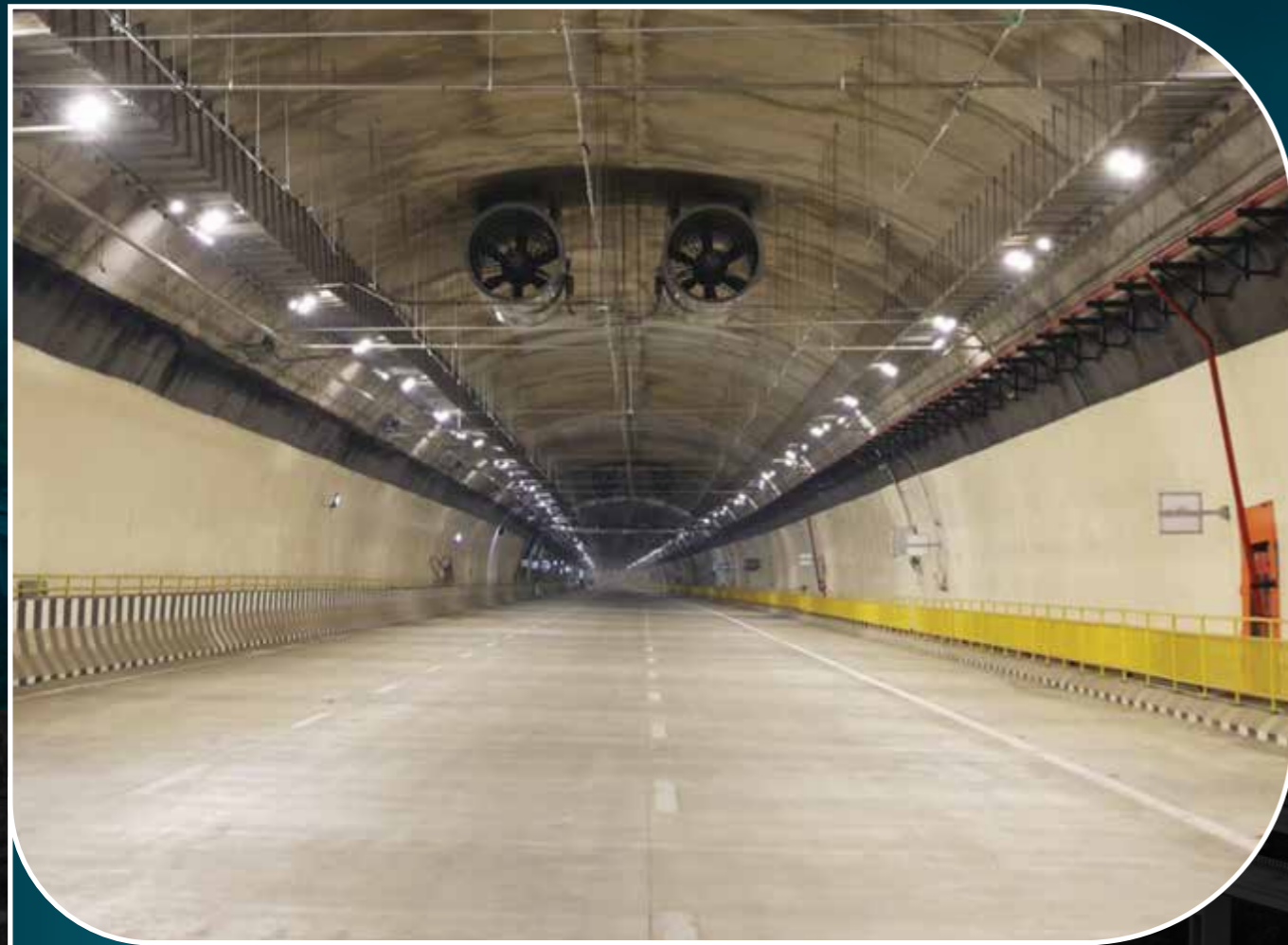
Strategic Significance: Constructed by the Border Roads Organisation (BRO), it provides all-weather access to the Manali-Leh highway, which was previously closed for six months due to heavy snow.

Engineering Marvel: The tunnel includes a 10.5-meter wide single tube, a 1-meter high pedestrian path, and a fireproof, semi-transverse ventilation system. It features emergency exits every 500 meters, CCTV cameras every 60 meters, and auto incident detection systems.

Travel Impact: It reduces the distance between Manali and Sarchu (on the way to Leh) by 46 km.

The tunnel was constructed in challenging geological conditions, including the difficult "Seri Nalah Fault Zone" and was named to honor former Prime Minister Atal Bihari Vajpayee.

SAMRUDDHI MAHAMARG PKG-14, MAHARASHTRA, INDIA



7.78 KM TUNNEL SECTION

LOCATION OF THE PROJECT : NEAR IGATPURI, NASHIK, MAHARASHTRA

Credits

Client:	Maharashtra State Road Development Corporation Limited (MSRDC)
Contractor:	AFCONS Infrastructure Ltd.
Structural Design Consultant	Beaver Infra Consultants Pvt. Ltd.
PMC Consultants:	(Tunnels); Force Structural Engineers Pvt. Ltd. (Structures/ Viaducts)
	EPTISA Servicios de Ingenieria S.L.

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Maharashtra Samruddhi Mahamarg Package-14 (Pkg-14) is a critical 13.1 kms section of the Nagpur-Mumbai Expressway, between Igatpuri and Vashala, featuring **Maharashtra's longest (7.78 km) twin tunnels at the time of construction**, significant viaducts, and an interchange, connecting the Western Ghats.

The structure is designed for a driving speed of 150 kmph carrying 3 lanes of traffic on each carriageway.

The twin tunnels feature 3 lanes per tube with provision for 1 additional lane, advanced ventilation, firefighting systems, and India's first high-pressure water mist system.

Viaduct 1 with a total length of 900 m contains simply supported spans of 35 m with continuity of 3 spans to ensure ride quality. The viaduct has pier positions such that it precisely crosses over the river Darna, two village roads as well as Interchange 1, which connects the expressway to NH3 and Igatpuri.

Viaduct 2 with a total length of 1300m contains balanced cantilever ribbed box girder spans of 98m. With pier heights ranging from 40 to 62 m and 600 m of structural continuity, Viaduct 2 soars over the valleys and mountains of Igatpuri. Twin leaf piers provide flexibility so that seismic and thermal action are greatly reduced.

Viaduct 2



MISSING LINK PROJECT, MAHARASHTRA, INDIA



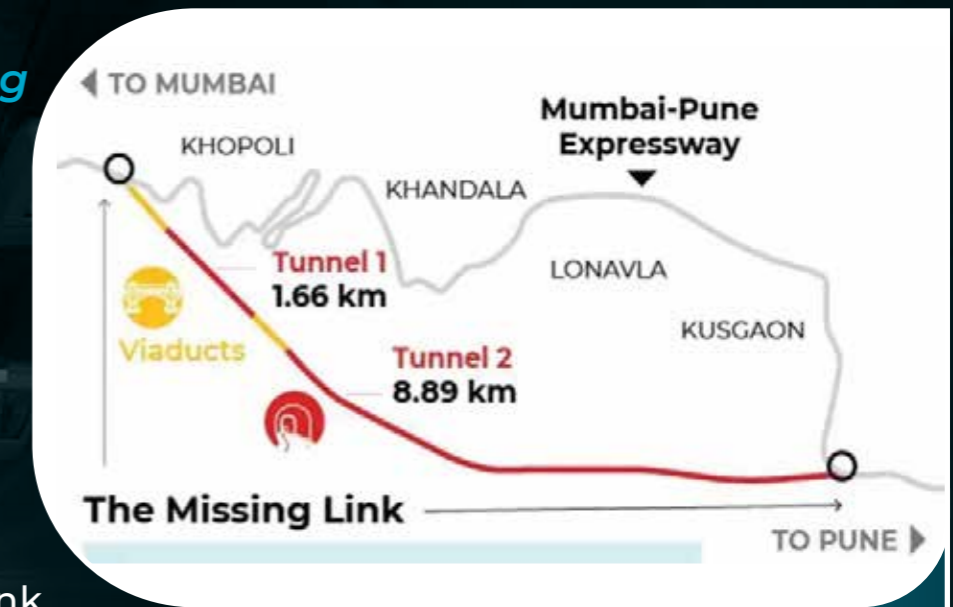
Viaduct -I

LOCATION OF THE PROJECT : NEAR LONAVALA, MAHARASHTRA

Credits

Client:	Maharashtra State Road Development Corporation Limited (MSRDC)
Contractor:	AFCONS Infrastructure Ltd.
Design Architect: Structural Design Consultant	Detailed Design Consultants : 1. Tech TANGENT Solutions Pvt Ltd. (For Viaduct-I and other structures) 2. Wiecon Consulting Engineers (For Viaduct-II, Cable- Stay Section);
PMC Consultants:	Louis Berger

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.



ALIGNMENT OF THE MISSING LINK PROJECT

Mumbai Pune Expressway Missing Link project is the India's prestigious project. The project consists of the following major structures, including two twin tunnels for up and down carriageways of approximately 1 km and 8.9 km length, making them among the longest road tunnels in India.

Viaduct-I

Viaduct-I comprises 3-4 span continuous pretensioned girders supported on RCC hollow tapered piers of varying cross-sections. The sub-structure was constructed using slip-form construction technology, enabling efficient casting of tall piers of a maximum 65m height. Full-depth precast concrete deck panels were successfully used instead of a conventional Cast-in-situ deck system.

Viaduct-II

Viaduct-II features India's tallest cable-stayed bridge pylons, reaching a height of approximately 182 m. The bridge includes complex diamond-shaped pylons constructed using advanced automated systems. Superstructure constructed using India's longest cast-in-situ segment, 9 m long and 25.86m wide, by a cantilever form traveller.



Viaduct 2 Under Construction



Viaduct 2 Under Construction



New VUP 13.5x5.5x38m Long



New Bridge on Slip road at Khopoli Exit and New VUP

3. Other Structures

The other structures under the project comprise the following:

- Construction of a new bridge at the Khopoli exit on the slip road towards Lonavala, consisting of 7 spans of 19.9 m PSC post-tensioned girders supported on piers with a maximum height of approximately 40 m.
- Construction of a new VUP of length 380 m with a carriageway size of 13.5 m × 5.5 m for the slip road towards Mumbai, executed using the cut-and-cover method.
- Construction of New MNB.
- Widening and rehabilitation works of MJB-1, MJB-2, MJB-3, minor bridges, VUP, PUP, pipe culverts, retaining walls, and RE walls.



MJB-3 Widening



MJB-1 Widening



New MNB & Widening of MNB

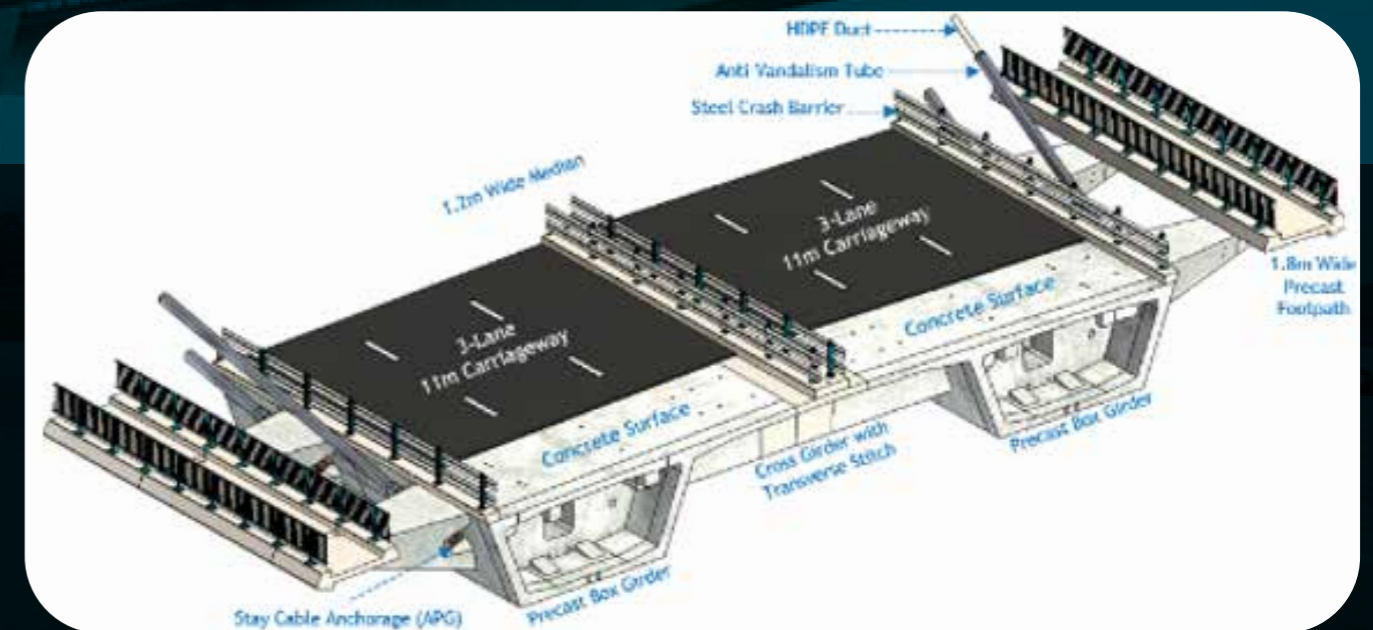
SECOND ISWAR GUPTA SETU



Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

General:

The Second Iswar Gupta Setu is a 714-metre (69m + 109m + 4x120m + 63m) Extradosed Cable-Stayed Bridge spanning the River Hooghly at Naihati-Bandel, West Bengal, India. The structure constitutes of an Exceptional Structural Distinction, characterized by Outward-Leaning 71° Inclined Dual Pylons, SADDLE System for Stay Cable Anchorage at Pylons, a 120-metre Main Span, and a 36m Wide Six-Lane Twin-Box Girder Deck, Collectively Exemplifying in Contemporary Bridge Engineering and Establishing a New Benchmark in Indian Infrastructure. Erected mostly by the Balanced Cantilever Method using 204m Long Launching Girder Weighing 1000MT and 4 Numbers of Bridge Builder.



**LOCATION OF THE PROJECT :
KALYANI, WEST BENGAL**

Credits

Client:

West Bengal Highway Development Corporation Limited [WBHDCL]

Contractor:

Larsen & Toubro Limited (L&T), India

Design Architect:

RITES-COWI JV

Structural Design Consultant

PMC Consultants:

LASA – YOOSHIN JV





SIGS Project 3D Rendering Image



SIGS PROJECT UNDER CONSTRUCTION



CONSTRUCTION OF GREEN FIELD SIX LANE EXTRADOSED CABLE BRIDGE OVER RIVER GANGA NEAR KACCHI DARGAH ON NH-30 TO NEAR BIDUPUR IN DISTRICT- VAISHALI ON NH-103 AT PATNA IN THE STATE OF BIHAR, INDIA



Extradosed Cable Bridge Over River Ganga Near Kacchi Dargah

**LOCATION OF THE PROJECT :
PATNA, BIHAR, INDIA**

Credits

Client:

Bihar State Road Development Corporation Limited (BSRDCL)

Contractor:

Daewoo - L&T JV (50:50)

Design Architect:

PEC, Korea- for Main Bridge; L&TIEL,

Structural Design Consultant

Chennai- for Approaches & Roads

Safety Consultant:

CRAPHTS Consulting (I) Pvt. Limited

Physical Model Study of 6-Lane

Extradosed Bridge:

IIT Roorkee

Proof Consultant:

CH2M Consulting India Pvt. Ltd

PMC Consultants:

AECOM-RODIC (JV)



Extradosed Cable Bridge over river Ganga near Kacchi Dargah

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Kacchi Dargah Bidupur Bridge Project, is being constructed across the Ganga River near Patna in the state of Bihar by Bihar State Road Development Corporation Limited (BSRDCL). BSRDCL is implementing this project under EPC mode to construct a six lane extradosed cable bridge over the River Ganga, connecting Kacchi Dargah on the southern bank to Bidupur on the northern bank, with seamless connectivity to Raghapur island. The total project corridor spans 19.759 km, including a 9.759 km navigational extradosed bridge across the Ganga along with approach roads.

The 9.759 km long extradosed main bridge comprises 22 blocks out of which end blocks, each having a span configuration of 79.5 m + 150 m + 75 m with a total length of 304.5 m and other blocks designated as typical blocks follows a span configuration of 75 m + 150 m + 150 m + 75 m, resulting in a total length of 450 m.

Deck continuity is achieved through the placement of needle beams at expansion joint locations. Block-C, designated as the connection block (Block-8), is located between Blocks B and D and features a cast-in-situ superstructure with a span arrangement of 75 m + 150 m + 150 m + 150 m + 75 m, having a total length of 600 m.

Precast segments are used in typical blocks with superstructure depths varying from 4.0 m to 5.0 m and a uniform width of 32.4 m. The connection block incorporates a cast-in-situ multicell box superstructure with depths ranging from 4.0 m to 5.0 m, while the width varies from 32.4 m to 53.054 m. The approaches consist of multiple spans of prestressed concrete girders supported on piers founded on large diameter bored cast-in-situ piles.

Since the project is situated in high seismic zone (Zone IV), the weight of the superstructure in Block B & D and Block A & E is minimized by providing internal and external struts along with transverse PT in the top slab of the deck. Internal struts at the cable anchorage zone are strengthened by internal tendons to transfer the stay force to the webs.

Upon completion, the Kacchidargah Bridge is expected to serve as a critical infrastructure link, decongest existing routes such as the Mahatma Gandhi Setu, and boost socio-economic development across north and south Bihar.

**Extradosed
Cable Bridge
over river
Ganga near
Kacchi Dargah**



**Extradosed Cable Bridge over
river Ganga near Kacchi Dargah**



**Extradosed Cable Bridge Over River Ganga
Near Kacchi Dargah**



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Joghichopa Bridge



Signature Bridge



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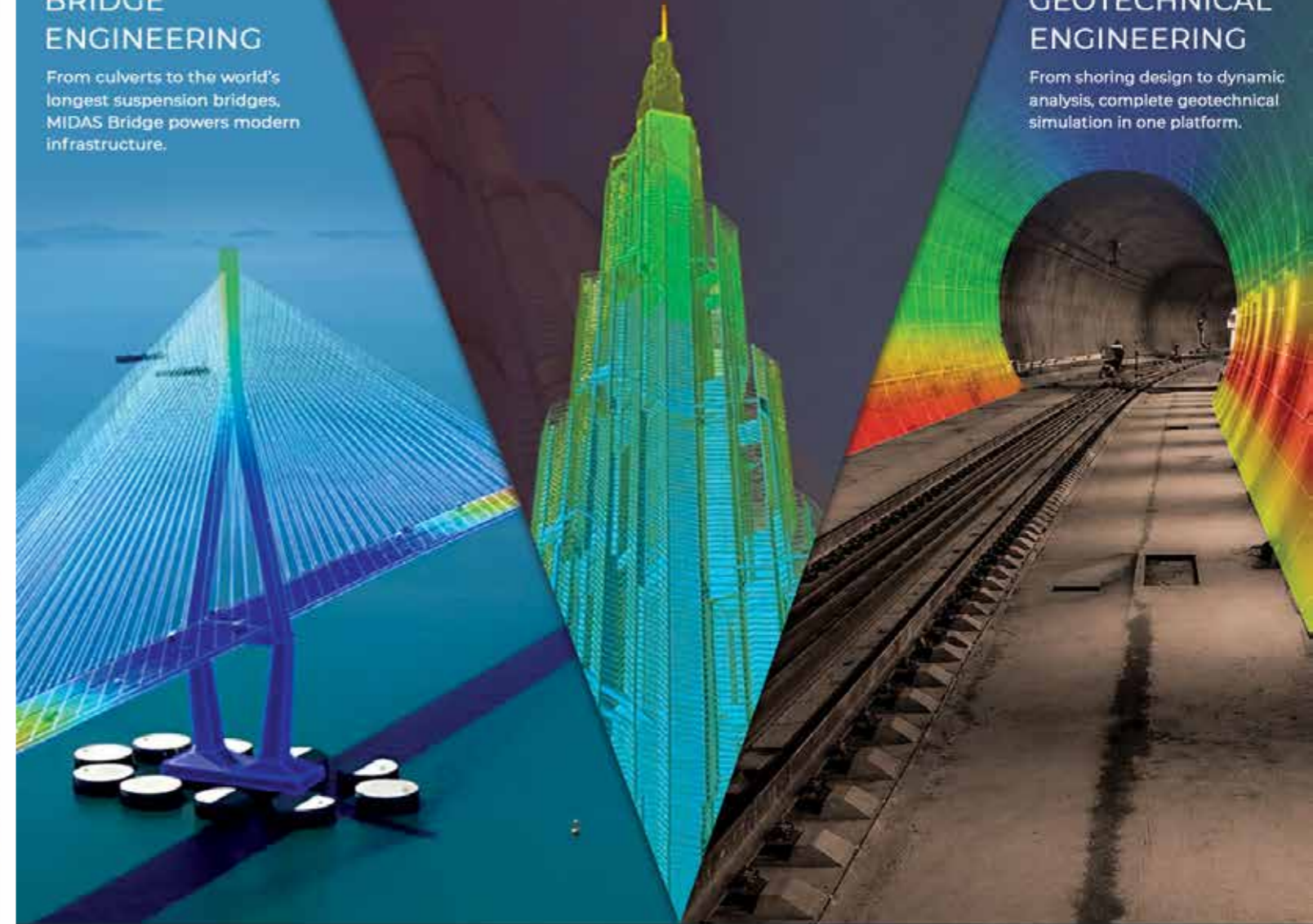
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MEGHALAYA (PHULBARI) ASSAM (DHUBRI) BRIDGE PROJECT (MABP)

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.



The Dhubri Phulbari Bridge over the Brahmaputra River is one of the most significant ongoing infrastructure projects in Northeast India, aimed at transforming regional connectivity and economic integration. The project is being undertaken by the Ministry of Road Transport & Highways through National Highways & Infrastructure Development Corporation Limited.

The bridge will connect Dhubri on the north bank of the Brahmaputra with Phulbari on the south bank, linking the states of Assam and Meghalaya. The total project length is approximately 20 km, with the main bridge stretch measuring about 18.36 km. Of this, a substantial 12.625 km constitutes the navigational span, designed to facilitate inland waterway movement, while the remaining length comprises approach viaducts on either side. Once completed, it is expected to become India's longest river bridge, showcasing advanced engineering suited to the challenging riverine conditions of the Brahmaputra.

LOCATION OF THE PROJECT : ASSAM

Credits

Client:	National Highways & Infrastructure Development Corporation Limited (NHIDCL)
Contractor:	Larsen & Toubro Limited (L&T), India
Design Architect:	L&T Construction, Transportation
Structural Design Consultant	Infrastructure IC, EDRC Special Bridges
PMC Consultants:	AECOM



The foundation and substructure design are highly complex due to the deep alluvial strata, requiring robust solutions such as large diameter piles or well foundations. The approaches consist of multiple spans of prestressed concrete girders supported on piers founded on large diameter bored cast-in-situ piles.

This bridge will drastically reduce travel distance from over 200 km to less than 20 km, significantly cutting down travel time between Assam and Meghalaya. More importantly, it will provide the shortest and most efficient connectivity between West Bengal and Meghalaya, strengthening interstate trade and logistics. In addition to its economic benefits, the Dhubri Phulbari Bridge holds strategic importance by improving mobility in the North-east, a region characterized by difficult terrain and limited cross-river connectivity. It will serve as a vital link for both civilian and defence movement, reinforcing national integration. Given the scale, complexity, and impact of the project, it stands as a landmark initiative comparable to several other mega bridge projects in India, reflecting the country's growing capability in executing large-scale, technically demanding infrastructure over major river systems.



MUMBAI TRANS HARBOUR LINK PROJECT – PACKAGE 1 & 3



MTHL Project



LOCATION OF THE PROJECT : Mumbai, Maharashtra

Credits

Client:

Mumbai Metropolitan Region Development Authority (MMRDA)

Contractor:

Larsen & Toubro Limited (L&T), India,
IHI Infrastructure Corporation, Japan.
COWI, Denmark

Design Architect:
Structural Design Consultant

PMC Consultants:

AECOM – PADECO – Dar Al Handasah –
T. Y. Lin International Consortium

MTHL Project

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Mumbai Trans Harbour Link (MTHL), officially named the Atal Bihari Vajpayee Sewri Nhava Sheva Atal Setu, is located in Mumbai, Maharashtra constructed by Mumbai Metropolitan Region Development Authority (MMRDA). It is India's longest sea bridge and one of the longest sea bridges in the world connecting Mumbai with Navi Mumbai. MTHL Package 1 was executed by a consortium of M/s Larsen & Toubro Limited, India, and IHI Infrastructure Corporation, Japan. The total length of Package 1 is around 10.4 Km with additional 6 Ramps at Sewri for about 5.8 Km Approximately. The Main alignment across Sea includes Marine Viaduct (Appx. 7.5 Km) and Steel Orthotropic deck bridges (2.33 Km). The viaduct structure was Prestressed concrete girder bridge of 60m typical spans with module length from EJ to EJ around 420m supported on Elastomeric bearings. In a national first, the steel bridge portion incorporating orthotropic steel decks was executed under this package. These orthotropic steel decks were fabricated in specialized facilities across Japan, Taiwan, China, and Vietnam, and subsequently assembled into 38 spans with lengths ranging from 85 m to 180 m. The steel superstructure, with a total weight of 51,444 metric tons, was transported and erected using specially designed barges and Self-Propelled Modular Transporters (SPMTs), reflecting exceptional engineering and construction expertise. A notable innovation in this package is the adoption of hollow pier foundations and Innovative pile foundation system with Dumbbell shape, specifically optimized for constructability, durability, and demanding marine conditions. Mumbai Trans Harbor Link Project, Package 1 received several awards globally including the most prestigious award as 2nd Bridges Winner for the "ACI Excellence in Concrete Construction Awards at the international level held on November 4, 2024, at USA.



MUMBAI TRANS HARBOUR LINK (MTHL) OFFICIALLY NAMED AS ATAL BIHARI VAJPAYEE SEWRI-NHAVA SHEVA ATAL SETU PACKAGE-2



LOCATION OF THE PROJECT : It connects Mumbai with Navi Mumbai- Thane Creek (Mumbai, India)

Credits

Client:	MMRDA
Contractor:	Daewoo E&C - Tata Projects (JV)
Design Architect:	
Structural Design Consultant	Ramboll India (Concrete Span), JFE Corporation (OSD span)
PMC Consultants:	PADECO, Dar Al-Handasah and T. Y. Lin International

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

MTHL bridge length is 21.8 km length which comprises 16.5 km of sea bridge and 5.5 km of viaducts on land on both ends of the bridge. MTHL is divided into three construction packages for execution. The MTHL package 2 starts at 10+380 in Mumbai Bay and runs up to chainage 18+187 at Shivaji Nagar. It includes the construction of the Shivaji Nagar Interchange with associated ramps. The length of MTHL package 2 is 7.807 km.

The package is broadly divided into 3 zones viz. Marine which is about 4.37 km, Intertidal zone which is about 2.09 km and Land zone which is about 1.35 km. In the land zone, there are 6 ramps which connect the bridge with the proposed CIDCO road. The Intertidal zone consists of mudflats and mangroves and is highly impacted due to the tidal variations. Due to this, the construction activities in this zone are carried out with the help of a temporary steel bridge of length 2.10 km running adjacent and parallel to the alignment of the main bridge. The temporary bridge was used for construction as well as logistic activities.

The bridge structure is mainly segmental box girder concrete decks of mostly 60m length spans in all the zones except for a navigational section which is steel deck, technically known as Orthotropic Steel Deck (OSD). The navigational section has a total of 32 Nos of spans with varying span lengths ranging from 65m to 180m

CONCRETE SPANS		STEEL SPANS (OSD)		SHIVAJI NAGAR INTERCHANGE	
					
6.1 km Length	14.8 m Deck Width	1.7 km Length	14.8 m Deck Width	1.9 km Length	9.15 m Deck Width
2 m Diameter Pile Foundations with depth up to 32 m		2 m & 3 m Diameter Pile Foundations with depth up to 32 m		Open Foundations with size up to 15m x 12m	
Hollow Piers with height up to 25 m		Hollow Piers with height up to 23 m		Solid Piers with height up to 14 m	
Segmental Spans with length 60 m		OSD Spans with length up to 180 m		In-situ spans with length up to 30 m	
2 Carriage-ways (3+3 Lanes)		2 Carriage-ways (3+3 Lanes)		Single Carriage-way (2 Lanes)	



Orthotropic Steel Deck
Longest Span Length: 180 m
Longest Span Weight: 2200 MT

DAEWOO E&C TATA PROJECTS



HANIMAADHOO



MUMBAI COASTAL ROAD PROJECT PACKAGE-1



MCR Project

LOCATION OF THE PROJECT : Mumbai, Maharashtra

Credits

Client:	Brihanmumbai Municipal Corporation (BMC)
Contractor:	L&T Construction
Design Architect: Structural Design Consultant	Ramboll
PMC Consultants:	Louis Berger International (A WSP Company)

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc

The Mumbai Coastal Road (MCR) project, officially named the Dharmveer Swarajya Rakshak Chhatrapati Sambhaji Maharaj Coastal Road, is a landmark urban infrastructure initiative undertaken by the Brihanmumbai Municipal Corporation (BMC) to enhance connectivity and ease traffic congestion in Mumbai. The project comprises an 8-lane, 29.2 km long access-controlled expressway along Mumbai's western coastline, linking Marine Lines in the south to Kandivali in the north.

The first phase, a 10.58 km stretch from Princess Street Flyover to the Bandra-Worli Sea Link, was divided into three civil packages (Packages 1, 2 and 4), of which Packages 1 and 4 were executed by Larsen & Toubro (L&T). Package-1 includes the coastal road section from Priyadarshini Park to Baroda Palace, constructed on reclaimed land and incorporating major interchanges at Amarson Garden and Haji Ali. The main alignment consists of twin concrete bridge decks, each 18 m wide, with an elevated viaduct length of about 1.05 km and three navigational spans of 60 m.

A key engineering highlight of the project is the extensive use of large diameter monopile foundations, marking a first-of-its-kind application in India for bridge structures. Monopiles of 3.3 m diameter were adopted for taller piers at the Haji Ali interchange and marine modules of the main bridge, while 2.6 m diameter monopiles were used for other interchange piers, with lengths ranging from 18 m to 35 m based on rock strata conditions. Installed using advanced reverse-circulation drilling technology, these monopiles enhance durability, enable post-seismic inspection, reduce carbon footprint, and minimise environmental impact.



MCR Project

Given the complex alignment and varied construction conditions, multidisciplinary construction methodologies were adopted, including precast segmental erection, overhead and underslung launching girders, and cast-in-situ construction. The main viaduct comprises a prestressed concrete box girder continuous superstructure, with span lengths ranging from 47 m to 60 m, supported on elastomeric bearings. Sustainable construction practices were implemented using GGBS-based concrete for higher grades, designed for a 100-year service life.

The project also involved reclamation of 111 hectares of land, construction of an 8.5 m high seawall over 7.47 km, and environmentally responsible measures including successful relocation of live corals. Despite challenges such as severe monsoons, tidal variations, cyclones, and global supply-chain disruptions, L&T demonstrated exceptional adaptive planning and execution, completing its scope within the stipulated timeframe while maintaining high standards of quality and safety. Mumbai Coastal Road Project received several awards globally including the most prestigious award as 1st Bridges Winner for the “ACI Excellence in Concrete Construction Awards at the international level held on November 4, 2024, at USA

The Mumbai Coastal Road stands as a pinnacle of modern urban engineering, significantly reducing travel time, improving mobility, and creating a resilient and sustainable infrastructure asset that will serve Mumbai for generations to come.



MCR Project

EXTENDED PIER WING PSC BRIDGE FOR THE GANGA EXPRESSWAY PROJECT, UTTAR PRADESH, INDIA

LOCATION OF THE PROJECT : Uttar Pradesh

Credits

Client:	Uttar Pradesh Expressways Industrial Development Authority
Contractor:	L & T Transportation IC
Design Architect: Structural Design Consultant	L & T Transportation IC & Force Structural Engineers Pvt. Ltd.
PMC Consultants:	Lion Engineering Consultants

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc

As part of the Meerut–Prayagraj Greenfield Expressway development, the major bridge across river Ganga at Chainage 66+850 was conceived to provide seamless high-speed connectivity across the state of Uttar Pradesh. The bridge has an overall length of approximately 960 m and carries a dual carriageway of 21.25 m width.



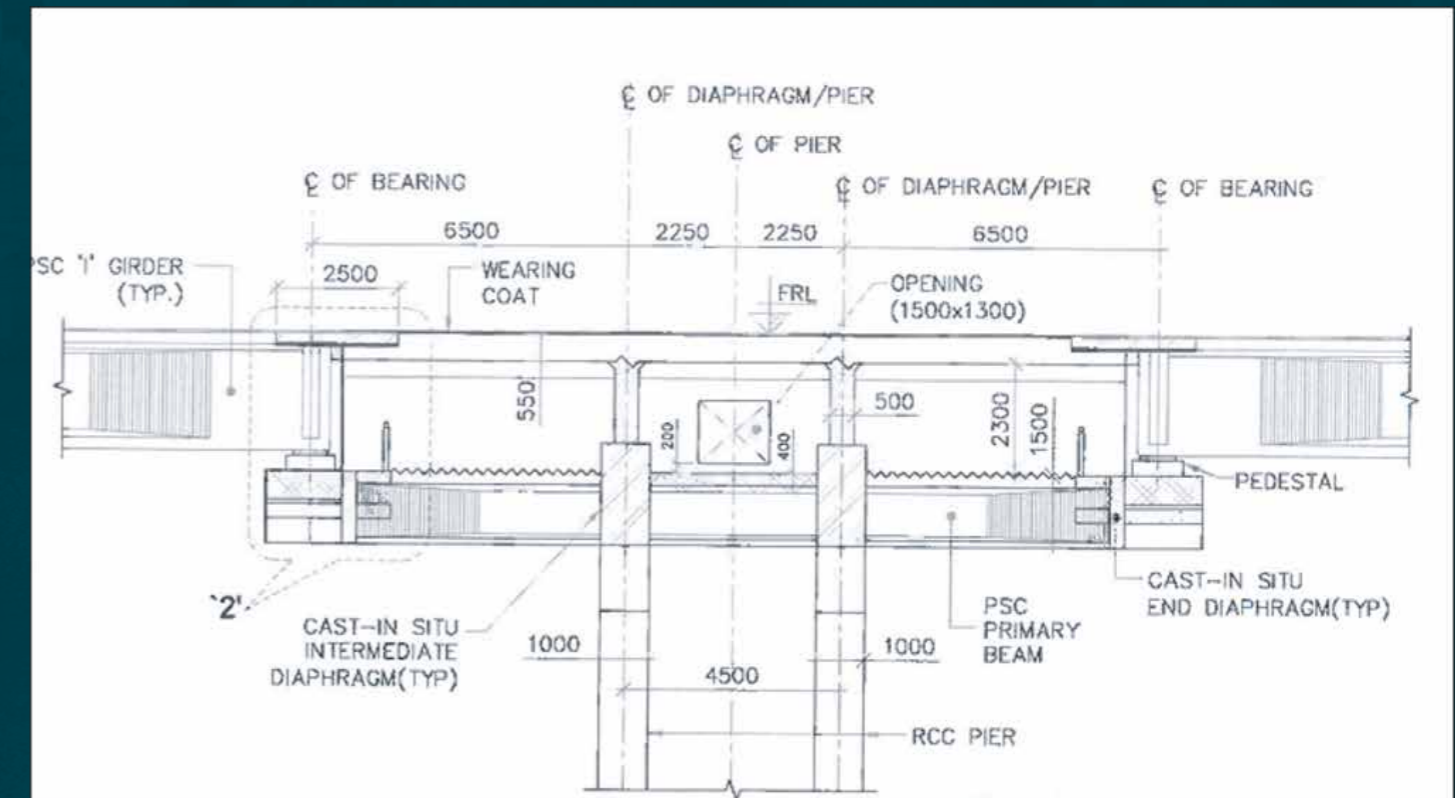
The structural system comprises 60 m pier-to-pier spans, incorporating a 43.3 m long precast prestressed concrete (PSC) main girder supported on an innovative precast extended pier wing beam system of 19.3 m length. The pier wing beams are supported on twin-leaf piers founded on six numbers of 1.5 m diameter bored cast-in-situ piles.

A defining innovation of the project is the adoption of a precast extended pier wing structural system, developed to eliminate the requirement of conventional in-situ construction, staging arrangements, and launching girders, while enabling the practical use of an I-girder system for 60 m spans. The 43.3 m long PSC main girders, each weighing approximately 115 tonnes, are supported on 19.3 m long precast PSC pier wing beams weighing approximately 62 tonnes. The entire superstructure was erected using 250-tonne capacity cranes, resulting in a faster, safer, and highly efficient construction methodology. Span configuration and girder weights were strategically optimized based on available erection equipment, ensuring smooth execution under site constraints.

The precast pier wing arrangement functions as an extended frame-type PSC beam system in the longitudinal direction, effectively reducing the span requirement of the main girders. This structural concept represents a first-of-its-kind application in bridge engineering and demonstrates a significant advancement in modular precast bridge construction technology. Temporary construction access was achieved through partial river filling, pipe culverts, and timber pile-supported platforms, facilitating the movement of heavy equipment while maintaining uninterrupted river flow conditions. The girders were cast adjacent to the bridge site, thereby eliminating the need for long-distance transportation from a remote casting yard to the erection location.

The project extensively utilized modular precast construction, advanced finite element analysis (FEA)-based structural design, and parallel construction sequencing to enhance construction quality, safety, and execution efficiency. Compared with conventional alternatives such as box girder systems erected using launching girders and supported on pile or well foundations (24–36 months), the adopted methodology reduced the overall construction duration to approximately 18 months, representing a time saving of nearly 30–40%.

In addition to construction efficiency, the project significantly minimized environmental impact by avoiding extensive in-stream activities and preserving the natural hydraulic behaviour of the river. The bridge establishes a new benchmark in modern bridge engineering through its innovative precast pier wing structural system, fully crane-based erection methodology, and accelerated precast construction approach. Owing to its technical innovation, constructability advantages, and replicability for future infrastructure projects, the bridge has received recognition through the World of Concrete India Award for Excellence in Structural Engineering and Design.



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APPLICATIONS

-  **BUILDING STRUCTURES**
Columns • Beams • Slabs • Transfer Girders
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Onshore • Offshore • Coastal Structures
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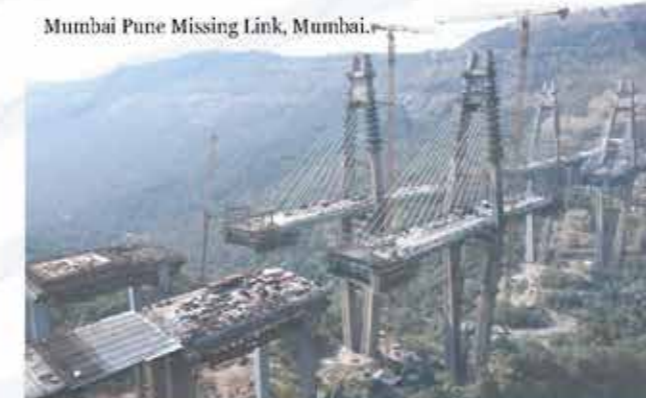
VSL India provides package services for construction of superstructure on bridge projects including the supply of major precasting and erection equipment. VSL India is leading supplier of its patented post-tensioning and stay cable technologies in India.

VSL India undertakes Specialist Package sub-contracts for Segmental Pre-cast bridges which includes Design, Supply & Operation of Launching Gantries for Span Erection, Supply of Casting moulds and Post Tensioning. VSL India also undertakes Supply & Installation of its Proprietary VSL SSI 2000 Stay cable System on Stay Cable Bridges and is one of the most widely used stay cable system in the country. In addition, VSL India undertakes Diaphragm Walls Construction for Underground Metros, Heavy Lifting Operations, Post-Tensioning on Various structures like Wind towers, Nuclear/LNG Tanks, Repair and Retrofitting works.



Mumbai-Trans Harbor Link (PKG-2), Mumbai.

Mumbai Pune Missing Link, Mumbai.

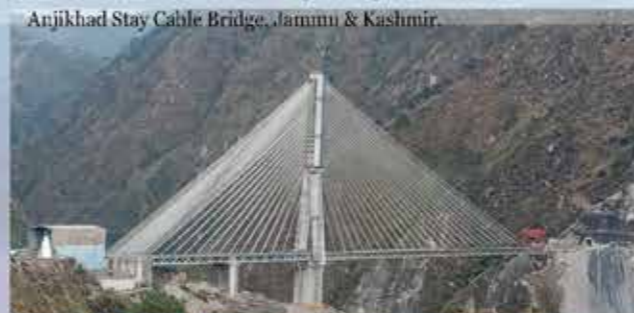


VSL India is a leader in Cable Stay Supply & Installation and has successfully installed Stay Cables on iconic bridges like Bandra Worli Sea Link-Mumbai; Atal Setu-Jammu; The Veer Kunwar Singh Setu- Bihar; Okha-Beyt Dwarka bridge, Anjikhad Stay cable bridge-Jammu, Mumbai-Pune Missing Link to name a few.

Santacruz-Chembur Link Road Stay Cable Bridge, Mumbai.



VSL India has successfully demonstrated its quality, competitiveness, speed & accuracy on various such package contracts executed on long segmental bridges like Bangalore Hosur Elevated Project-Bangalore, Devenahalli-Hebbal Elevated Highway-Bangalore, Hindon Elevated Road Project-Ghaziabad & Mumbai-Trans Harbor Link (PKG-2) to name a few.



Anjikhad Stay Cable Bridge, Jammu & Kashmir.

VSL India is presently engaged in construction of highly challenging projects like New MG-Setu Bridge-Patna; Bakthiyarpur- Tejpur Bridge -Patna; Chennai Port-Maduravoyal Expressway.



Bakthiyarpur - Tejpur Ganga Bridge, Patna.



Chennai Port-Maduravoyal Expressway, Chennai.

REDEVELOPMENT OF HANIMAADHOO INTERNATIONAL AIRPORT - REPUBLIC OF MALDIVES.



LOCATION OF THE PROJECT :
The project is located at Hanimaadhoo International Airport on the island of Hanimaadhoo, situated in the northern region of the Maldives.



Credits

Client: Ministry of Transport and Civil Aviation.
EPC Contractor: Kalpataru projects international Ltd.
Architect: Somnium London, Studio DRA & Meinhardt Group.
PMC Consultants: STUP Consultant Pvt Ltd.

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The redevelopment of Hanimaadhoo International Airport is a strategically important infrastructure project undertaken in the northern region of the Maldives. The project aims to upgrade the existing domestic airport into a fully functional international airport, thereby enhancing regional connectivity, promoting tourism, and supporting economic growth across the northern atolls.

A key component of this development is the construction of a **fuel access jetty and associated marine infrastructure**, designed to facilitate safe berthing, mooring, and transfer of fuel from marine vessels to onshore storage facilities. The jetty extends from the shoreline into deeper waters and comprises access trestles, main platform, breasting dolphins, and mooring dolphins, forming an integrated system for efficient fuel handling operations.

Significance of the Project:

The project holds high significance as it acts as a catalyst for the socio-economic development of the northern Maldives. By enabling the operation of larger aircraft and improving logistical infrastructure, it reduces dependency on distant international airports and strengthens regional accessibility. The fuel jetty, in particular, ensures a reliable and safe fuel supply chain, which is critical for uninterrupted airport operations.

Construction of an access jetty: The construction methodology involved systematic erection of spun piles, casting of pile heads, and installation of precast elements. Spun piles were first positioned using a guide frame to ensure accurate alignment, then lifted and pitched vertically using cranes, followed by controlled driving with an impact hammer starting with low-energy blows and gradually increasing to achieve the required penetration and bearing capacity; pile segments were joined by full circumferential welding where required, and excess pile length was cut to the specified cut-off level. After pile installation, pile head casting was carried out by preparing and cleaning the pile top, fixing reinforcement with proper anchorage, installing bottom and side shutters using clamp-based supports suitable for marine conditions, and placing high-grade concrete with proper compaction, finishing, and curing to ensure structural integrity. Subsequently, precast elements cast in a controlled yard environment were transported to site, lifted using cranes, and placed over prepared pile heads with suitable bedding, followed by precise alignment and positioning to form the deck structure, ensuring improved construction speed, quality control, and efficiency in challenging marine conditions.

Construction of main platform, mooring & breasting dolphins:-

The construction of the main platform, mooring dolphins, and breasting dolphins for the fuel access jetty at Hanimaadhoo International Airport was carried out using specialized marine construction techniques under controlled offshore conditions. The process commenced with positioning of a jack-up barge using DGPS to establish a stable working platform, followed by lifting, pitching, and driving of steel pile liners using an impact hammer with the help of guide frames to ensure accurate alignment and verticality. After achieving the required penetration and set criteria, brackets were welded onto the pile liners to support the temporary soffit arrangement. Primary and secondary beams were then installed, and bottom shutter panels were fixed to form the base for concreting. Reinforcement was placed as per design specifications, and vertical shutters were erected to define the structural geometry. Concreting was executed using boom placers supplied by transit mixers transported via LCT barges, ensuring proper placement, compaction, and finishing of concrete for pile caps, beams, and deck slabs. In certain cases, construction was optimized using staged concreting to reduce load on temporary supports and accelerate execution. The breasting dolphins were constructed with heavy-duty fender systems to absorb berthing impact, while mooring dolphins were provided with bollards and fixtures to secure vessels. Post-concreting, curing was carried out to achieve the required strength, followed by systematic de-shuttering and inspection to ensure quality and structural integrity, resulting in a robust and efficient marine infrastructure system.

Innovativeness in Design & Construction:

Marine construction inherently involves complex challenges such as tidal variations, dynamic sea conditions, and limited working windows. The project demonstrates innovation through the integration of advanced construction planning, specialized marine equipment, and adaptive engineering solutions.

Key innovative approaches include: -

- Use of jack-up barges and DGPS-based positioning systems for precise offshore operations
- Adoption of custom-designed guide frames to ensure accurate pile alignment in challenging marine conditions
- Integration of precast elements to improve quality control and reduce dependency on in-situ works
- Deployment of boom placers and marine logistics systems for efficient offshore concreting

These solutions ensured high precision, safety, and efficiency in execution under adverse marine conditions.



Casting of pile head.



Spun Pile Driving.

Exclusiveness through Value Engineering:

A major highlight of the project is the implementation of **value engineering techniques focused on faster construction and improved constructability**, resulting in significant time and cost savings.

1. Raising Bracket Level to Overcome Tidal Constraints

The supporting bracket level was increased by 500 mm to avoid submergence during high tide, thereby significantly improving the working window for welding operations. This intervention reduced execution delays and improved productivity by approximately 30%.

2. Adoption of Precast Fender Beams

Instead of conventional cast-in-situ construction, precast fender beams were utilized. This eliminated challenges related to shuttering under tidal conditions and resulted in a time saving of approximately 9 days, while also improving quality and reducing site dependency.

3. Two-Stage Concreting Methodology

The platform construction was optimized by adopting a two-stage concreting approach (500 mm + 1000 mm) instead of a single 1.5 m pour. This reduced load on temporary structures, enabled early removal of formwork, and accelerated construction cycles, achieving significant time and resource savings.

Overall Impact: These engineering interventions not only addressed the constraints of marine construction but also enhanced execution efficiency, reduced construction duration, and optimized resource utilization. The project stands as a strong example of how **innovative design thinking and value engineering can significantly improve constructability and project delivery in challenging environments.**

SUMMARY

Project Overview

The Hanimaadhoo Jetty forms part of the larger harbour and airport infrastructure development at Hanimaadhoo, aimed at strengthening maritime connectivity in the northern Maldives. The project supports logistics, passenger movement, and integration with the upcoming international airport.

Scope of Work

- Construction of marine jetty and quay infrastructure
- Harbour basin dredging and channel development
- Construction of breakwaters, revetment walls, and groynes
- Installation of mooring facilities, ramps, and navigation aids
- Shore protection and paving works

Key Engineering Features

- Marine construction in coral island and shallow lagoon conditions
- Extensive dredging and reclamation works (~50,000+ m³ scale)
- Use of precast and in-situ concrete for quay walls and jetty structures
- Integration with coastal protection systems (breakwaters up to ~700 m)

Project Significance

- Enhances regional connectivity and logistics efficiency
- Supports tourism growth and airport development
- Provides resilient coastal infrastructure in a climate-sensitive zone
- Demonstrates KPIL's capability in marine and island infrastructure projects



Liner Installation.



Liner Driving.



Erection of supporting arrangement. Bracket Fixing.



Erection Of Soffit shutter.



Fixing of Rebar.



Concreting.



Concreting.

KANPUR ELEVATED METRO PROJECT KNPCC -07 - Corridor-1-Transport Nagar Ramp to Naubasta



LOCATION OF THE PROJECT : Kanpur

Credits

Client:	Uttar Pradesh metro rail corporation limited
Contractor:	Kalpataru Projects International Limited
Design Architect: Structural Design Consultant	SYSTRA MVA Consulting India PVL LTD
PMC Consultants:	Consortium of Tecnica y Proyectos, S.A. and Italferr S.P.A General Consultant (GC) - TYPASA (in joint venture with Italferr S.p.A)

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The primary goal of the project is to provide an efficient and reliable transportation solution to mitigate traffic congestion and improve connectivity within Kanpur and its surrounding areas. Kanpur Metro Rail Project package 07 (KNPC-07) starts from Transport Nagar ramp to Naubasta. This 5.427 KM section on the eastern-end of the 23.785 km Line-1 (IIT Kanpur-Naubasta) consists of 5 elevated stations at Baradevi, Kidwai Nagar, Vasant Vihar, Baudh Nagar and Naubasta.

Pre-tensioned U girders are cast in 148-meter-long casting beds for the casting and pre-tensioning of 5 U girders at a time. The casting bed for pre-tensioned U girders is supported by 6 piles, each 1 meter in diameter and 30 meters in length, at both the stressing and dead end abutments. Between the dead and stressing end abutments, an RCC raft footing is provided to support the U girder formwork. Layout of casting bed are shown in Figures 18 and 19. Each U girder has 84 strands, with each strand carrying a jacking force of 19.9 MT. Six 400 MT capacity hydraulic jacks are used to apply the 1700 MT pre-stressing force through 6 Macalloy bars (each 40 mm in diameter), connected to a floating beam at the stressing end abutment.

In this entire stretch of the project, there is one obligatory span of 45 meters for crossing the metro line over the existing flyover of NH (Kanpur-Jhansi Highway). The total weight of the 45-meter steel U girder is 120 MT. Erecting the complete 45-meter length of the U steel girder is difficult and not feasible with two tyre-mounted cranes, and it is also not possible with a single crane in pool of the available crane capacities in India (the required capacity for a tyre-mounted crane exceeds 700 MT). There is also space constraint for placing a higher capacity tyre or crawler-mounted crane, as this location is at the junction of two National Highways. Therefore, the 45-meter length of the steel U girder is divided into three pieces, based on the feasible length for resting over the temporary support to cross the flyover of NH and to keep the weight of the steel U girders within the lifting capacity of the two tyre-mounted cranes (500 MT and 300 MT capacity).

SUMMARY

Project Overview

The elevated section of the Kanpur Metro is part of Phase-1, designed to provide rapid transit connectivity across the city. KPIL executed key viaduct and station works under civil package KNPCC-07.

Scope of Work

- Construction of elevated viaduct (~5.27 km stretch)
- Erection of precast U-girders (25–28 m spans)
- Installation of long-span steel composite girders (~30 m) across critical crossings
- Construction of 5 elevated stations

Key Engineering Features

- Adoption of precast segmental construction technology for rapid execution
- Use of steel composite girders to cross wide highways and flyovers
- Erection of girders at height (~6 m above flyover level) over live traffic corridors
- Optimized construction sequencing to minimize urban disruption

Project Significance

- Improves urban mobility in a dense industrial city
- Reduces congestion and travel time
- Demonstrates expertise in urban elevated metro viaduct systems
- Showcases KPIL's strength in fast-track metro infrastructure delivery



KNPCC-11: DESIGN AND CONSTRUCTION OF TBM TUNNEL, CUT & COVER TUNNEL AND RAMP AFTER DOUBLE PULLIA, RAMPS IN AGRICULTURAL DEPOT FOR MAIN LINE AND DEPOT CONNECTIONS AND THREE UNDERGROUND METRO STATIONS OF KANPUR MRTS PROJECT AT KANPUR, UTTAR PRADESH, INDIA



LOCATION OF THE PROJECT : Kanpur

Credits

Client:

Uttar Pradesh Metro Rail Corporation limited

Contractor:

EPC Contractor: Kalpataru Gulermak JV

Design Architect:

AYESA INGENIERIA Y ARQUITECTURA S.A.

Structural Design Consultant

Design Architect: SYSTRA MVA CONSULTING (INDIA) PVT. LTD.

PMC Consultants:

Consortium of Tecnica Y Proyecto, S.A. and Italferr S.P.A



Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The primary goal of the project is to provide an efficient and reliable transportation solution to mitigate traffic congestion and improve connectivity within Kanpur and its surrounding areas. Kanpur Metro Rail Project package 11 (KNPCC-11) starts from Agriculture University ramp to Vijay Nagar. This 4.1 KM section on the eastern-end of the 8.6 km Line-2 (Agriculture University to Barra-8) consists of 3 underground stations at Rawatpur, Kakadeo & Double Pullia Station.

SUMMARY

Project Overview

The underground section (Package KNPCC-11) of Kanpur Metro Corridor-2 is a technically complex project executed by a KPIL joint venture, involving tunnelling and underground station construction.

Scope of Work

- Construction of twin underground tunnels (~4.08 km)
- Development of 3 underground stations: Rawatpur, Kakadeo, Double Pullia
- Construction of cut-and-cover sections and underground ramps
- Deployment of Tunnel Boring Machines (TBMs)

Key Engineering Features

- Use of shield TBM technology for twin tunnels
- Tunnel internal diameter ~5.8 m (segmental lining system)
- Complex urban tunnelling beneath dense built-up areas
- Integration with elevated corridor at interchange stations
- Sequential excavation and precast segmental lining construction

Construction Highlights

- Deployment of multiple TBMs
- Achieved key breakthroughs in 2025 for tunnel drives
- Parallel execution of station box construction and tunnelling

Project Significance

- Introduces advanced underground metro construction technology in a tier-2 Indian city
- Enhances multimodal connectivity
- Demonstrates capability in complex tunneling and underground infrastructure
- Contributes to development of sustainable mass transit systems



Main structural works for the stations and cut and covers are completed. Finishing works and restoration works are in progress. The photographs are given below the stations and cut & Cover wise.



India's metro rail sector has witnessed remarkable growth over the past decade, transforming urban transport infrastructure across the country. The operational metro network has expanded from about 229 km in 2014 to nearly 1,150 km by 2026, covering 29 cities, making India the world's third-largest metro network after China and the United States.

The growth momentum has largely come from the expansion of existing systems in major metropolitan and Tier-2 cities such as Delhi, Mumbai, Kolkata, Bengaluru, Chennai, Ahmedabad, Kanpur, Nagpur, Pune, Jaipur, Noida, and Lucknow, alongside new metro corridors in Agra, Patna, Visakhapatnam, Vijayawada, and Surat.

At present, around 900 km of metro lines are under construction. Most projects use advanced construction methods such as precast segmental/full span twin U-girder viaducts for elevated routes and Tunnel Boring Machines (TBMs) for underground sections. The rapid expansion reflects strong government investment in sustainable mobility, reduced traffic congestion, and improved connectivity in India's growing urban centers.

KANPUR METRO PHASE 1: CORRIDOR 1 & CORRIDOR 2

LOCATION OF THE PROJECT : Kanpur

Credits

Client:	Uttar Pradesh Metro Rail Corporation limited
Contractor:	Afcons, Kalpataru, Gulermak-SAM India JV, Kalpataru Gulermak JV, Afcons-SAM India JV, CEIGALL
Design Architect:	SYSTRA
Structural Design Consultant	SYSTRA, AYESA, TCPL-GEOCONSULT JV, BRIDCON
PMC Consultants:	Consortium of Tecnica Y Proyecto, S.A. and Italferr S.P.A

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The project aims to deliver an efficient and reliable urban transit system that reduces traffic congestion and enhances connectivity across Kanpur and its surrounding regions. It has been structured into 5-6 civil contract packages and comprises both elevated and underground corridors.

The elevated stretches are being developed using full-span, pre-tensioned twin U-girders supported on precast pier caps. To improve construction speed, quality, and consistency, precast components have been extensively adopted across the elevated sections wherever feasible.





*Cut and Cover
Portion*



*Inside of
TBM Tunnel*



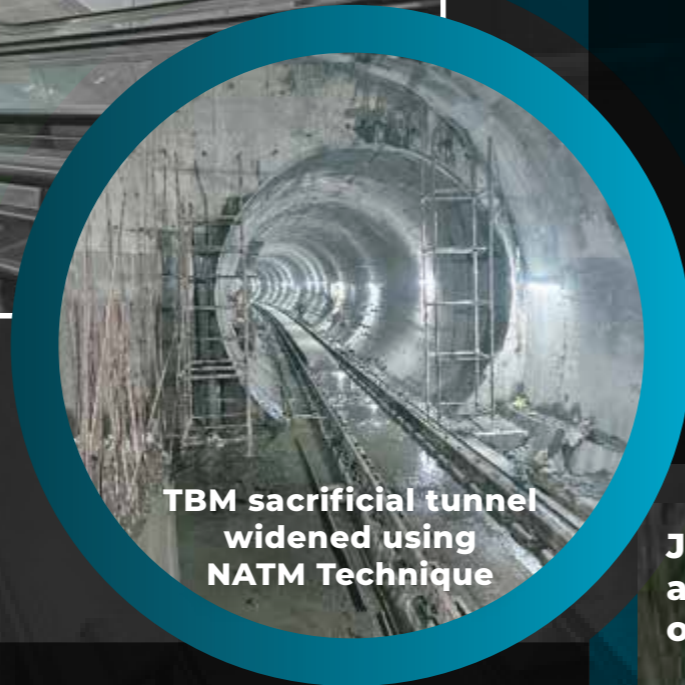
*Construction of
Underground
Stations*



MUMBAI METRO LINE 3 (AQUA LINE)



LOCATION OF THE PROJECT : Mumbai



TBM sacrificial tunnel widened using NATM Technique

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Mumbai Metro Line 3 is a 33.5 km underground rapid transit corridor connecting Aarey JVLR to Cuffe Parade through 27 stations, out of one station is only at grade. The project includes construction using Tunnel Boring Machines for twin underground tunnels through dense urban zones. Cut-and-cover and NATM construction techniques were adopted for station and crossover. Major interchanges, airport connectivity, and links to business districts enhance mobility across Mumbai. This project reduces traffic congestion, travel time, fuel consumption, and environmental pollution significantly in Mumbai.

Due to Mumbai's highly congested urban environment, adequate ground space was not available at several stations, making planning and construction of conventional cut-and-cover methods impractical. Therefore, innovative NATM (New Austrian Tunneling Method) techniques were adopted for the construction of six underground stations: Hutatma Chowk, Kalbadevi, Girgaon, Grant Road, Sitla Devi, and Marol Naka. For the remaining underground stations, bottom-up cut-and-cover construction methodology was implemented using secant pile earth-retaining systems supported by temporary struts and anchors. In addition, three crossover structures were also constructed using NATM methodology.

Credits

- Client: Mumbai Metro Rail Corporation Limited
- Contractor: L&T-STEC JV, HCC-MMS JV, DOGUS-SOMA, CEC-ITD CEM-TPL JV, J. Kumar-CRTG
- Design Architect & Structural Design Consultant: Systra, Ayesa, TCPL-Geoconsult-Frischmann Prabhu JV, Stup-Amberg JV, Omikron Kappa - PSP – Indus Consultants JV, ICT-D2 Consultants
- General Consultants: AECOM Asia led consortium (JV between Padeco, Japan, LBG Inc., USA and Egis Rail, France)

Junction of Cut-Cover and NATM portion of Station





Big NATM Cavern at Kalbadevi Station



Photographs after Completion of Station

MUMBAI LINE 2B

LOCATION OF THE PROJECT : Mumbai

Credits

Client:

Mumbai Metropolitan Region Development Authority

Contractor:

J. KUMAR INFRAPROJECTS LTD., NCC Limited

Design Architect:

Systra

Structural Design Consultant:

Spectrum Techno-Consultants Pvt. Ltd., Structcon Designs Pvt. Ltd.

General Consultants:

AYESA lead consortium JV with CEG, ITALFERR & AYESA INDIA



Segmental spans at BKC

Shunya Bridge at BKC



Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Erection of U-Girder at Night



Mumbai Metro Line 2B (Yellow Line) is a 23.6 km elevated metro corridor stretching from DN Nagar in the west to Mandale in the east. The line is designed to enhance east-west connectivity across Mumbai's suburbs and is expected to cut travel time by as much as 75%. Once fully operational, it will provide seamless links between DN Nagar, BKC, Kurla, and Mandale, while integrating with Metro Line 2A, Metro Line 1, the Monorail, and both the Central and Western Railway networks.

The viaduct is being developed using precast full-span pre-tensioned twin U-girders, with extensive use of precast components for elevated stations. Around 50% of the stations are being built using precast spine-wing construction for concourse levels, while the remaining stations use precast girders combined with precast or cast-in-situ cross arms. At platform levels, precast cross arms and girders are being adopted for nearly all stations.

In addition to standard viaduct structures, steel-composite superstructures are being employed for special spans such as railway crossings, water bodies, and highway interchanges. The project also features two iconic cable-stayed bridges and one curved balanced cantilever bridge. Of the two cable-stayed bridges, one incorporates a steel pylon with a concrete deck, while the other uses a concrete pylon with a steel-concrete composite deck, selected based on span length and structural requirements.



Spine & wing stations

MUMBAI LINE 4



LOCATION OF THE PROJECT : Mumbai

Credits

Client:	Mumbai Metropolitan Region Development Authority
Contractor:	Tata Projects, J kumar, Reliance
Design Architect:	Systra
Structural Design Consultant:	Aecom, LKT,
General Consultants:	DB-Hill-LB JV

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Mumbai Metro Line 4 (Green Line) is an approximately 35 km elevated corridor connecting Wadala in Mumbai to Kasarvadavali in Thane, with an extension up to Gaimukh and a total of 32 stations, the project is designed to strengthen north-south connectivity between Mumbai and Thane. It will provide seamless interchange opportunities with Metro Line 2B, the proposed Line 11, and suburban railway stations. Once operational, the line is expected to offer direct travel between Thane and central Mumbai while easing congestion on Lal Bahadur Shastri (LBS) Marg, the Eastern Express Highway, and overcrowded suburban rail routes.

The viaduct is being developed using precast full-span pre-tensioned twin U-girders, with extensive use of precast components for elevated stations like all other Mumbai Metro projects.

In addition to standard viaduct structures, steel composite superstructures are being employed for special spans over railway and highway crossings.



DELHI METRO PHASE 4 & PHASE 5



Temporary retaining system for UG Station

LOCATION OF THE PROJECT : Delhi

Credits

Client:	Delhi Metro Rail Corporation Limited
Contractor:	Longjian-KEC JV, Sam India-Gulermak JV, Afcons Infrastructure Limited, YFC Projects Pvt. Ltd., HCC-VCCL Joint Venture, J Kumar Infraprojects Ltd., Larsen & Toubro Limited, Kalpataru-SOMA Joint Venture (JV)
Design Architect:	AYESA, AECOM-TCPL JV., EGIS
Structural Design Consultant:	TCPL-GEOCONSULT JV., AMBERG, AECOM, BRIDGECON, ICT, SYSTRA

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Delhi Metro Phase 4 is an ongoing expansion project of approximately 86 km, designed to strengthen citywide connectivity, ease traffic congestion, and improve access to emerging residential and commercial hubs. The phase includes extensions of existing metro lines along with the introduction of the new Golden Line (Aerocity–Tughlakabad).

Key Corridors of Phase 4

- **Janakpuri West – R.K. Ashram Marg (Magenta Line Extension):** 28.92 km corridor with a mix of elevated and underground sections; partly operational, with the remaining stretch under construction.
- **Aerocity – Tughlakabad (Golden Line):** 23.62 km fully underground corridor currently under construction.
- **Maujpur – Majlis Park (Pink Line Extension):** 12.55 km fully elevated corridor, now operational.
- **Inderlok – Indraprastha (Extension):** 12.38 km fully underground corridor in the tendering and construction stage.
- **Lajpat Nagar – Saket G Block:** 8.39 km fully elevated corridor under construction.
- **Rithala – Narela – Kundli (Red Line Extension):** 26.46 km fully elevated corridor currently in the tendering stage.



Gokulpuri CLC – Curved in plan

Alongside Phase 4, preparations are also underway for Phase 5, which will include the extension of the Magenta Line through Central Vista and its connection to the Inderlok–Indraprastha corridor.

The viaduct is being constructed using precast full-span pre-tensioned twin U-girders, with extensive use of precast components for elevated stations. In elevated stations, both concourse and platform are being constructed using precast segmental cross arm and precast T/L girders.

In addition to standard viaduct structures, steel-composite superstructures are being employed for special spans such as railway crossings, water bodies, and highway interchanges. Two in-situ balanced cantilever bridges are also completed -one over Yamuna River and another one is curved at Gokulpuri-crossing existing flyover.

The underground section is planned to be executed using twin TBM-driven tunnels. Underground stations are being constructed using the top-down diaphragm wall method where suitable soil strata extend up to the station base level. In locations where rock is encountered at shallow depth, a bottom-up construction approach is adopted, utilizing temporary retaining systems such as secant piles or soldier piles supported with anchors or struts. A composite construction approach combining NATM and cut-and-cover techniques is also being adopted for one station, necessitated by limited ground-level space that restricts the use of conventional station construction methods.



Double deck Viaduct at Bhajanpura- Highway at first level and Metro at 2nd level



Elevated Station



CLC over Yamuna – near Signature Bridge

MUMBAI LINE 6

LOCATION OF THE PROJECT :
Mumbai



Credits

Client:	Mumbai Metropolitan Region Development Authority.
Contractor:	J. KUMAR INFRAPROJECTS LTD.
Design Architect:	SMEC India Private Limited.
Structural Design Consultant:	Spectrum Techno-Consultants Pvt. Ltd, Structcon Designs Pvt. Ltd, Aecom Designs Pvt. Ltd and CCTPL Designs Pvt. Ltd.
General Consultants:	Delhi Metro Rail Corporation





Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Mumbai Metro Line 6 (Pink Line) is a fully elevated corridor extending from Lokhandwala Complex (Jogeshwari West) to Vikhroli (EEH). The project is aimed at strengthening east-west connectivity across key suburban corridors of Mumbai and is expected to significantly reduce travel time and traffic congestion along arterial routes such as Jogeshwari-Vikhroli Link Road (JVLR). Once operational, the line will provide seamless connectivity between major nodes like Lokhandwala, Goregaon, Powai, Kanjurmarg, and Vikhroli, while integrating with Metro Line 2A, Metro Line 7, Metro Line 3, Metro Line 4 and the Kanjurmarg station.

The critical stretches of the corridor and involve the construction of elevated viaducts and stations using advanced precast construction techniques. The viaduct is primarily being executed using precast full span U-girders girders, Steel girders and Portal Piers erected through overhead launching gantries, ensuring faster construction, improved quality control, and minimal disruption to traffic.

A significant portion of the stations under these packages are being developed with extensive use of precast elements, including precast pier caps, U-girders/Pi-girders, and platform-level structural components. The station construction methodology incorporates a mix of precast and cast-in-situ elements, with emphasis on speed, safety, and consistency in quality. Precast cross arms and girders are widely utilized at platform levels to accelerate erection activities.

In addition to standard viaduct construction, special structural solutions are adopted at critical locations such as busy junctions, major road crossings, and constrained urban stretches. These include steel or composite girders and specially designed spans to accommodate geometric and clearance requirements. The project also addresses complex alignments and curvature, requiring precise engineering and execution planning.

Overall, the Line 6 showcase a modern, efficient, and innovative approach to metro construction in dense urban conditions, with a strong focus on precast technology, optimized construction methodologies, and integration with Mumbai's expanding multimodal transport network.

JIA BRIDGE, HIMACHAL PRADESH, INDIA



LOCATION OF THE PROJECT : Jia Village, Dist. Kullu, Himachal Pradesh

Credits

Client:	National Highways Authority of India
Contactora:	NKC Projects Pvt Ltd
Structural Design Consultant:	Tech TANGENT Solutions Pvt Ltd
Authority Engineer:	Theme Engineering Services Pvt Ltd
Safety Consultant:	Khanna Goyal Designers LLP
Proof Consultant:	G-ENG Advisory Services Pvt Ltd

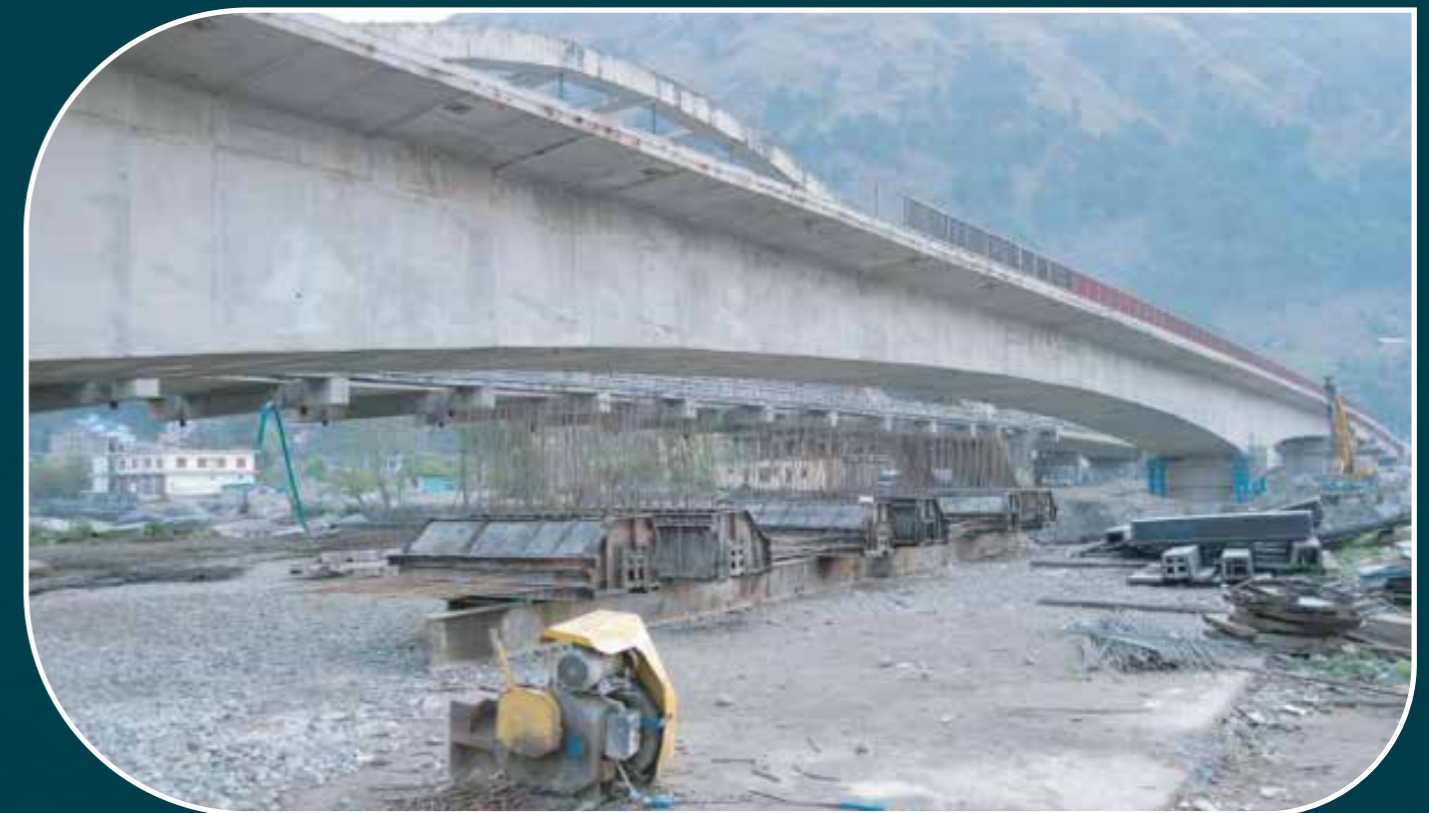
Description of the project, highlighting the significance of the project, innovativeness in design concept and construction method etc.

The project involves the construction of a Balanced Cantilever Bridge over River Parvati at Ch 255+230, as part of the Four Laning of Takoli-Kullu section of NH-21 under NHDP Phase IV-B in Himachal Pradesh.

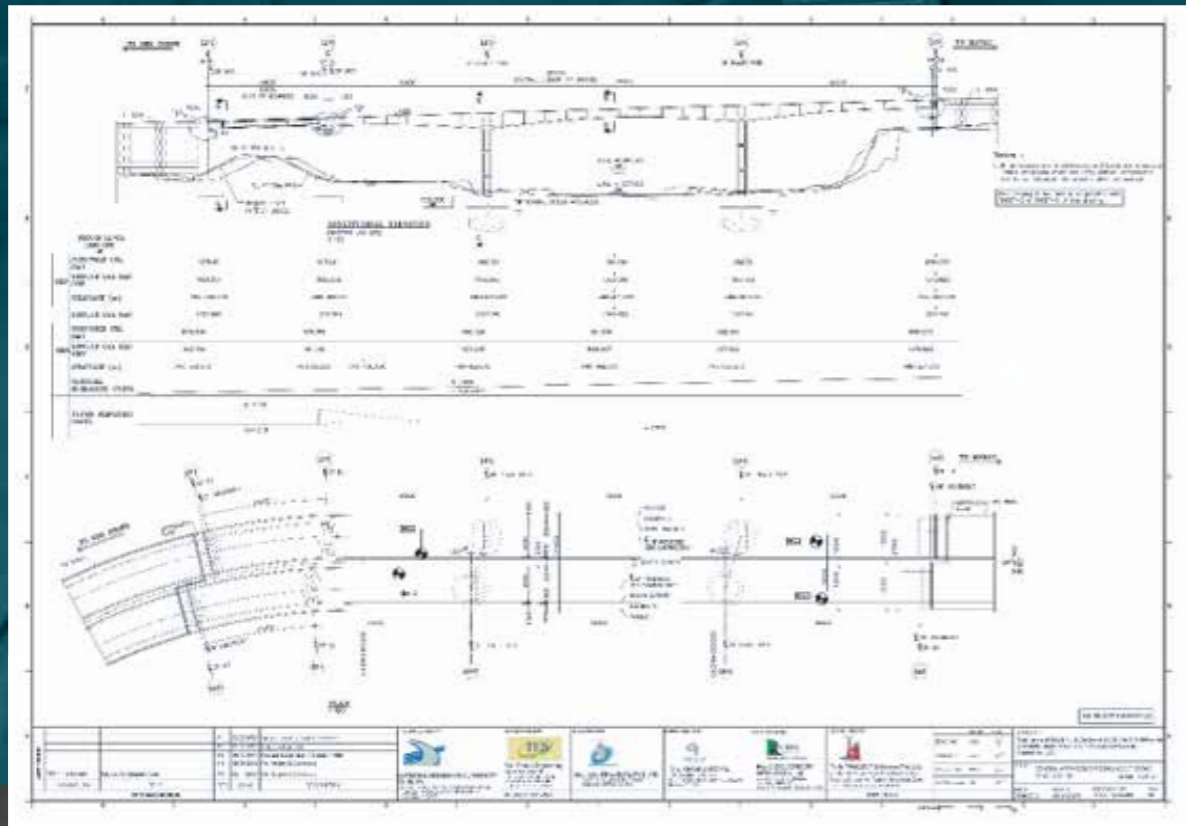
The bridge has a total length of 200 m, comprising span configuration of 52.5 m + 95 m + 52.5 m, designed using the balanced cantilever technique for efficient construction over river conditions. The bridge superstructure has a width of 12.5 m.

The structure is supported on well foundations, designed to safely transfer loads to deeper strata and withstand scour, hydraulic forces, and lateral loads in the river environment. The bridge consists of plate piers and a variable depth PSC box girder superstructure, optimized for structural efficiency and long-span performance. The depth of the box girder is 6 m at pier locations P4 and P5, and 3 m at mid-span and support locations P3 and P6.

Spherical bearings are provided at the pier locations to accommodate structural movements and rotations under service conditions. The project demonstrates effective engineering in addressing hydrological and geotechnical challenges, ensuring safe load transfer, structural stability, and durability of the bridge.



BAJAURA BRIDGE, HIMACHAL PRADESH, INDIA



Bajaura Bridge - GAD

LOCATION OF THE PROJECT :

**Bajaura Village, Dist. Kullu,
Himachal Pradesh**



Credits

Client:	National Highways Authority of India
Contactora:	NKC Projects Pvt Ltd
Structural Design Consultant:	Tech TANGENT Solutions Pvt Ltd
Authority Engineer:	Theme Engineering Services Pvt Ltd
Safety Consultant:	Khanna Goyal Designers LLP
Proof Consultant:	G-ENG Advisory Services Pvt Ltd

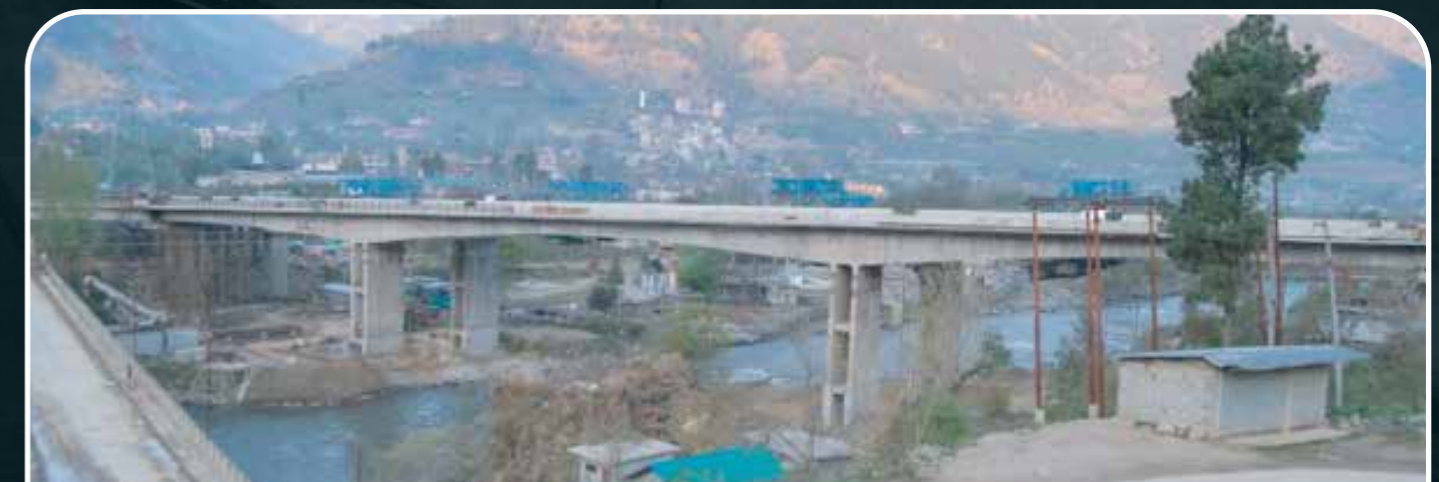
Description of the project, highlighting the significance of the project, innovativeness in design concept and construction method etc.

The project involves the construction of a Balanced Cantilever Bridge over River Parvati at Ch 242+000, under the project Four Laning of Takoli-Kullu Section of NH-21 (Km 242+000 to Km 272+000) under NHDP Phase IV-B in the State of Himachal Pradesh on EPC mode.

The bridge has a total length of 175 m, comprising span configuration of 45 m + 75 m + 55 m (LP2-LP3-LP4-LA2). The bridge superstructure has a width of 12.5 m. The main spans are designed using the balanced cantilever construction technique, which is suitable for long-span river crossings and minimizes the requirement of staging in flowing water conditions.

The structure consists of a PSC box girder balanced cantilever superstructure having variable depth, with a depth of 4.5 m at pier locations LP3 and LP4, and 2.4 m at mid-span and end supports LP1 and LA2, optimized for structural efficiency and long-span performance. POT-PTFE bearings are provided at LP1, LP2, and LA2, while the balanced cantilever superstructure is monolithically connected to the Plate piers at locations LP3 and LP4.

The structure is supported on well foundations, designed to safely transfer the superstructure loads to deeper founding strata and to resist scour effects, hydraulic forces, and lateral loads due to river flow conditions. The bridge consists of RCC piers supporting the PSC balanced cantilever superstructure with variable depth, optimized for structural efficiency and long-span performance. In addition, the approach span between LP1-LP2 is proposed as a PSC I-Girder structure of span 34 m with girder depth of 2.2 m, providing smooth connectivity between the approach and the main bridge portion. The project reflects effective consideration of hydrological, geotechnical, and structural design challenges, ensuring safe load transfer, stability, and long-term durability of the bridge structure.



GHAGHRA BRIDGE, GHAZIPUR, UTTAR PRADESH, INDIA



LOCATION OF THE PROJECT :
Gazipur-Ballia to Rawalganj
Bypass, Uttar Pradesh and Bihar



Credits

Client:	National Highways Authority of India
Contactora:	NKC Projects Pvt Ltd
Structural Design Consultant:	Tech TANGENT Solutions Pvt Ltd
Authority Engineer:	Dhruv Consultancy Services Ltd
Proof Consultant:	Stellar Civil Engineers Pvt Ltd

Description of the project, highlighting the significance of the project, innovativeness in design concept and construction method etc.

The project involves the construction of a major bridge structure under the work "Construction of Four Lane Highway from Gazipur – Ballia – UP/Bihar State Border (Greenfield) Section of NH-31, Package-III [From Pindari (Km 78.150) to Rawalganj Bypass (Km 117.120)] on EPC Mode in the States of Uttar Pradesh and Bihar.

The structure is designed as a Balanced Cantilever Bridge, suitable for long-span crossings and ensuring efficient execution without extensive staging requirements. The total length of the bridge is 1162.8 m,

comprising the following span configuration:

The box girder is continuous from RA01 to RP04 (64.675 m+ 96.90 m+ 96.90 m+ 64.675 m), RP05 to RP08 (64.675 m+ 96.90 m + 96.90 m+ 64.675 m), RP08 to RP12 (64.675 m+ 96.90 m+ 96.90 m+ 64.675 m), and RP12 to RA02 (32.0 m+ 64.675 m+ 64.675 m+ 32.0 m), corresponding to the respective span configurations.

Expansion joints are provided at RP04, RP08, and RP12 to accommodate thermal movements and structural deformations.

The superstructure consists of a PSC balanced cantilever segmental box girder with variable depth, optimized for structural efficiency, long-span performance, and durability. The depth of the box girder is 6 m at pier locations RP01 to RP15, and 3 m at mid-span and end support locations RA01 and RA02.

The bridge is supported on a combination of pile foundations of dia 1.8 m designed to safely transfer the structural loads to deeper strata and to resist hydraulic forces, scour effects, and lateral loads under river flow conditions. Spherical bearings are provided at the pier locations to accommodate structural movements and rotations.

In the balanced cantilever arrangement, The project demonstrates effective structural planning and engineering design in addressing long-span bridge requirements, ensuring safe load transfer, structural stability, serviceability, and long-term durability of the bridge structure.

NAGPUR METRO PHASE 2



Metro Viaduct: Nagpur Metro

LOCATION OF THE PROJECT : Nagpur

Credits

Client: Maharashtra Metro Rail Corporation Ltd.
Contractor: Rail Vikas Nigam Ltd. (RVNL) /GR Infra Projects Ltd./Kalpataru Projects International Ltd.

Design Architect: LKT/ENIA
Structural Design Consultant: Structcon Designs Pvt. Ltd. /TCPL/AYESA
PMC Consultants: Systra-Aecom-CEG

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.



**Double Decker Metro Viaduct :
Nagpur Metro**

The project involves civil works for the design and construction of elevated metro corridors, divided into three contract packages. All three packages are extensions of the existing Nagpur Metro corridors and include the design and construction of elevated metro stations, several of which feature unique architectural concepts and construction methodologies. The majority of the elevated viaduct consists of prestressed segmental construction, with span lengths ranging from 17.5 m to 31 m. Notably, approximately 2 km of the viaduct is to be constructed at a second level above an existing flyover, utilizing the same piers and foundation system—making it a particularly complex and innovative design and construction challenge. Additionally, certain obligatory spans have been designed using steel composite configurations.

The station designs vary, with some featuring 24 m wide concourses and platforms supported by central piers, while others consist of 15 m wide platforms with separate station buildings. The project also includes two balanced cantilever bridges in separate contract packages—one crossing a railway line (span 74m+110m+74m) and the other over the Veena River (span 71m+120m+79m).

The construction of the central piers for the Veena River bridge,

which rest on the abutment fill of a narrow existing bridge, presented significant challenges. These were successfully addressed through the implementation of a carefully planned construction methodology.

CHENNAI METRO PHASE 2

LOCATION OF THE PROJECT : Chennai



Credits

Client: Chennai Metro Rail Limited

Contractor: Larsen & Toubro (L&T), Tata Projects Ltd., HCC-KEC JV, Bridge and Roof Company India Ltd, DRA-SOMA JV, RVNL, URC Construction Pvt Ltd, ITD Cementation India Limited,

Design Architect and Structural Design Consultant: CEG-AECOM Consortium, Systra, SMEC-MMSPA-MMSB, Rdx Architects.

General Consultants: Consortium of Nippon Koei India Pvt. Ltd., Aarvee Associates Architects Engineers & Consultants Pvt. Ltd. and Balaji Railroad Systems Pvt. Ltd (Contract GC1)

JV of AECOM India Pvt Ltd., Oriental Consultants Global Co Ltd (OCG) & Nippon Koei Co. Ltd (NK) (Contract GC2)

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Chennai Metro Phase II is a major urban transit expansion comprising a 118.9 km network with 128 stations across three new corridors. The project includes Corridor 3 from Madhavaram to SIPCOT (45.8 km), Corridor 4 from Lighthouse to Poonamallee Bypass (26.1 km), and Corridor 5 from Madhavaram to Sholinganallur (47.0 km). Designed to strengthen citywide connectivity and ease traffic congestion, the expansion is targeted for completion by the end of 2028. Out of 118.9km, about 36% of corridors are underground and rest is elevated section. In Corridor 5, Double-decker lines for around 4 km, where the metro runs above road flyovers.

The viaduct is being constructed using precast full-span pre-tensioned twin U-girders, with extensive use of precast components for elevated stations. In elevated stations, both concourse and platform are being constructed using precast segmental cross arm and precast T/L girders.

In addition to standard viaduct structures, steel-composite superstructures and balanced cantilever spans have been used as special spans, wherever required.

Overhead Gantry used for launching of U-girder over existing Metro line.



Curved Steel Span





Erection of Station Precast elements with Double Decker Portion

Construction of Curved Balance Cantilever Viaduct Spans

EPC CONTRACT FOR CONSTRUCTION OF CONTAINER BERTH AND FISHERY HARBOUR AT VIZHINJAM, KERALA



General Layout

LOCATION OF THE PROJECT : VIZHINJAM, KERALA, INDIA

Credits

Client:	HOWE ENGINEERING PROJECTS (INDIA)
Contractor:	PRIVATE LTD. ADANI GROUP
Design Architect:	AFCONS Infrastructure Ltd.
Structural Design Consultant:	AFCONS Infrastructure Ltd.
	STUP INDIA PRAVET LTD.
PMC Consultants:	Adani Vizhinjam Port Private Limited (AVPPL)

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Brief Details of the Project:

Adani Vizhinjam Port Private Limited (AVPPL) a subsidiary of ADANI GROUP is planning to develop container terminal in the proposed Green Field Vizhinjam Port. The Port is Located in the Western Coast of India in Kerala State. The length of the proposed Phase-1 berth is about 800m. The new container berth shall cater for maximum vessel size of 24000 TEU or up to 2,80,000 DWT. The dredge depth in front of the berth will be (-) 18.4m CD. Proposed berth shall have provision for tug landing facility on the Northern end.

Scope of Work

- Engineering for Container Berth and Fishery Harbour
- Construction of 800m x 53.075m Container Berth
- Construction of 500m x 10.242m Fishery Harbour
- Installation of Crane Rail
- Installation of Fenders
- Supply and Installation of Marine Fixtures

The work EPC Contract for Construction of Container Berth and Fishery Harbor was awarded on 30.12.2016



Piling Work



Civil Work



MECON ROUNDABOUT FLYOVER PROJECT (MRFP)



Aerial View

LOCATION OF THE PROJECT : Ranchi, Jharkhand, India

Credits

Client:	Road Construction Department, Govt. of Jharkhand
Contractor:	Larsen & Toubro Ltd. Transportation Infrastructure IC (TIIC)
Design Architect:	Engineering design & Research Center (EDRC), TIIC,
Structural Design Consultant	STUP Consultants Pvt Ltd
Proof Consultants:	IIT Bombay

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Mecon Roundabout Flyover Project (MRFP) is a flagship urban infrastructure initiative undertaken by the Road Construction Department (RCD), Government of Jharkhand, and executed by Larsen & Toubro Limited (L&T) on an Engineering, Procurement and Construction (EPC) basis. Conceived under the visionary leadership of the Honourable Chief Minister of Jharkhand, the project aims to address growing traffic congestion in Ranchi and improve urban connectivity through high-capacity, grade-separated transport infrastructure.

The project involves construction of a 2.34 km long, 4-lane elevated corridor connecting Siramtoli Chowk to Mecon Chowk via Rajendra Chowk, along with an additional exit ramp towards Nepal House. Located on one of the busiest corridors in Ranchi, the flyover enables smooth and uninterrupted traffic flow, significantly improving travel efficiency. Upon completion, travel time along this stretch is expected to reduce from nearly 30 minutes to around 5 minutes, providing major benefits to commuters and commercial traffic.

A key highlight of the project is the construction of Jharkhand's first cable-stayed bridges, marking a major milestone in the state's infrastructure development. The project also includes the first cable-stayed Rail Over Bridge (ROB) under South Eastern Railways, showcasing advanced engineering, innovative structural solutions, and close coordination with railway authorities.



ROB Cable Stay Bridge Under Construction



ROB Cable Stay bridge

Major Cable-Stayed Structures

1. Ranchi Railway Station ROB

- Total Bridge Length: 248 m
- Configuration: 58 m + 132 m + 58 m
- Main Steel Span: 132 m over active railway tracks
- Side Spans: 58 m concrete spans on either side
- Pylon Height: 40 m
- Type: Hybrid Cable-Stayed ROB

2. Harmu Cable-Stayed Bridge

- Total Bridge Length: 226 m
- Configuration: 58 m + 96 m + 58 m
- Main Steel Span: 96 m crossing Harmu River and roadway
- Side Spans: 58 m concrete spans on either side
- Pylon Height: 38 m
- Type: Hybrid Cable-Stayed Bridge



Night View

Engineering Challenges and Innovations

Due to severe Right of Way (ROW) limitations, dense urban surroundings, and numerous underground utilities, the project required several innovative engineering solutions, including:

- Adoption of 2m diameter monopile foundations
- Use of precast pier caps and precast/prestressed concrete elements
- Steel-concrete composite girders
- Optimized erection methodology for construction over live railway tracks
- Accelerated construction techniques to minimize disruption to traffic and railway operations

These measures improved construction safety, reduced on-site activities, and enabled efficient execution within congested urban conditions.

Importance of the Project

Apart from easing congestion in Ranchi city, MRFP provides improved connectivity between Hazaribagh and Birsa Munda Airport, supporting faster and safer transportation. The project is expected to:

- Improve urban mobility
- Enhance commuter safety
- Boost economic and commercial activities
- Improve logistics efficiency
- Support sustainable urban development



Harmu cable Stay bridge

SIX-LANE EXTRADOSED BRIDGE OVER RIVER GANGA ON AUNTA-SIMARIA SECTION OF NH-31 CONNECTING MOKAMA WITH SIMARIA IN BIHAR.



Completed Bridge

LOCATION OF THE PROJECT : Begusarai and Patna districts in Bihar

Credits

Client:	National Highway Authority of India (NHAI)
Concessionaire	
Contractor:	Welspun Enterprises
Design Architect:	SPS Constructions India Pvt. Ltd.
Structural Design Consultant	NA

Independent Engineer	Bridgecon Infra Consultants, India AECOM
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Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The project features India's widest extradosed bridge over the River Ganga, spanning 1.8 km. With segment lengths ranging from 57 to 115 meters and 70-metre cantilever arms, the structure exemplifies engineering excellence.

Strategically located between Aunta (Patna district) and Simaria (Begusarai district), the project integrates North and South Bihar, reducing travel time by over an hour and significantly improving regional connectivity. Specialized materials like silica fume have been used to develop high-performance concrete, enhancing structural durability

Main Features of the Bridge:

Total Length: 1865m

Span Arrangement: 15 x 115m + 2 x 70m

Total Width: 34m

Foundations: 12m dia well upto 47m depth

Substructure: Elliptical Pylons and RCC Shafts

Superstructure: Precast Post-tensioned Segments

Bearing Course: 25mm thick mastic over 40mm BC



Superstructure under Construction



Segment Lifting



Segment Transportation

INDIA'S FIRST 102.6 m SPAN UHPFRC BRIDGE

PCI DESIGN AWARD 2026 WINNER



NIRA CANAL BRIDGE, MAHARASHTRA

Reimagining Possibilities.
Redefining Performance.



150+ MPa
Concrete
Strength



102.6 m
Single Span
UHPFRC Bridge



PCI
Design Award
2026



Metro &
Railway
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Dedicated
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Manufacture •
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OUR LANDMARK PROJECTS



INDORA BRIDGE

Nagpur, Maharashtra



MISSING LINK

Pune, Maharashtra



AIRPORT LINK ROAD

Navi Mumbai, Maharashtra



SHEELA NAGAR JUNCTION

Vizag, Andhra Pradesh

- The UHPFRC Company, successfully implementing future material technology for more than 150 structures in India.
- Advancing Concrete Technology for the Next Generation of Infrastructure.
- Span ranging from 20m to 102m.



Pune



Nagpur



Delhi



SCAN TO KNOW
MORE ABOUT US

4-LANES SIGNATURE BRIDGE BETWEEN OKHA AND BEYT DWARKA IN GUJARAT STATE



General Layout

LOCATION OF THE PROJECT :

The bridge is located on the Western coast of India between Okha town and Beyt Dwarka island on new NH 51 in the state of Gujarat.

Credits

Client:	Ministry of Road Transport & Highways, Govt. of India and Road & Building Department, Govt. of Gujarat
Contractor:	SPS Constructions India Pvt. Ltd.
Design Architect:	STUDIO BOXX, Mumbai
Structural Design Consultant	WIECON Co. Ltd., Taiwan for Cable Stayed Bridge and ASC Infratech Pvt. Ltd., Noida for Approach Viaduct
PMC Consultants:	AARVEE Associates, India

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Signature Bridge connecting Okha port and Beyt Dwarka is 2320 m long. A length of 900 m long three span cable-stayed bridge is provided in the central portion of Signature Bridge having main span of 500 m (main navigation span) with two side spans of 200m each. Approach roads of 2.452 km length (1.241 km on Okha side and 1.211 km on Beyt Dwarka Side) are developed as a four-lane divided carriage-way highway along the project stretch.

Pylons for cable stayed bridge are constructed as outward inclined A-shapes and cable arrangement is semi-fan type and provided in two planes. The 27.2m wide bridge deck comprises of 4 lane vehicular carriageway (9.5m + 9.5m) with a central median of 1.2 m & two separate corridors of 2.5 m clear width each for golf cart/cycle track/pedestrian walkway respectively.

Main significant features of the cable stayed bridge are as follows:

- Pylons: A-shaped pylons of height 130m above the pile cap with hollow rectangular section at the base of size 10m x 4m and have leaning configuration in outward direction.
- Minimum concrete grade for Pylon and its foundation/substructure is M70.
- Superstructure Steel deck comprising edge beams and cross girders with RCC deck in M70.
- Decorative Structural Steel Railing and Crash Barrier.
- Impression of Peacock's feather of size 12m x 20m provided at top of Pylons.
- Solar panels have been installed on the roofs of both sides of the pedestrian corridor.
- A total of 12 viewing Galleries have been positioned on the bridge
- Precast sacrificial slabs supported on pile casing, used for casting of pile cap of size 29m x 18.5m x 3m below each pylon leg.
- Prefabricated steel segments each of length 12m and weight 100 t assembled on-shore and transported to the bridge site on barges.
- Precast concrete panels were used for desk slab construction.



PILE CAP CONSTRUCTION



SEGMENT ERECTION

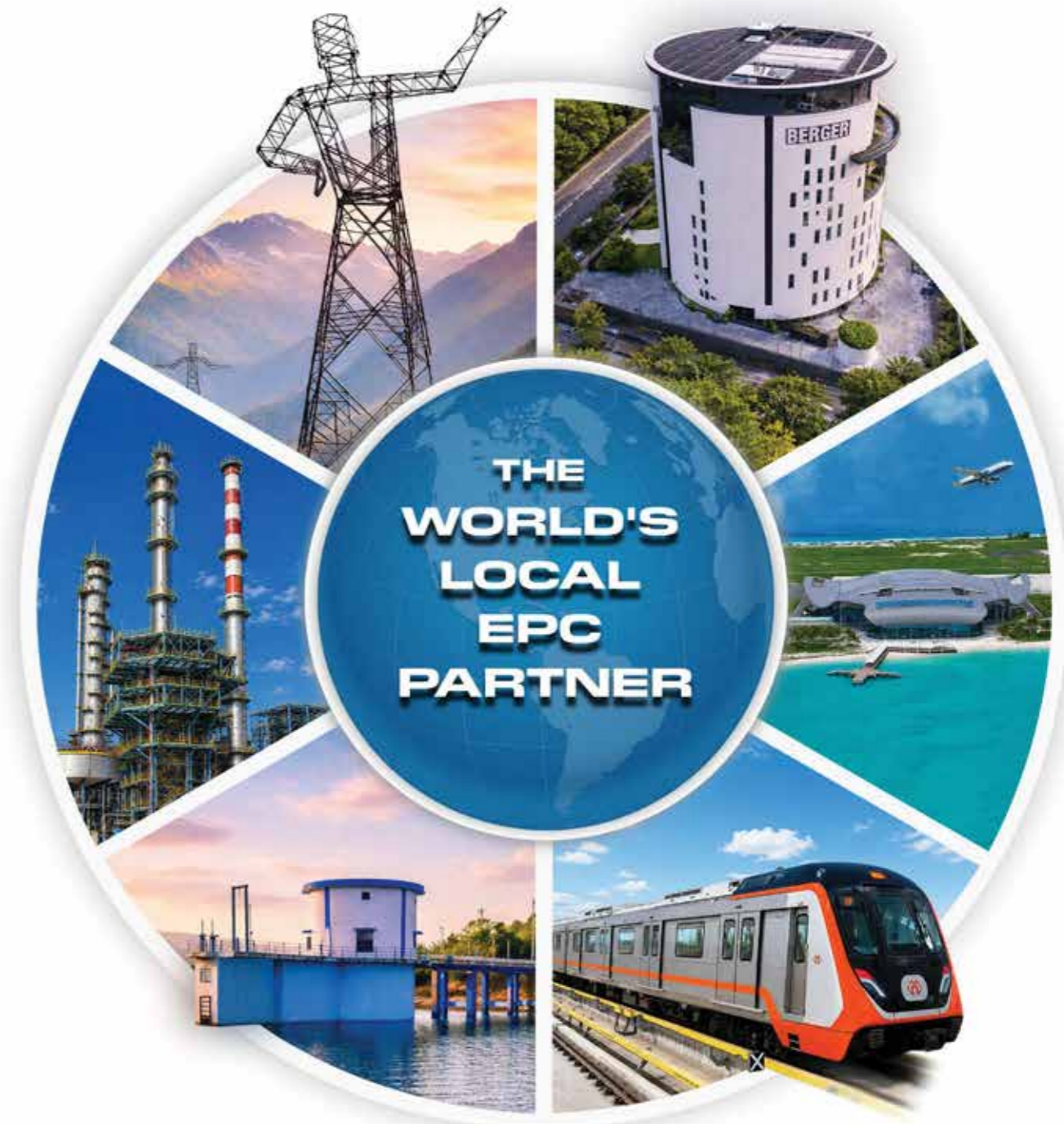


SEGMENT TRANSPORTATION



PYLON AND SUPERSTRUCTURE CONSTRUCTION


SUPERSTRUCTURE CONSTRUCTION

COMPLETED BRIDGE


**THE
WORLD'S
LOCAL
EPC
PARTNER**

**One of the largest Engineering & Construction companies listed in India,
with a diversified portfolio of projects across the world.**

 Order Book
(FY26)

**USD 6.9
Billion**

 Consolidated Revenue
(FY26)

**USD 2.8
Billion**

Global Footprint

250+
Projects
(Under Execution)

75+
Countries

5
Continents

50+
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6-LANE EXTRADOSED PSC BRIDGE OVER RIVER BRAHMAPOOTRA CONNECTING GUWAHATI AND NORTH GUWAHATI IN STATE OF ASSAM, INDIA



View of Completed Superstructure -North Guwahati side

LOCATION OF THE PROJECT : Guwahati in the State of Assam,India



Superstructure construction in Progress

Credits

Client:	Public Works Roads Department (PWRD), Government of Assam
Contractor:	SPS Constructions India Private Limited, INDIA
Design Architect:	STUDIO BOXX, Mumbai
Structural Design Consultant	WIECON Co. Ltd., Taiwan for Cable Stayed Superstructure and ASC Infratech Pvt. Ltd., Noida for Foundations, Flyovers and Viaduct
PMC Consultants	SYSTRA Engenharia e Consultoria Ltda, Brazil in Association with SAI (SYSTRA GROUP), India
Independent Design Consultant (IDC)	B&S Engineering Consultants Pvt. Ltd., India

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The project is located in a high seismic zone in North Eastern part of India and includes construction of a 1240m long continuous extradosed bridge over river Brahmaputra at Guwahati, connecting ramps and flyover on South bank side, viaduct and approach roads on North Guwahati side. The extradosed bridge is constructed with a continuous superstructure supported over Friction Pendulum bearings, having spans of 200m which is first of its kind in India. Another significant feature is the deck width of 33.0 m which includes divided carriageways of 12.5m width each and 1.5m wide footpath on each side. The superstructure is supported on deep Double-D well foundations of size 18m x 10m and pile foundations of diameter 2.5 m. Constructing this bridge over the mighty Brahmaputra River posed several challenges due to large water depth and limited construction period.

Features of the Main Extradosed bridges:

Hydraulic Parameters

Design discharge = 81032 cumecs

Velocity of flow = 5m/s

Foundations:

- For piers PY2 to PY5: Double-D Well foundations of plan size 18m x 10m and depth 56.75m
- For piers PY1 and PY6: Bored cast-in-situ Pile foundations of diameter 2.5m of maximum length 58m socketed into rock.
- Floating Caissons:** Four nos. of floating caissons were used for sinking of wells at four pylon locations PY2 to PY4 where water depth varied between 8 m to 24m.

Superstructure

Overall length between PY1 to PY2=1240m
Span Arrangement=1x120m+5x200m+1x120m
Type of Deck: Prestressed precast concrete box segments
Overall deck width with dual divided carriageways=33.0m
Weight of single precast segment=190 MT
Number of precast segments=405
Each Carriageway width=12.5m
Footpath on one side of each carriageway=1.5m
Median: 3.5m
Concrete crash barrier=0.45m
Railing= 0.30m

Pier shaft: Size 8mx5.2m having height of 19.25m between well cap top and superstructure bottom.
Height of Pylon above deck level=32.25m



Towing the steel caisson on a barge



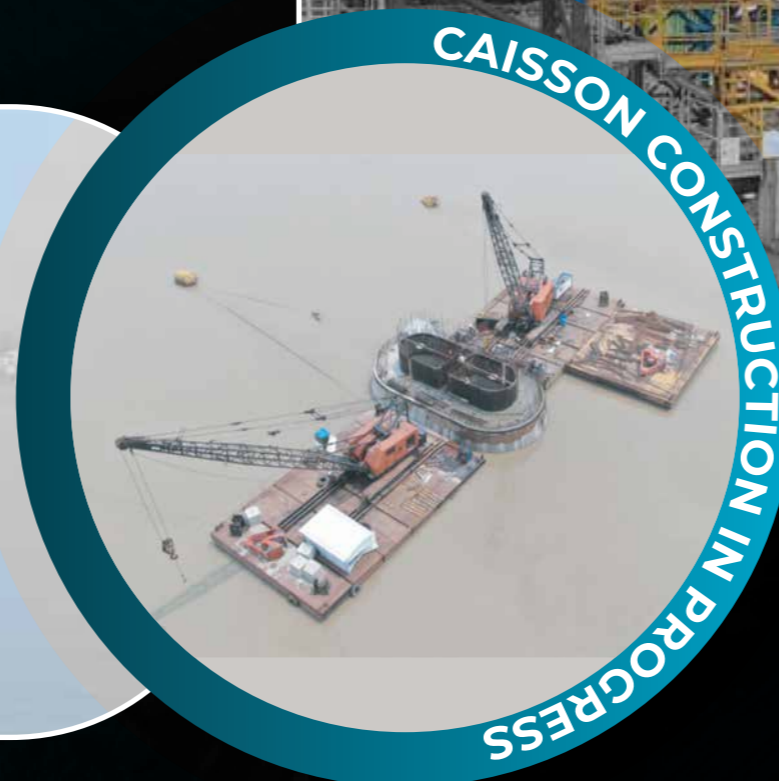
Caisson grounding at final location



LAUNCHING OF CAISSON INTO RIVER



Segment Casting



CAISSON CONSTRUCTION IN PROGRESS



Segment Lifting above the Barge



Superstructure construction in Progress



Overall view of the completed project

RAIL-CUM-ROAD BRIDGE OVER RIVER GANGA BETWEEN GHAZIPUR AND TARIGHAT IN THE STATE OF UTTAR PRADESH, INDIA



LOCATION OF THE PROJECT :
Near Ghazipur city, state of Uttar Pradesh,
India

Credits

Client:	Indian Railways through Rail Vikas
Contractor:	Nigam Limited
Design Architect:	SPS Constructions India Pvt. Ltd.
Structural Design Consultant:	NA
PMC Consultants:	CDC Consulting Design Engg. Center Pvt. Ltd., Kolkata WAPCOS, India

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

This Rail-cum-Road bridge over river Ganga is located at Ghazipur city having a length of 1027.5m and provides a vital link between the East Central and North Eastern Railways directly connecting Tarighat, Ghazipur city and Ghazipur Ghat stations. The bridge has been constructed upstream of existing Road Bridge "Veer Abdul Hamid Setu" by Indian Railways.

Major Features of the bridge:

Type of Superstructure: Steel Bridge with a concrete deck at top

**Rail Deck width= 10.6 m clear between the trusses
(2 B.G. Tracks)**

Road deck width=16.1m (3-lane with footpaths)

Span Length = $11 \times 85.5m + 2 \times 43.5m = 1027.5m$

Design Discharge=51010 cumecs

Road Level=87.5m

Rail Level=77.6m

Highest Flood Level (HFL) =65.41m

Lowest water Level (LWL) =53.0m

Maximum depth of scour below HFL= 39.0m

Maximum Scour Level (MSL)= 26.41m

Founding Level= 8.165m

Grip Length (embedment) below MSL=18.245m

Well cap level=53.965m

Depth of well=45.8 m below well cap level

Type of subsoil= Generally silty sand

Type of well= Double-D of size 18.5m x8.5 m

Water depth =2m to 11m

**Maximum depth of water at pier P2 & P3
= 11m & 7m respectively.**

Substructure: Solid Rectangular Pier with semi circular cut water

Floating Caisson Construction

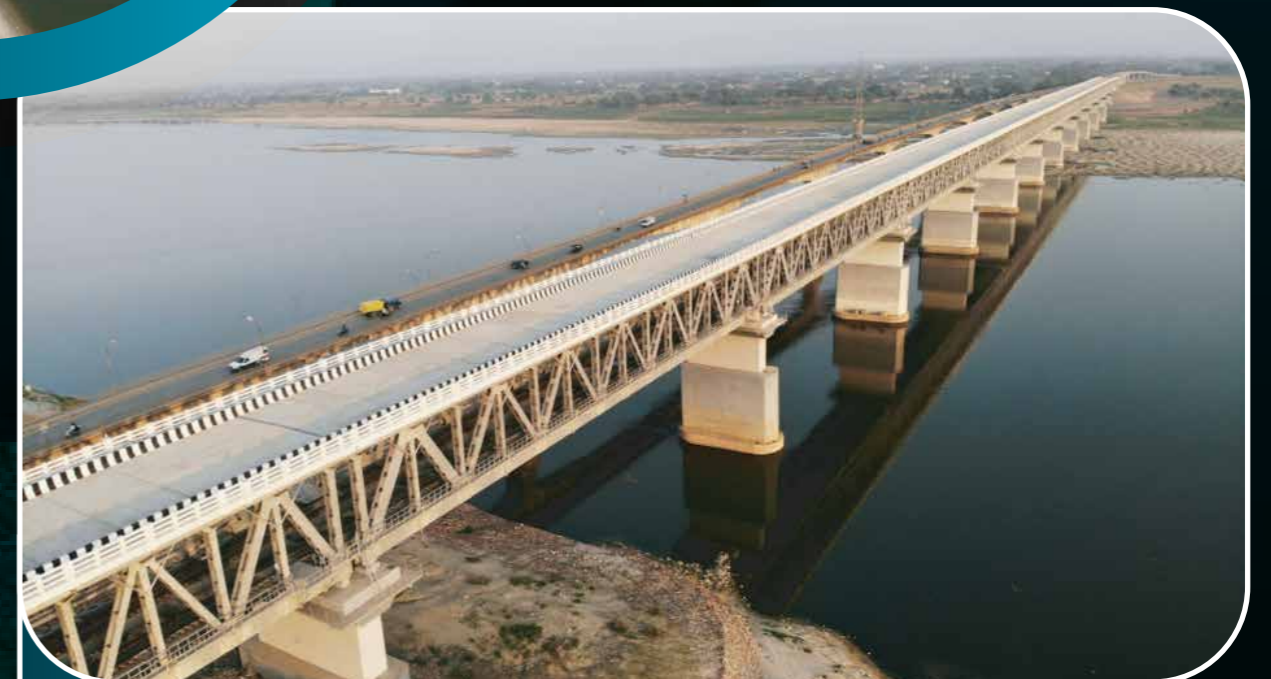
Two nos. of foundation P2 & P3 were done by floating caisson method due to depth of water of 11 m & 7 m respectively.



Foundation Under Construction



Superstructure Erection



Views of Completed Bridge

Reconstruction of 4-Lane Majerhat Bridge (ROB) adjacent to Majerhat Railway Station at 5.8 km on Diamond Harbour Road (NH-117),



General Layout

LOCATION OF THE PROJECT : Kolkata, West Bengal, India

Credits

Client:

Works (Roads) Directorate,
Government of West Bengal .

Contractor:

Public Works (Roads) Directorate,
Government of West Bengal .

Design Architect:
Structural Design Consultant
PMC Consultants:

Authority's Engineer for Supervision:
Lea Associate South Asia, India in JV
with M/s PYUNGHWA Engineering Con-
sultants Ltd. (PEC), Korea

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Majerhat bridge , located on Diamond Harbour Road (NH-117) , one of the busiest road of Kolkata, runs over the Majerhat Railway Station and connects the city centre to Behala and other southern suburbs. The old bridge collapsed on 4th September, 2018 at Majerhat near Majerhat Railway Station. Reconstruction of 4-lane Majerhat Bridge (ROB) was immediately planned and execution started.

Feature of the bridge:

- Taratala Viaduct – 379m long
- Mominpur Viaduct – 81m
- Cable Stayed ROB with span – 20m +60m+100m+47.5m
- Designed Steel Composite Girder
- 1388 MT Steel has been fabricated for Approach Viaducts
- Bridge Construction Completed in shortest possible time for a cable stayed Bridge
- Bi-directional Pile load test done for 1500mm dia pile under two Pylons of Cable Stayed portion of Bridge



MUMBAI-AHMEDABAD HIGH-SPEED RAIL CORRIDOR (MAHSR), INDIA



Portal Beam

LOCATION OF THE PROJECT : Gujarat, Maharashtra, Dadra and Nagar Haveli

Credits

Client: NATIONAL HIGH SPEED RAIL CORPORATION LIMITED (NHSRCL)
Contractor:
Design Architect:
Structural Design Consultant:
PMC Consultant:

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept & construction method etc.

The Mumbai-Ahmedabad High-Speed Rail Corridor (MAHSR) is India's first high-speed railway and one of the largest infrastructure projects currently under construction worldwide. The 508 km corridor, connecting Maharashtra and Gujarat, is designed for train speeds up to 320 km/h and is being implemented by the National High Speed Rail Corporation Limited (NHSRCL) with financial assistance from the Japan International Cooperation Agency (JICA).

The project represents a major milestone in the transfer and adaptation of Japanese Shinkansen technology to Indian conditions and has established new benchmarks in concrete construction, precast manufacturing, tunnelling, geotechnical engineering, and digital construction management.

The corridor comprises approximately 475 km of elevated viaducts, multiple river and steel bridges, eight mountain tunnels, twelve passenger stations, and three maintenance depots. Construction has involved over 15 million m³ of concrete, 6.5 million tonnes of cement, and nearly 1.5 million tonnes of reinforcement steel, making it one of the largest concrete infrastructure programs undertaken in India.

A notable innovation is the adoption of the Full Span Launching Method (FSLM) for viaduct construction, used for the first time in India. Full-span precast prestressed concrete box girders of 40 m span and approximately 970 t weight are manufactured in dedicated casting yards and erected using specialized launching equipment. India has become one of only a few countries worldwide to successfully deploy this technology at large scale, enabling faster construction, superior quality control, and improved durability.



Track work Photograph

The project also includes several technically demanding structures. India's first undersea railway tunnel, extending 7 km beneath Thane Creek, forms part of a 21 km tunnel system constructed using both Tunnel Boring Machines (TBMs) and the New Austrian Tunnelling Method (NATM). The tunnel employs a single 13.1 m diameter tube carrying both tracks, excavated using India's largest railway TBMs.

The alignment incorporates innovative foundation and seismic technologies, including the first application in India of the Japanese Shinso Pile system for constrained locations adjacent to existing railway corridors. Continuous bridge structures utilize damper-stopper systems that provide controlled force distribution under service loads while enhancing seismic performance during earthquakes.



Shinso Pile Photograph



Portal Beam

Several world-class surveying and investigation technologies have been introduced, including India's first railway application of LiDAR-based aerial surveys, Continuously Operating Reference Stations (CORS) for high-precision positioning, and Static Refraction Technique (SRT) investigations for characterization of the undersea tunnel geology.

The project also marks the introduction of the Japanese J-Slab ballastless track system in India. Precast reinforced concrete track slabs are installed using fully mechanized construction methods, providing the precision, durability, and low-maintenance performance required for high-speed railway operations.

Among the landmark structures is the underground Bandra-Kurla Complex (BKC) station in Mumbai, India's first underground high-speed rail station. Constructed up to 32 m below ground level, the station utilizes high-performance M60 and M80 concretes and requires approximately 530,000 m³ of concrete and 124,000 t of reinforcement steel.



Digital technologies play a significant role in project delivery. NHRCL has implemented integrated BIM and 4D construction management systems, enabling virtual construction, clash detection, schedule integration, and real-time project monitoring. Advanced geotechnical instrumentation and automated monitoring systems are employed throughout tunnels and critical structures to ensure construction safety and performance.

The MAHSR project demonstrates how international high-speed rail technology can be successfully adapted to local conditions through innovation in concrete engineering, precast construction, tunnelling, seismic design, and digital project delivery. The experience gained is expected to provide the technological foundation for the next generation of high-speed rail corridors planned across India.

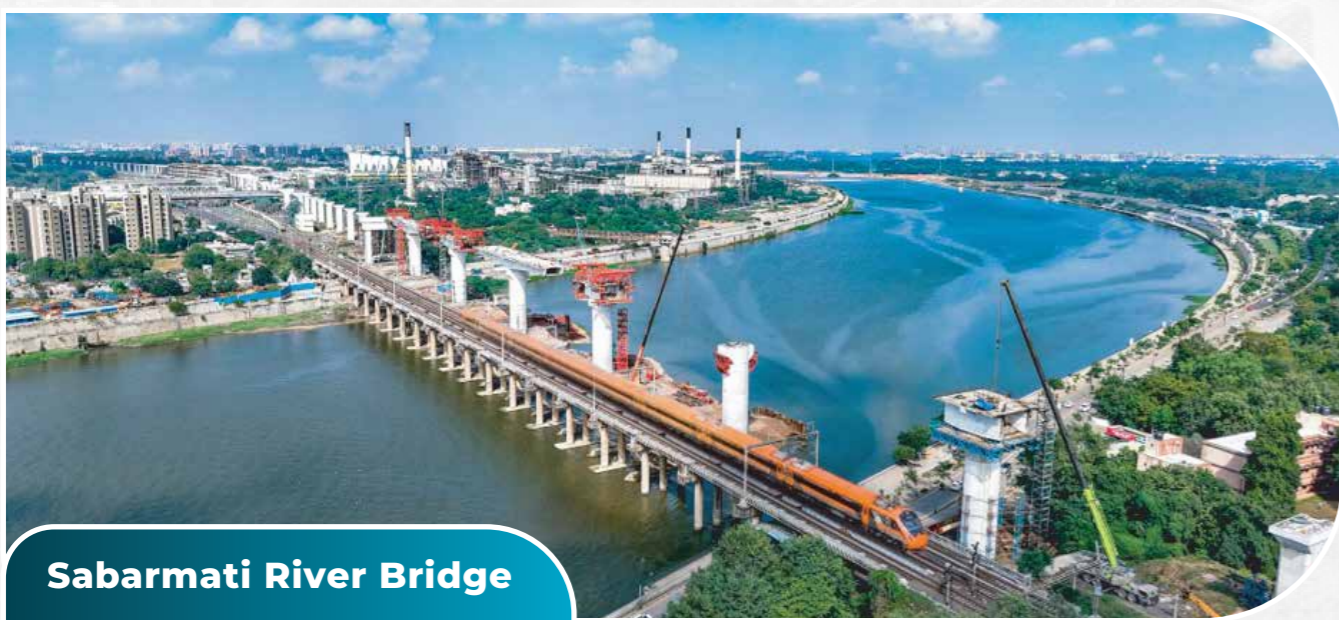


Vaitarna River Bridge (2.32KM long)



Shinso Pile Photograph

River Bridges :



Sabarmati River Bridge



Dhadhar River Bridge



MAHI RIVER BRIDGE

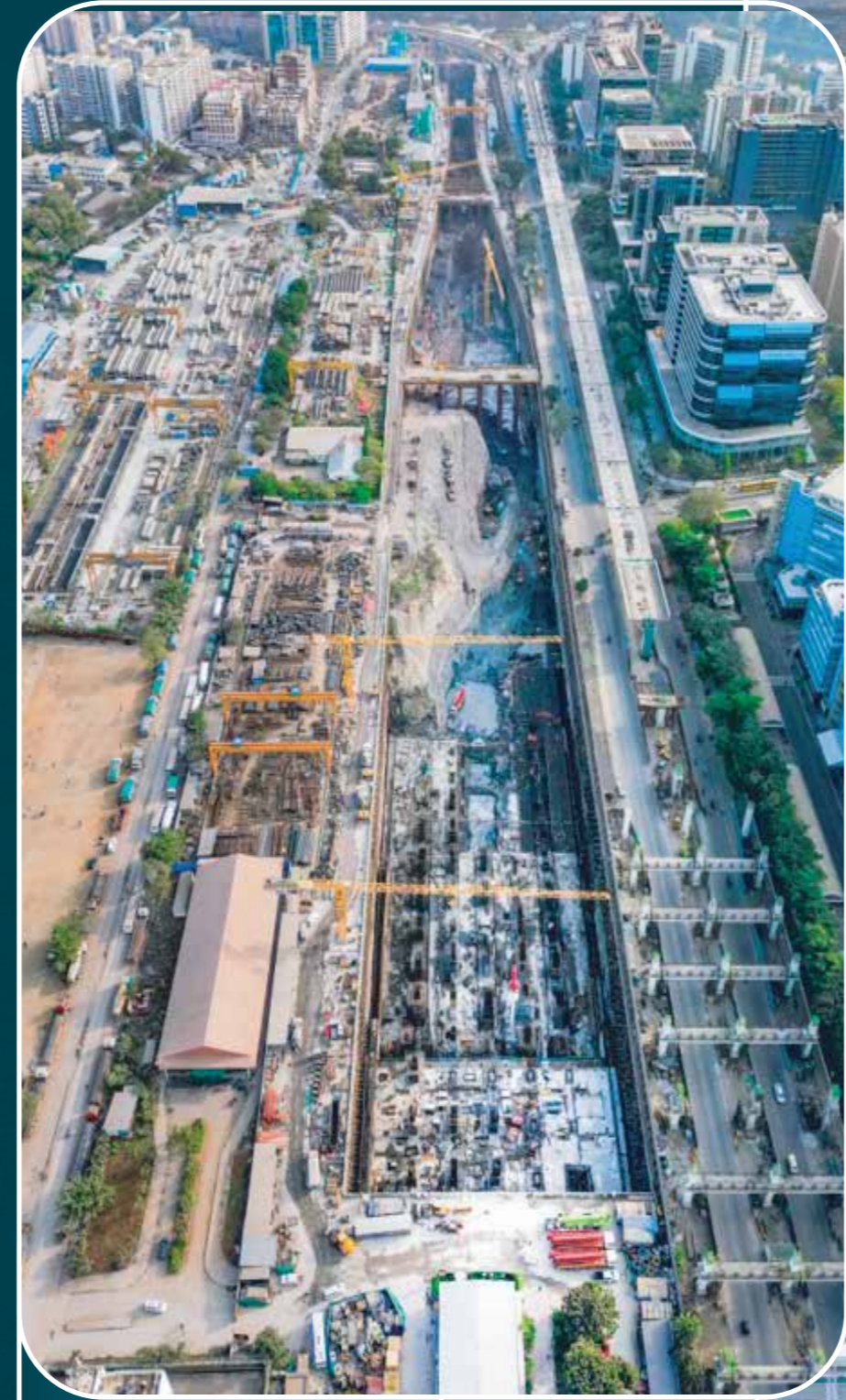
Viaduct Photograph :-



Viaduct Photograph :-



Vapi Station

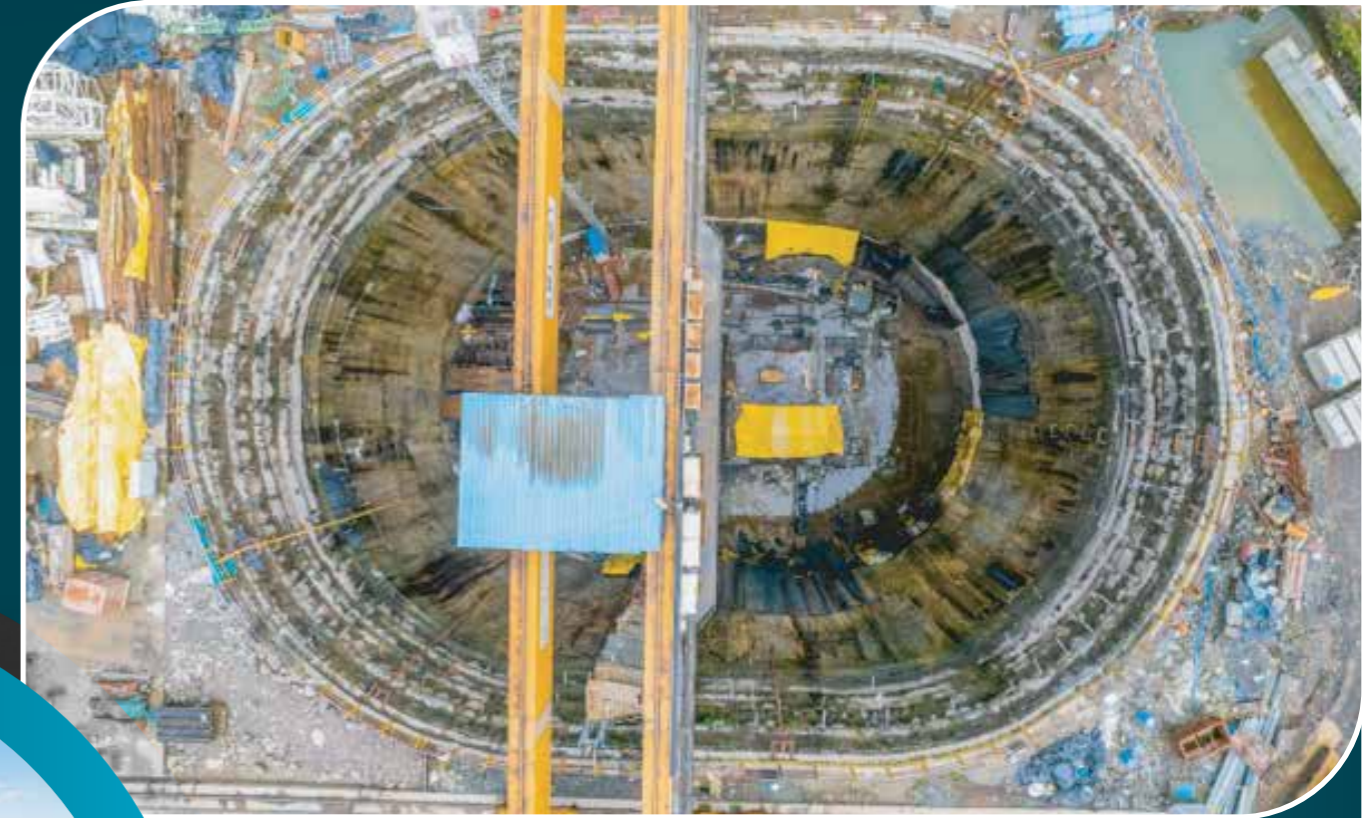


BKC HSR station



Anand HSR station

VIADUCT IN NANASARI DISTRICT



Work in Progress at Vikhroli Shaft, Maharashtra



FSLM launching Photograph



Work in Progress at Sawli Shaft, Ghansoli Maharashtra



Work in Progress at Vikhroli Shaft, Maharashtra

SRINAGAR RING ROAD, JAMMU & KASHMIR, INDIA



Interchange At Ch : 1+008



HOWRAH UNDERGROUND METRO STATION

Description of the project, highlighting the significance of the project, innovativeness in design concept and construction method etc.

1. MJB at Ch:36+775 on Flood Channel
Span Arrangement: 33.00m x 7 No's
(PSC-2 Span Deck Continuous)
Width of Bridge: 12.5m width 2 Carriageway

Structures:

- Foundation: Pile Foundation having 1.5m dia.
- Superstructure: 33.00m PSC I Girder.

2. Viaduct Cum MJB at Ch:20+852
Span Arrangement: 33m x 12 No's
(PSC-2 Span Deck Continuous)
Width of Bridge: 11.0m width 2 Carriageway

Structures:

- Foundation: Pile/Open Foundation
- Superstructure: 33m PSC I Girder.

Credits

Client:	National Highways Authority of India
Contactora:	NKC Projects Pvt Ltd
Authority Engineer:	Rodic Consultant Pvt Ltd.
Structural Design Consultant:	Tech TANGENT Solutions Pvt Ltd
Proof Consultant:	Setu Infra Consulting Engineers Pvt Ltd
Safety Consultant:	Forgiving Roads LLP

3. RUB-1 At Ch:2+811
Span Arrangement: 81.645m U
Through + 52m Box + 92.85m U
Through
Width of Box: 12.5m width 2 Carriageway
4. RUB-2 At Ch:28+484
Span Arrangement: 45.075m U
Through + 62.774m Box + 78.555m U
Through
Width of Box: 12.5m width 2 Carriageway
5. Interchange At Ch:1+008
Span Arrangement: 33m x 2 No's +
35.5m x 2 No's + 33m x 12 No's (PSC-2
Span Deck Continuous)
Width of Bridge: 11.0 m width 2
Carriageway

Structures:

- Foundation: Pile Foundation having 1.5m dia
- Substructure: Circular Pier
- Superstructure: 33m, & 35.5m PSC I Girder.

6. Overpass
Total No's of Overpass: 7 No's
Span Arrangement: 32m x 2 No's
(PSC-2 Span Deck Continuous)
Width of Bridge: 12.0m width 1
Carriageway

Structures:

- Foundation: Open/Pile Foundation
- Substructure: Circular Pier
- Superstructure: 32.00m PSC I Girder.

7. Major Bridge-2 No's
8. Minor Bridge-26 No's
9. VUP/Flyover-4 No's
10. Box Culvert-200 No's
11. LVUP-18 No's
12. Gabion Wall
13. Random Rubble Masonry Wall
14. Retaining Wall
15. Water Channel for Overpass the Water



Aqueduct



BHARATMALA PARIYOJANA, RAJASTHAN, INDIA

LOCATION OF THE PROJECT :
Amritsar-Jamnagar, Rajasthan



Lot-3 ; Package 3: ROB (Ch. 62+234)

Credits

Client:	National Highways Authority of India
Contactora:	NKC Projects Pvt Ltd
Authority Engineer:	SA Infrastructure Consultants Pvt Ltd. / LEA Associates South Asia Pvt Ltd
Structural Design Consultant:	Tech TANGENT Solutions Pvt Ltd Teckkonnct / Setu Infra Consulting/ For- giving Road LLP/ Khanna Goyal Designers LLP/
Safety Consultant:	SETU/ Transwat Engineering and Manage- ment Consultants/ TTL Engineering Pri- vate Limited/ Strav Engineering Consul- tancy/ Nitya Nayra Civil Solutions Pvt Ltd
Proof Consultant:	

Description of the project, highlighting the significance of the project, innovativeness in design concept and construction method etc.

Lot-2; Package-5: ROB (Ch. 122+400)

Length of Project: 131.280m

Span Arrangement: 2x25m (PSC) + 31.280m (Steel) + 2x25m (PSC)

Width of Bridge: 16.5m width 2 Carriageway

Structures:

Foundation: Open foundation resting on soil

Substructure: 3 Pier (Frame type)

Superstructure: 25m PSC I Girder & 31.280m Steel Girder

Lot-3 ; Package 3: ROB (Ch. 62+234)

Length of Project: 312.93

Span Arrangement: 25.8m(PSC)+31.500m(Steel)+3X37.500m(Steel)
+ 31.500m (Steel)+ 28.230m (PSC)+2X25.8m(PSC)+31.800m(PSC)

Width of Bridge: 16.5m width 2 Carriageway

Structures:

Foundation: Open foundation resting on soil

Substructure: 3 Pier (Frame type)

Superstructure: 25m PSC I Girder & 31.280m Steel Girder



Lot-3 ; Package 3: Major Bridge (Ch. 64+420) on Luni River

Lot-3 ; Package 3: Major Bridge (Ch. 64+420) on Luni River

Length of Project: 810m

Span Arrangement: 33.75X24 (PSC-3 Span Deck Continuous)

Width of Bridge: 14.5m width 2 Carriageway

Structures:

Foundation: Pile Foundation having 1.2m dia.

Substructure: Capsule Type Pier

Superstructure: 33.75m PSC I Girder.

Lot-2 ; Package-5: BOW String Arch Bridge

Span of Arch Bridge: 60m

Width of Bridge: 14.5m width 2 Carriageway

Structures:

Foundation: Open foundation resting on rock

Substructure: Wall type Pier

Superstructure: 2 No's Bow sting Arch having 60m span

VUP-Integral Bridge

Span of VUP: 20m

No of VUP: 20 No's

Skew: Ranging from 00 to 350

Span Arrangement: 1x20m (Clear) RCC Cast in situ Girder

Width of Bridge: 14.5m width 2 Carriageway

Structures:

Foundation: Open foundation resting on soil

Substructure: 2 Pier (Frame type)

Superstructure: 20m RCC Cast in situ Girder

Interchange-Integral Bridge

Span of Interchange: 2X20m

No of Interchange: 7 No's

Skew: Ranging from 00

Span Arrangement: 2X20m (Clear) RCC Cast in situ Girder, Deck & Diaphragm

Width of Bridge: 14.5m width 2 Carriageway

Structures:

Foundation: Open foundation resting on soil

Substructure: 2 Pier (Frame type)

Superstructure: 2X20m RCC Cast in situ Girder

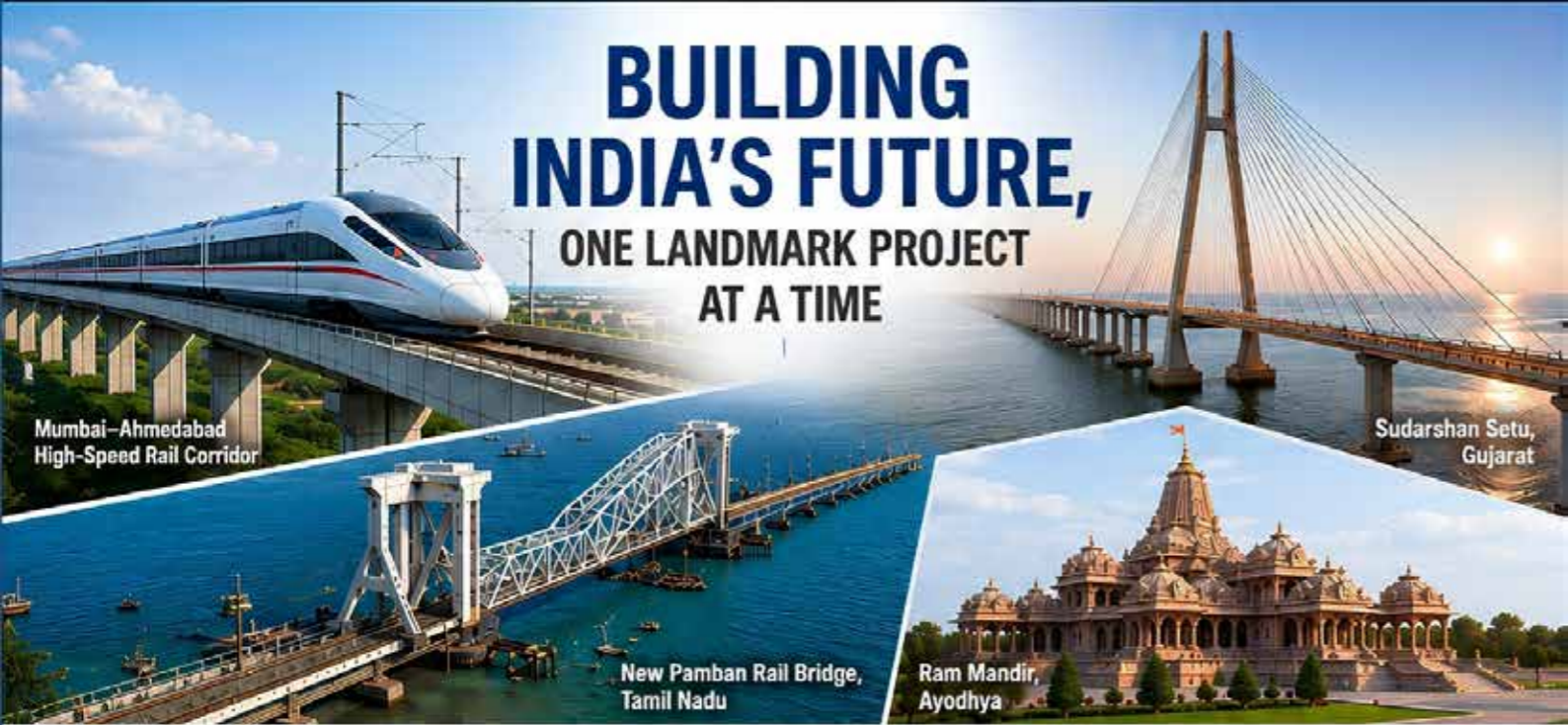


Integral VUP



Integral Interchange

BUILDING INDIA'S FUTURE, ONE LANDMARK PROJECT AT A TIME



Bagchal Bridge, Himachal Pradesh, India

LOCATION OF THE PROJECT :
Bilaspur, Himachal Pradesh –
(Spanning the Sutlej River - Gobind Sagar Lake)

Credits

Client: Himachal Pradesh Public Works Département
 Contactor: Gammon Engineers and Contractors Private Limited
 Structural Design Consultant: Tech TANGENT Solutions Pvt Ltd.
 Proof Consultant: B & S Engineering Consultants Pvt Ltd.



Maurer Sanfield India Limited

For over three decades, Maurer Sanfield India Limited has been a trusted partner in India's infrastructure growth, delivering advanced engineering solutions for bridges, high-speed rail corridors, metros, highways, industrial facilities, airports, and iconic structures.

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-  **1000+ PROJECTS ACROSS INDIA**
-  **500+ ENGINEERS & TECHNICAL EXPERTS**



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-  **2000s** Delivered key bridges, flyovers and industrial structures across India
-  **2010s** Integral part of metros, high-speed rail and major infrastructure corridors
-  **2020s** Strengthening India's infrastructure for a stronger, sustainable tomorrow

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Complete view of bridge



Longest Balanced Cantilever Span of BHARAT.

Load testing of bridge

Description of the project, highlighting the significance of the project, innovativeness in design concept and construction method etc.

The project involved the design, rehabilitation, and completion of the Bagchhal Bridge located in Himachal Pradesh, providing a vital connectivity link between Swarghat and Marotan across the Govind Sagar reservoir.

The project includes India's longest cantilever bridge, comprising a continuous span configuration of 72.5 m + 185 m + 72.5 m with a 12 m wide deck, constructed using the balanced cantilever with external cable inside the box girder.

The project encountered challenging geological conditions at Pier P2, where weaker strata replaced the expected rock, affecting foundation performance.

These challenges were effectively addressed through detailed geotechnical investigations and innovative rehabilitation measures, including introduction of deep pile foundations, span modification, uplift control, and pier strengthening.

A robust foundation system using 1.2 m diameter bored cast-in-situ piles of 30 m depth was implemented at Pier P2 to transfer loads to competent strata, while rock anchoring and concrete capping enhanced stability at Pier P1.

The superstructure was optimized by modifying external prestressing profiles, and existing piers were strengthened with 300 mm jacketing to meet updated design requirements. These engineering interventions ensured safe load transfer, improved structural capacity, and successful completion of the bridge under challenging site conditions and structure has evolved not only safe but aesthetic to hilly surrounding.



DELHI-MEERUT REGIONAL RAPID TRANSIT SYSTEM



Completed Pre-Cast Slab Tracks on Viaduct

LOCATION OF THE PROJECT : Delhi-Meerut

Credits

Client: National Capital Region Transport Corporation (NCRTC)
Contractor: Larsen & Toubro Ltd - Railway Business
Design Architect: Ayesa S.A.U - Italferr SpA - Ayesa India
Structural Design Consultant

PMC Consultants: Ayesa S.A.U - Italferr SpA - Ayesa India

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Delhi-Meerut RRTS is *India's first semi high-speed rail project*, spanning ~82 km from *Sarai Kale Khan (Delhi) to Modipuram (Meerut)*.

Designed for a *maximum speed of 180 km/h* (operational: 160 km/h), the project necessitated adoption of an advanced precast slab track system to meet stringent performance and safety requirements.

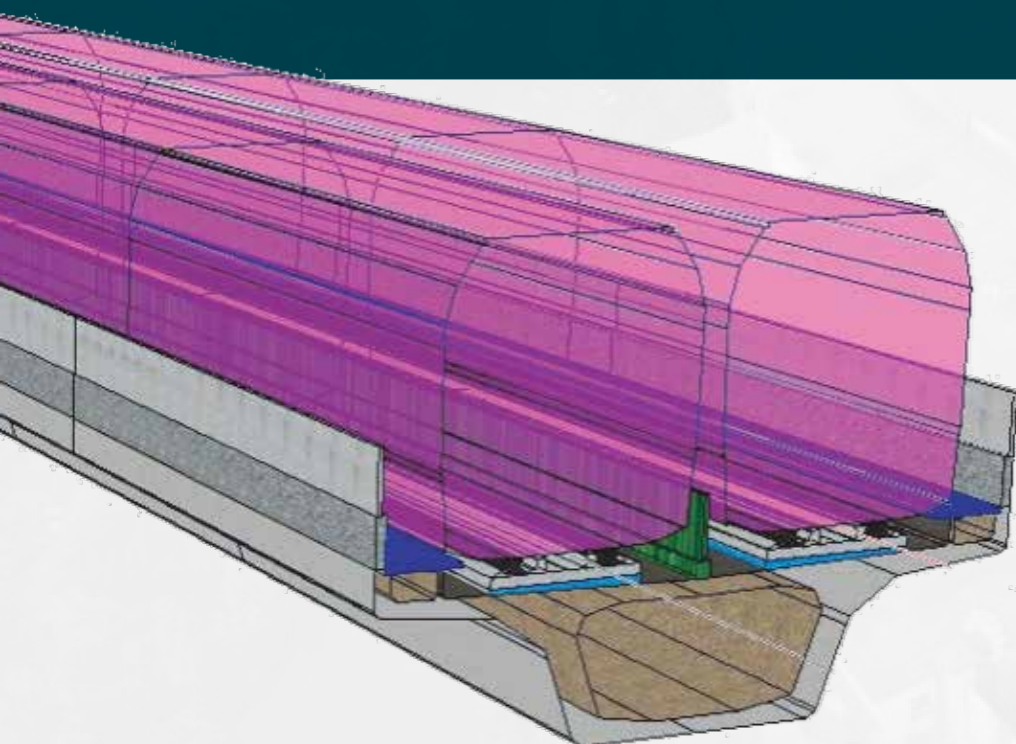
Through technology transfer from PORR (Austria), L&T adopted a *Precast Slab Track System* to enable *high-speed operations, enhanced durability, and superior maintainability*.

Each precast slab (~5 m × 2.5 m, >4 tonnes) was produced in a factory-controlled environment, ensuring high precision and quality. Advanced digital systems were deployed for *sub-system management, slab traceability, and supply chain optimization*.



Key Highlights & Challenges

- **First-Time Technology Adoption**
Integration of a precast slab track system at this scale, including high-speed turnouts and derailment containment provisions.
- **Precast Facility Setup**
End-to-end establishment of a dedicated slab casting facility under space constraints, requiring optimized layouts and methodologies.
- **Productivity Enhancement**
Cycle time reduced by optimizing concrete supply logistics, enabling production of ~45,000 slabs within schedule.
- **High-Capacity Friction Buffer Stop**
Designed for 40 km/h impact speed, 612T impact mass, and 28 m stopping distance—a first of its kind by L&T.
- **Complex Stakeholder Coordination**
Seamless alignment across multiple agencies to ensure timely execution.
- **Construction Challenges**
Precision installation in high viaducts and confined tunnels, with stringent geometry control and tight timelines.
- **Noise & Vibration Control**
Deployment of advanced mitigation systems to minimize urban disruption.



Load testing of bridge



Spring Type Noise & Vibration Mitigation System

Digital & Engineering Excellence

L&T leveraged BIM and digital workflows for real-time monitoring, analytics, and decision-making across the project lifecycle. Engineering Innovations and minimal environmental impact.

- **Capability Development**
In-house expertise built for PORR slab track system and specialized components.
- **Design Automation & 3D Modeling**
 - Automated cross-sections for tunnel segments
 - 3D modeling using OpenRail Designer for optimized SCC layer thickness
- **Advanced Noise & Vibration Solutions**
 - Implementation of:
 - Strip + filler systems
 - Full-surface systems
 - Steel spring systems

Ensuring passenger comfort



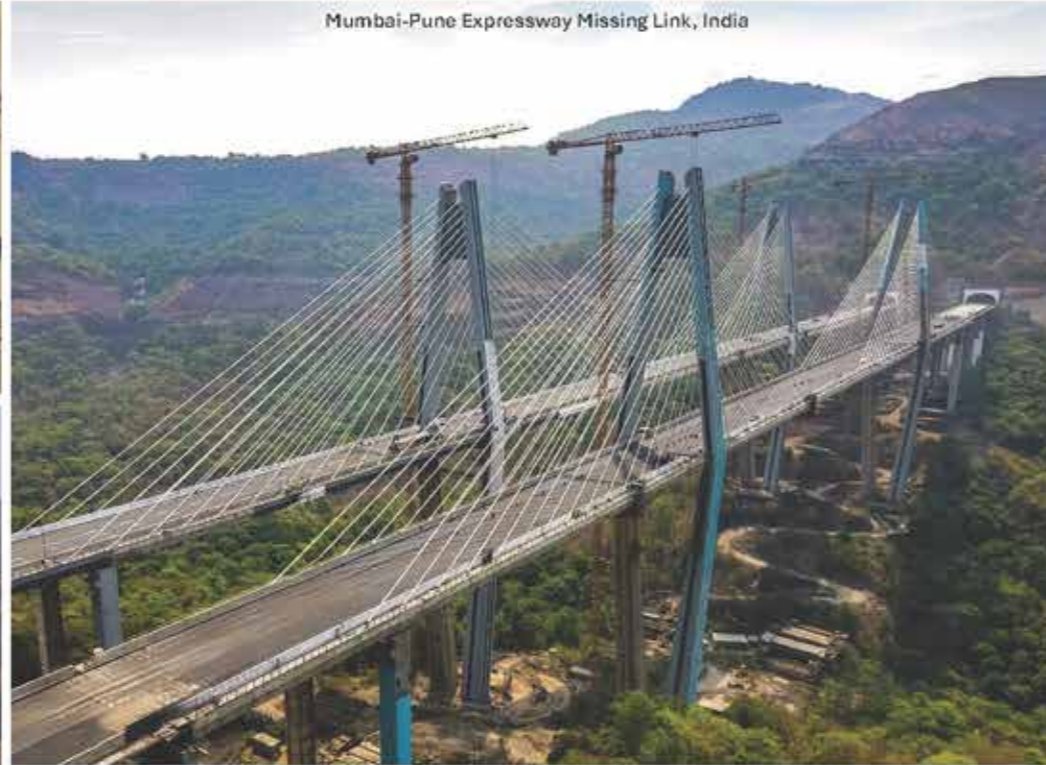
TURNING ADVERSITY INTO ACCOMPLISHMENT

Navi Mumbai International Airport (NMIA)

**LOCATION OF THE PROJECT :
Ulwe, Pargaon Dungi, Maharashtra**



Atal Tunnel, Rontang, India



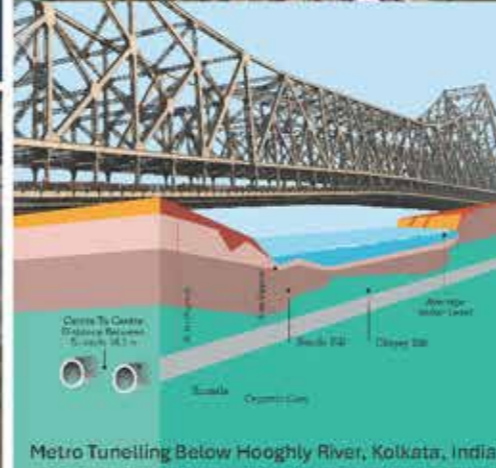
Mumbai-Pune Expressway Missing Link, India



Samruddhi Mahamarg PKG-2, India



Vizhinjam Port, Kerala



Chenab Railway Bridge, J&K, India

Metro Tunneling Below Hooghly River, Kolkata, India

Credits

Client:

Contractors:

Architect :

Consulting Planner :

Navi Mumbai International Airport Private Ltd (NMIAL)

Larsen & Toubro Limited

Zaha Hadid Architects (ZHA)

Pascal +Watson

Structure, MEP, Façade, VHT - Arup



Navi Mumbai - PTB

Afcons delivers large-value complex projects with unmatched precision. From India to the Middle East and Africa, we transform challenges into infrastructure landmarks, showcasing prowess of Indian engineering.





Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Navi Mumbai International Airport (NMIA) stands as a benchmark in modern infrastructure, showcasing large-scale, innovative, and performance-driven use of concrete across its 2,867-acre rock-fill site. By transforming challenging geology into a structural advantage, the project exemplifies advanced concrete engineering at its best.

An aerial view of NMIA's passenger terminal resembles an eagle with open wings, symbolizing its grandeur. At ground level, the intricately designed façade reflects the curved petals of a lotus, blending modernity with cultural symbolism.

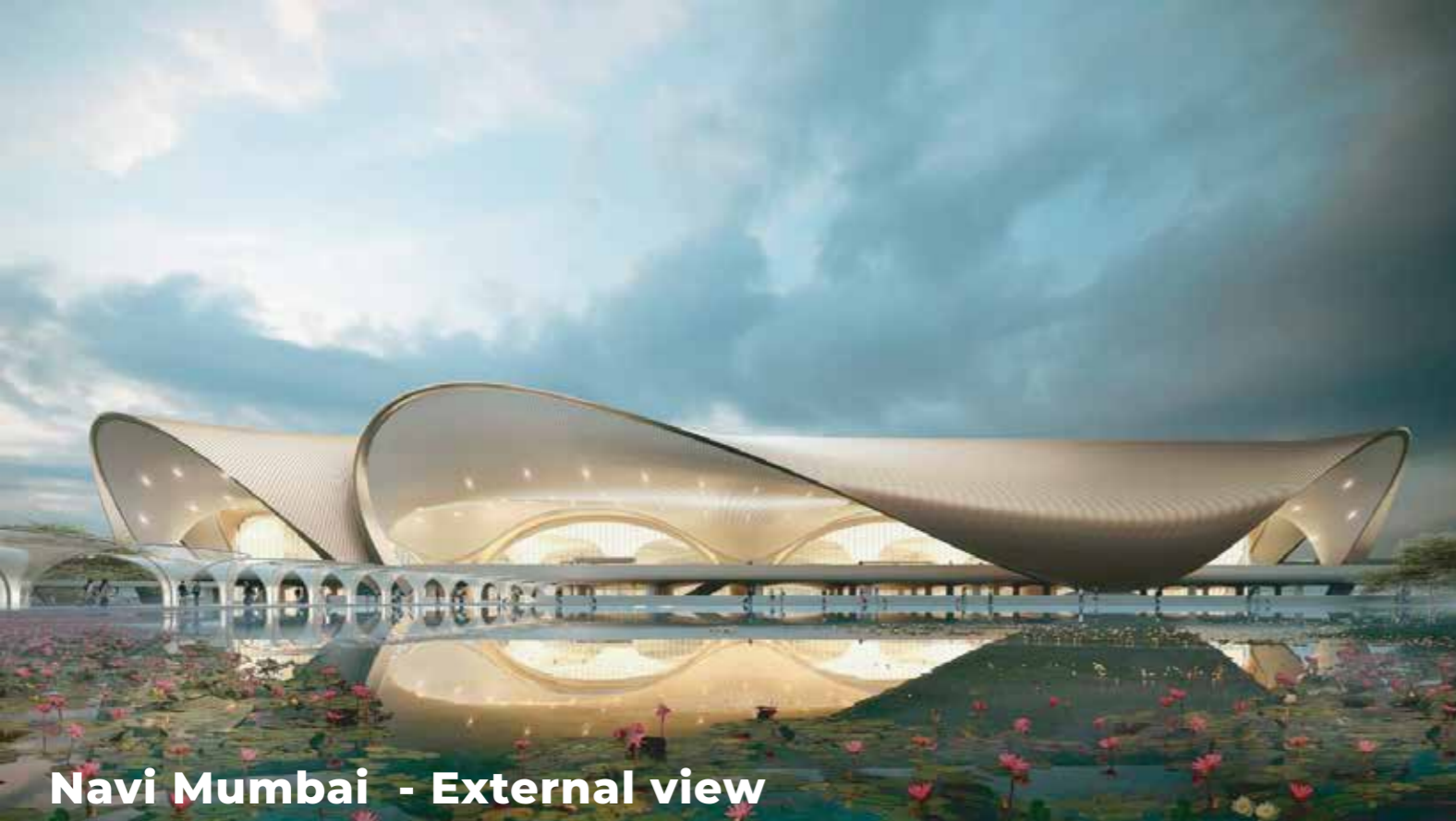
Architecturally, concrete enables iconic terminal features such as lotus bud-shaped columns and complex geometries that combine aesthetics with structural efficiency. The project also delivers over 23km of precast concrete boundary walls with excellent finish and zero rejection, reflecting precast construction excellence. Customized lightweight concrete ($\leq 1800\text{kg/m}^3$) is strategically used to reduce dead loads without compromising strength.

A defining strength of the project is its in-house aggregate and concrete production using blasted site rock, ensuring strict quality control, uninterrupted supply, and sustainable material reuse. Concrete mixes are specifically designed for the aggressive coastal environment, addressing chloride and sulphate exposure through optimized compositions and protective treatments.

Innovative structural solutions include high-strength, pumpable M40 concrete for precision structures such as the 37.3m tall Air Traffic Control tower. Temperature-controlled mass concreting with embedded thermocouples minimizes cracking, while advanced testing methods—including MASW, Falling Weight Deflectometer, and footing load tests—confirm foundation stability and zero settlement over rock-fill strata.

NMIA features high-performance concrete applications tailored for durability, precision, and long-term performance across its 3.7km runway and extensive airside infrastructure.

Despite challenges from heavy monsoons and concurrent rock blasting, robust protection measures, controlled construction methodologies, and vibration monitoring practices ensure uninterrupted progress and consistent quality.



Navi Mumbai - External view

Overall, NMIA exemplifies how innovation, material science, and precision execution elevate concrete into a defining element of world-class, resilient infrastructure—redefining possibilities in Indian airport construction.



Navi Mumbai - PTB

SHRI RAM JANMABHOOMI MANDIR AT AYODHYA

LOCATION OF THE PROJECT : Ayodhya, Uttar Pradesh.



Shri Ram Janmabhoomi Mandir

Credits

Client:

Shree Ram Janmabhoomi
Teerth Kshetra Trust (SRJTK)

Contractor:

Larsen & Toubro Limited

Design Architect:

C.B. Sompura Temple
Architecture (CBS)

Structural Design Consultant:

Larsen & Toubro Limited

PMC Consultants:

Tata Consulting Engineers
Limited (TCE)

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

This project represents a rare convergence of visionary architecture, advanced structural engineering, and enduring craftsmanship.

Conceived for an intended service life of 1,000 years, it establishes a new benchmark in permanence, resilience, and cultural significance. A defining principle of the design is the complete elimination of reinforcement and all ferrous materials—ensuring long-term durability without risks of corrosion, and aligning with the philosophy of timeless construction.

The substructure demonstrates exceptional engineering precision, executed in three stages. An engineered foundation fill of 135,000m³ of M35-grade concrete is placed in 51 compacted layers of 250mm, achieving uniform load distribution and ground stability. This is followed by a 1.5m thick plain cement concrete (PCC) raft foundation (9m × 9m), constructed with stringent thermal control to mitigate heat of hydration and prevent cracking. Above this rises a 21ft high granite plinth with interlocking stone keys, forming a stable and robust transition to the superstructure.

The superstructure is realized entirely in natural pink sandstone, with each block individually hand-carved and assembled through traditional joinery techniques. This approach not only eliminates dependence on steel but also enhances longevity, structural integrity, and architectural authenticity.



Stone interlocked columns

Concrete works were executed under rigorous quality control: flow values maintained between 520–580mm, placement temperatures controlled below 20°C using chilled materials, and continuous thermal monitoring ensured peak temperatures remained within 54–55°C, with controlled differentials. Compaction exceeding 98% MDD was verified through Nuclear Density Gauge testing. A fully digital QA/QC framework, combined with a zero-rework philosophy, ensured precision across all stages.

The foundation system underwent independent validation by premier institutions including IIT Madras and CBRI Roorkee, confirming its robustness and long-term performance. Executed under complex conditions—including the installation of over 5 lakh cubic feet of carved stone and managing high daily footfall—the project stands as a testament to engineering excellence rooted in durability, material integrity, and timeless design.



Shri Ram Janmabhoomi Mandir - Interior



RIL NEW ENERGY INITIATIVE (NEI) PROJECT, JAMNAGAR

LOCATION OF THE PROJECT : Jamnagar, Gujarat

Credits

Client:	Reliance Industries Limited
Contractor:	Larsen & Toubro Limited
Design Architect:	RIL Architecture
Structure Design Consultant:	Larsen & Toubro Limited
PMC Consultants:	Tata Consulting Engineers (TCE)

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc

Originally conceived as a conventional cast-in-situ reinforced concrete structure, the project transitioned to an innovative monolithic precast system to address stringent timelines and skilled workforce constraints. The adopted system was designed to achieve emulative monolithic behavior in a moment-resisting frame, while meeting demanding seismic (Zone IV+, Z = 0.32) and wind (50m/s) requirements, and adhering to architectural constraints that restricted the use of corbels.

The design strategy focused on relocating joints away from critical confinement zones to relatively less stressed regions. Structural continuity was achieved through mechanical connections, including couplers and sleeve joints at beam-column interfaces and column splices. A hybrid methodology was implemented: cast-in-situ foundations with pedestal dowels connected to precast columns via grouted couplers, followed by erection of precast beams, sleeve grouting, and stitch concreting to ensure overall monolithic action.

Execution involved handling large precast elements, with unit weights up to 46MT (columns) and 67MT (beams). The superstructure was completed using hollow core slabs and precast wall panels, significantly reducing dependence on conventional formwork and masonry. The system enabled the delivery of approximately 12,300m³ of precast concrete, 32,000m² of hollow core slabs, and 40,000MT of precast elements within just 11 months. Structural optimization reduced primary beams by nearly 80%, improving constructability and minimizing reinforcement congestion.



Structural Retrofitting of Dilapidated Bridge on NH14 over River Kangsabati, West Medinipur, West Bengal



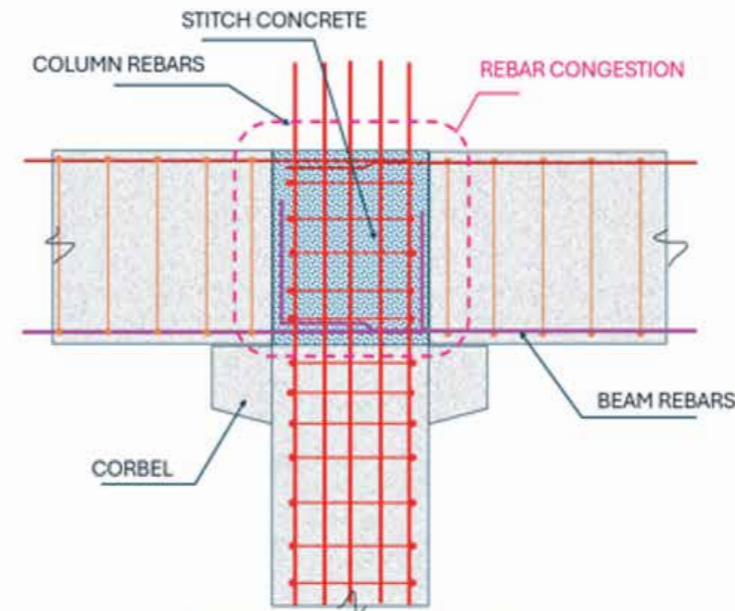
Winner of Best Technical Paper on Maintenance in IRC 2025



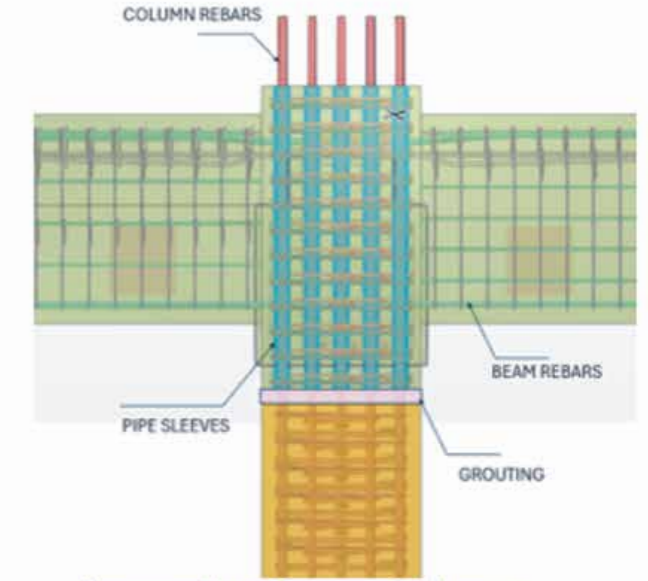
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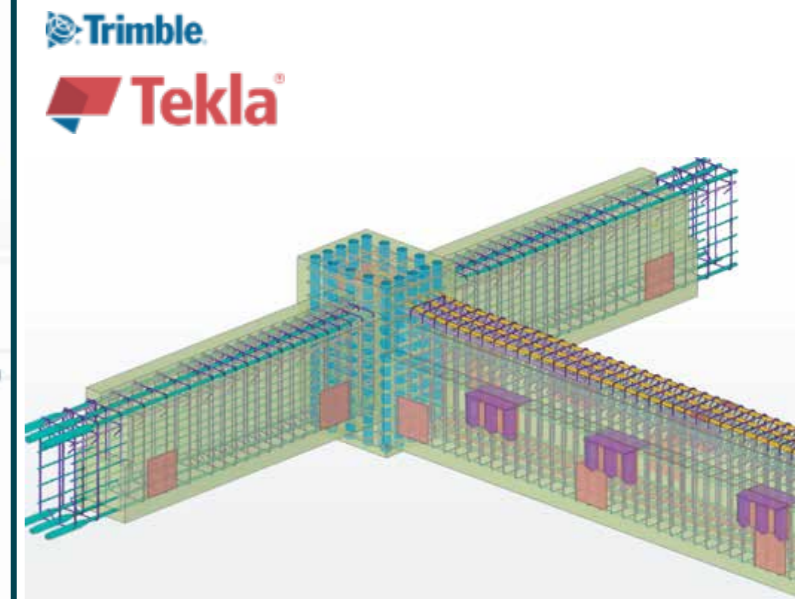
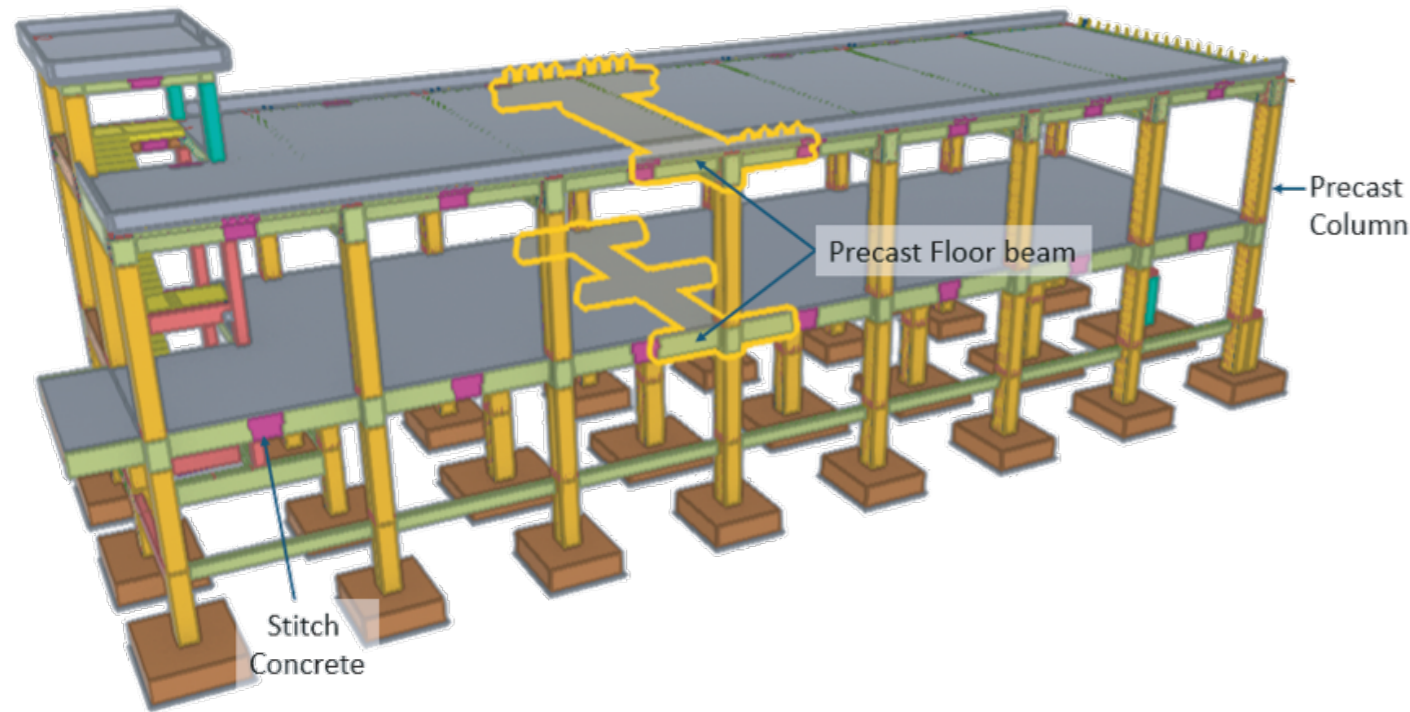
Innovation / Solutions implemented








Conventional Beam – Column connection



Innovative Beam-Column Connection



Structural System Proposal:

Element	Construction Method		Element	Construction Method	
Foundation & Plinth Beam	Cast in Situ		Floor Slab	Hollow Core Slab Panels (250 / 150 Thk.) with Topping Slab	
Column	Precast (Wt. - 46 Ton)		Walls (Periphery & Partitions)	Precast Wall Panels	
Floor beams	Precast (Wt. - 67 Ton)		Staircase & Parapet	Precast (Staircase Flight Wt. - 10 Ton)	



Erection of Precast Beam



STATUE OF ONENESS AT OMKARESHWAR



**Finished
Statue**

LOCATION OF THE PROJECT : Mandhata Hill, Omkareshwar, Madhya Pradesh

Credits

Client:

MP State Tourism Corporation Ltd.

Contractor:

Larsen & Toubro Limited

Design Architect:

C P Kukreja Architects

Structural Design Consultant -

Larsen & Toubro Limited

PMC Consultants:

Meinhardt Singapore PTE Ltd

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

A Monument of Enduring Engineering and Spiritual Legacy

The 108ft (32.9m) multi-metal statue of Shri Adi Shankaracharya at Omkareshwar, Madhya Pradesh, represents a synthesis of spiritual expression, advanced materials, and long-life engineering. The statue is supported on a 27m high reinforced concrete (RCC) pedestal founded on a 4m deep RCC raft, designed for an intended service life of 500 years.

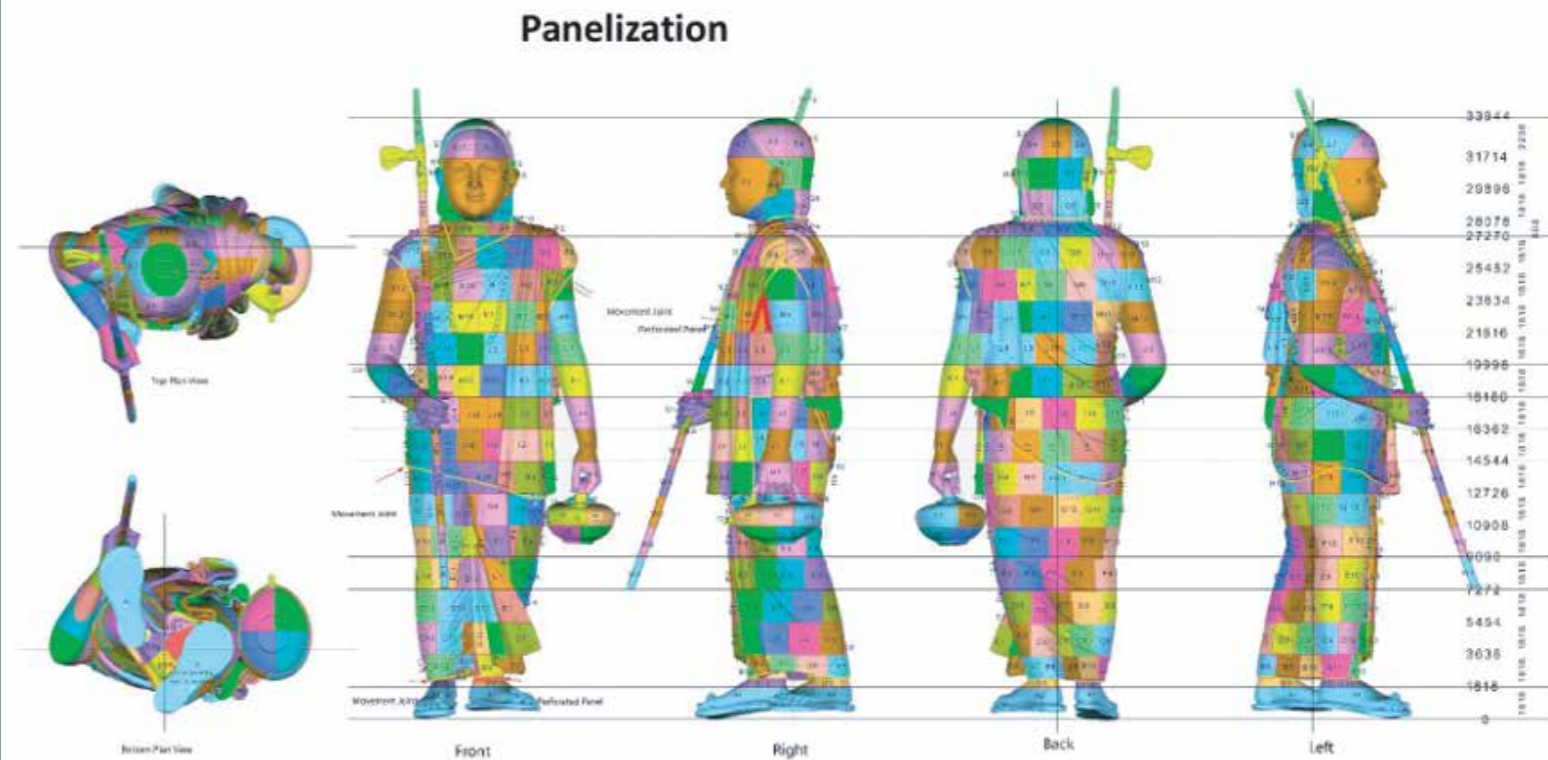
The structural system utilizes high-grade austenitic stainless steel (SS 316L) for both reinforcement and primary framing, with section thicknesses up to 75mm, ensuring superior corrosion resistance and durability. The external cladding comprises bronze (Grade C90300), while the pedestal is enriched with architectural stonework in Bansi Pahadpur pink sandstone, including a 12m diameter lotus form at the base and approximately 3ft (0.9m) deep carved stone cladding.

Concrete durability was addressed through performance-based mix design, extensive trials, and detailed service life assessment. Thermal effects were rigorously managed, with fresh concrete temperatures controlled at 20°C and peak core temperatures reaching 77°C within acceptable limits. Measures to mitigate Delayed Ettringite Formation (DEF) and early-age thermal cracking were incorporated, with reinforcement adequacy verified accordingly.

Long-term exposure conditions, including carbonation under evolving environmental scenarios, were considered in the design. The use of SS 316L ensures sustained passivity even at lower pH levels and resistance to chloride concentrations up to 2% by binder weight, supporting long-term structural integrity.

The bronze cladding was executed through a high-precision process involving 3D scanning, digital modelling, mould preparation, casting, pre-assembly, finishing, and stringent quality inspection, followed by careful on-site installation.

The project stands as a durable and iconic structure, combining material innovation, structural robustness, and craftsmanship to create a landmark of enduring significance.



**Structural steel
Segment-1
Erection**

THE PRESTIGE MUMBAI



LOCATION OF THE PROJECT : Shakti Mill Lane , Near Race Course, Mahalaxmi , Mumbai, Maharashtra

Credits

Client:	Prestige Office Ventures
Contractor:	Larsen & Toubro Limited
Design Architect:	Mandviwala Qutub & Associates, Mumbai
Structural Design Consultant :	Buro Happold, Mumbai
PMC Consultants:	JLL Property Consultants Pvt Ltd

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

India's tallest commercial tower under construction, rising to 300.05m, represents a significant advancement in high-rise concrete engineering through scale, material innovation, and execution precision. The development comprises three towers: Tower A (219.05m) with 55 office floors, Tower B with integrated podium and retail levels, and Tower C reaching the full height of 300.05m with 69 office floors—all supported on four basement levels.

At the heart of the structural system lies a defining concrete element—the Megha column (2.5m × 2.5m × 4.2m)—founded on a massive 3.5m thick raft incorporating approximately 12,000m³ of M60 temperature-controlled concrete. This foundation exemplifies large-scale mass concreting, executed with stringent thermal control to ensure structural integrity and long-term performance.

The superstructure utilizes high-performance concrete technologies, including M80 grade Self-Compacting Concrete (SCC) and Temperature-Controlled Concrete (TCC) for vertical elements, achieving superior strength, durability, and workability at height. Concrete quality is rigorously monitored through comprehensive fresh and hardened property testing—flow, J-Ring, V-Funnel, L-Box, temperature control, modulus of elasticity, and creep—ensuring consistency across extreme elevations.

Thermal management remains a critical aspect of execution. Concrete placement temperatures are controlled below 30°C using up to 75% ice substitution in mixing water, while embedded thermocouples ensure peak core temperatures remain within 80°C and thermal gradients within 20°C. Early challenges such as plastic shrinkage and reinforcement congestion were addressed through optimized mix design—adopting SCC-TCC blends with finer aggregates, controlled retardation, and balanced cementitious content (~750kg/m³), validated through non-destructive testing.

Construction efficiency is driven by advanced formwork systems, including Auto Climbing Systems (ACS) for core walls and Vertical Slip-form Panels (VSP) for columns, enabling rapid vertical progress with 4.2m lift cycles, 16–24 hour de-shuttering, and 24–30 hour floor cycles. Pour rates of 16–20m³/hour further reflect the project's high productivity.

A fully digital QA/QC ecosystem supports real-time monitoring, early risk identification, and zero-rework execution across more than 75 floors at heights exceeding 300m.

This project stands as a benchmark in high-rise concrete construction—demonstrating how advanced materials, thermal control, and precision execution can converge to deliver a resilient, efficient, and iconic vertical structure.



The Prestige Mumbai

IIT HYDERABAD – PHASE II



LOCATION OF THE PROJECT :
Kandi Village and Mandal, Sangareddy District,
Telangana

Credits

Client:

M/s IIT Hyderabad

Contractor:

Larsen & Toubro Limited

Design Architect:

M/s Arcop Associates Pvt Ltd. - New Delhi

Structural Design Consultant : M/s TPC Technical Projects Consultants Ltd

PMC Consultants:

M/s Tata Consulting Engineers Limited

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Folded Plate Concrete Structures at IIT Hyderabad: Form-Finished Precision at Scale

The Phase II campus development of IIT Hyderabad represents a forward-looking academic ecosystem, integrating advanced infrastructure with architectural innovation. Within this development, the Sports and Cultural Complex (SnCC) stands out as a distinctive concrete engineering achievement, defined by its large-span folded plate roof structures executed in exposed, form-finished concrete.

The SnCC comprises four facilities—Fitness Centre Arena, Sub Arena, Cultural Arena, and Main Arena—each characterized by long-span folded plate roof slabs ranging from 42m to 56m. A defining feature of these structures is the three-dimensional curvature with continuously varying angles along the span, demanding exceptional precision in both design and execution. The entire roof surface is realized as exposed concrete, placing stringent requirements on formwork accuracy, concrete quality, and surface finish.



Rebar Tying Platform

Concrete through Top Shutter

To address this complexity, the formwork system was fully engineered in a 3D digital environment using advanced modelling platforms, enabling accurate visualization, coordination, and fabrication. A modular formwork strategy was adopted to facilitate efficient erection and dismantling across large spans, optimizing construction cycles while maintaining geometric fidelity.

Given the inclined and enclosed nature of the folded plate geometry, specialized top shuttering systems were developed to control concrete pressure and achieve the required profile. Concrete placement posed a unique challenge due to the absence of direct visual access. This was addressed through the introduction of strategically located access openings at regular intervals, ensuring proper flow, compaction, and continuity of concreting across the entire surface.

A detailed pre-pour methodology, supported by workshops involving formwork, quality, and execution teams, enabled precise sequencing and successful implementation. The result is a series of structurally efficient, architecturally expressive folded plate roofs, delivered with high-quality form-finished concrete surfaces.

This project demonstrates how advanced formwork engineering, digital planning, and controlled concreting techniques can realize complex geometries in concrete—establishing a benchmark in long-span folded plate construction and exposed concrete craftsmanship.



MAHINDRA SUV PROVING TRACK (MSPT)

LOCATION OF THE PROJECT : Cheyyar, TN



Parabolic High Speed track

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

L&T Buildings and Factories IC made the History of making Asia's No1 and one of its kind in the world's Proving Grounds (Testing facility for Automobiles) construction of High Speed Parabola Asphalt Pavement with curvature as steep as 44.6" degrees designed for Cruising speed of 220 Km/h, with stringent surface tolerance using inhouse indigenous technology, with international Safety and Quality Standards under The "Make in India" initiative, Which setting benchmark for the industry and First time, In Asia. Constructed for Mahindra & Mahindra(M&M) by making 16 Nos of track total length of 44 Kms. with 58 specialized track surfaces stimulate to scientific experiment and testing of M&M automotive products SUV's / MPV's Pickup Trucks (Upto 5 Ton)

Passenger Cars 3 Wheelers / 2 wheelers Multi-Axle Trucks/ Trailers/ Buses (upto 50 Ton capacity), Tractors & Farm equipment are being developed and tested in this facility.

Credits

Client: Mahindra & Mahindra Ltd
 Contractor: Larsen & Toubro Ltd.
 Design Architect: IDIADA & TILKE
 PMC Consultants: Intercontinental Consultant and Technocrats Pvt. Ltd. (ICT)

Haring Bone Surface



Pot Hole Surface



Twist Surface



Belgium Paving & Cobble stone surface High Frequency Surface



Wave Concrete

PHASE I OF NOIDA INTERNATIONAL AIRPORT AT NORTH JEWAR, UTTAR PRADESH



Front View

LOCATION OF THE PROJECT : Jewar, Greater Noida, Uttar Pradesh

Credits

Client: Yamuna International Airport Private Limited (YIAPL)
Contractor: TATA Projects Limited
Structural Design Consultant: M/S SMEC

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

Introduction:

The project involves the development of the Passenger Terminal Building (PTB) and associated infrastructure for Noida International Airport (NIA), a major greenfield international airport in Jewar, Uttar Pradesh. The terminal comprises key components including the Head House, Pier, Forecourt, and Central Utility Plant (CUP), designed to handle large passenger flows with provisions for phased expansion. The airport is planned under a Public Private Partnership (PPP) model, with an initial capacity of 12 million passengers per annum, scalable to 60 million passengers over time.

Significance of the Project:

Strategic Infrastructure Development:

The project represents NCR's second major airport, enhancing regional connectivity and decongesting Delhi's IGI Airport.

Large-Scale Greenfield Project:

Developed on a 1,334-hectare site with minimal pre-existing constraints, enabling optimized planning, efficient construction, and long-term expansion flexibility.

National Importance & Sustainability Focus:

The project integrates modern sustainable construction practices, contributing to infrastructure growth while minimizing environmental impact.

Foundation Under Construction (PIER)



Advancements in Design Concept:

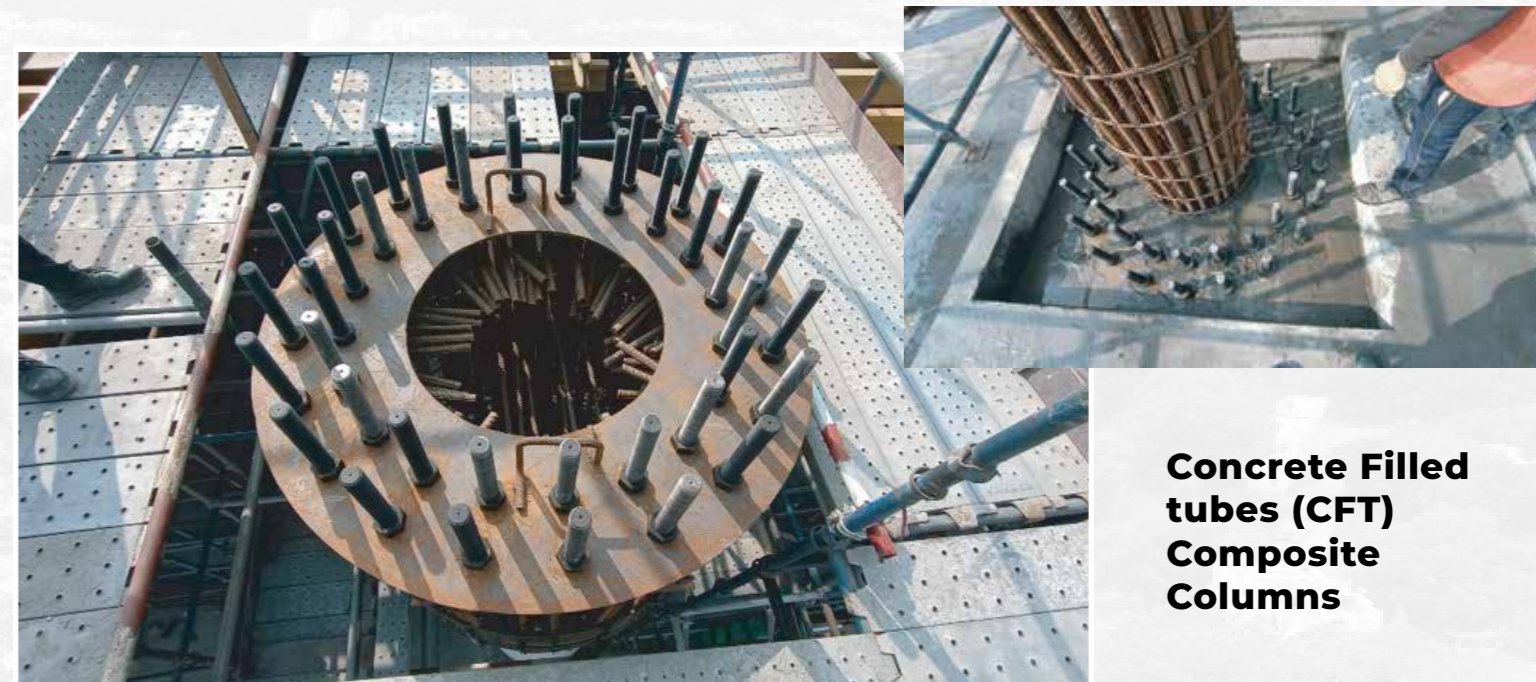
- Structural grids (18m, 36m modules) allow future expansion with minimal disruption.
- Separation joints and independent structural systems for Head House and Pier enhance adaptability and performance under loads.
- Advanced Roof Structural System which includes diagrid steel truss system forming a diamond geometry for roofs with integration of hyperbolic tensile fabric soffits and steel composite columns (CFT) for load transfer and stability.
- CFT : Provides high strength and ductility, reduces structural weight and improve seismic performance.
- The structural stability under lateral loads (e.g. wind forces, seismic loads) is ensured by the columns and trusses acting together as a moment resisting frame (i.e. sway frame or portal frame) in both directions. The combination of the trusses and purlins creates a lattice arrangement on plan that acts as a rigid diaphragm allowing the load to be evenly distributed through the columns. As the stability relies on the moment frame action, the joints at the top and bottom of the columns become a critical component of the system. The use of a composite column (concrete filled steel column) provides continuity between the column above (supporting the roof) and below (substructure) which allow the connection to be relatively stiff (when compared with a steel-only column).

Sustainable Construction Advancements

- Use of Neogence catalyst admixture leading to 20–30% reduction in cement consumption and increase in concrete strength and durability. Advanced admixture technologies help achieve higher performance with reduced cement usage, improving both cost and sustainability.
- Use of Fly Ash and LC3 cement led to reduction in carbon footprint by 25–40% and enhanced durability and workability. Sustainable cement alternatives can meet performance standards while significantly lowering environmental impact.
- Optimized logistics such as dumper-based PQC transport resulted in fuel reduction cost savings and improved productivity.



Foundation Under Construction (PIER)



Concrete Filled tubes (CFT) Composite Columns



PIER Constructed

CONSTRUCTION OF 100.00 METRE SPAN MOTORABLE BRIDGE OVER RIVER BEAS ON HANOGI KHOLA NAL ROAD



LOCATION OF THE PROJECT : Himachal Pradesh

Credits

Client: Himachal Pradesh Public Works Department
Contractor: Ajay Kumar Sharma- 'A' Class Govt. Contractor
Design Architect: SPECTRUM Techno Consultants Pvt Ltd
Structural Design Consultant

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The location of the bridge has a constraint with NH-3 across the bridge alignment, at the toe of a hillock and it was required to have a span of about 95m over the river.

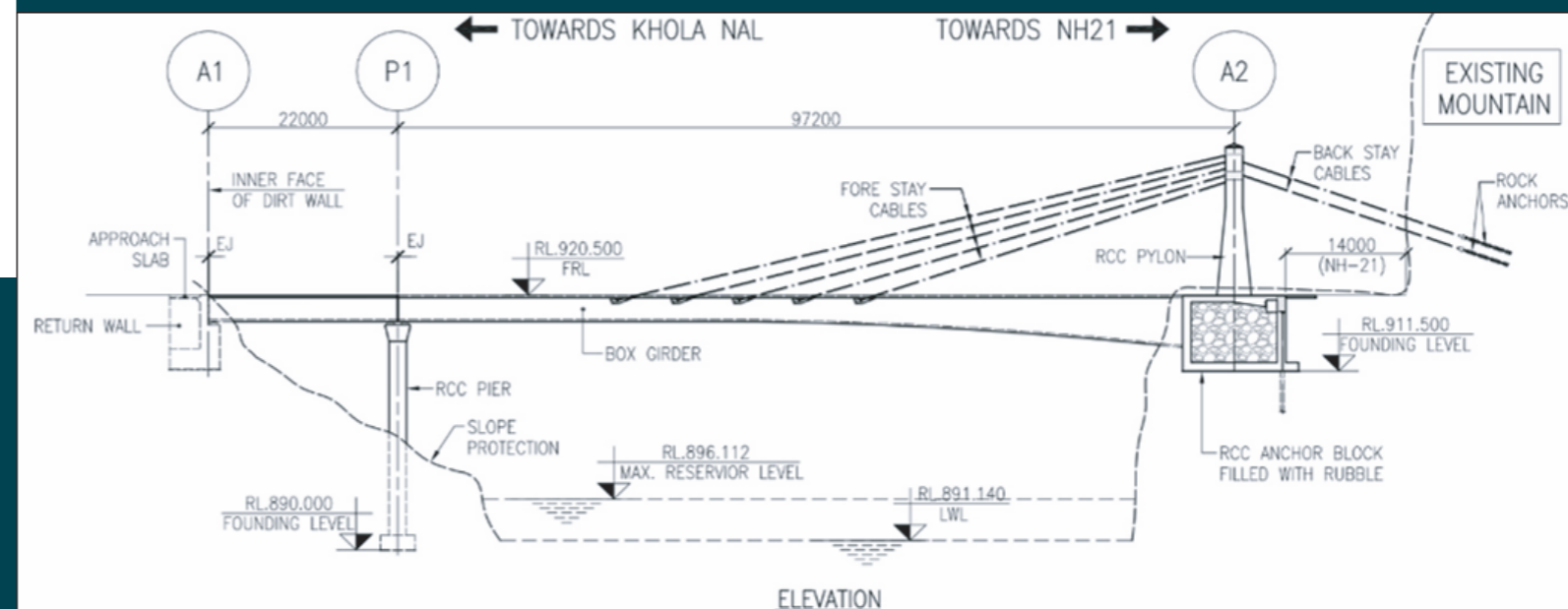
The total length of the bridge proposed was 119.2m with two spans of 22m and 97.2m

The superstructure for 22m span is a prestressed concrete box girder supported on elastomeric bearings on both Abutment A1 side and Pier P1.

The 97.2m span is proposed as an extradosed span with prestressed concrete box girder. Superstructure & Pylon of the extradosed span is made integral with the box type abutment A2 on Manali/NH side.

Cantilever method of construction using form traveller was adopted for casting of the superstructure for a length of 63 m from the abutment A2 beyond which the superstructure was cast on staging erected on ground supported temporary trestles, brackets cast along with pier cap of pier P1 and structural steel supporting frame erected on segment S19.

Extradosed spans with cantilever construction is one the optimal and feasible solution for bridges across deep gorges



HIGH-LEVEL BRIDGE ACROSS RIVER WAINGANGA AT AMBHORA



LOCATION OF THE PROJECT : Nagpur, Maharashtra

Credits

Client:

Maharashtra Public Works Department
T and T Infra

Contractor:

SPECTRUM Techno Consultants Pvt Ltd

Design Architect:

Structural Design Consultant

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The cable stayed portion of the bridge is 700m long which is divided into 5 equal spans of 140m each.

Based on the bed profile, the bridge was divided into two modules, Module 1 and Module 2. Module 1 is a 3-span continuous cable stayed system with a total span of 420m from A1 to P3a (P3a is an intermediate pier between Pylons P2 and P3). Module 2, therefore, is a 2-span continuous system of 280m length between P3a and A2.

The superstructure consists of a 7.5m wide 2 lane carriage way with 3m wide footpaths on either side. The deck spans between RCC cross girders spaced at 4m in longitudinal direction. The load is then transferred to the two main longitudinal girders, thus creating a pi-shaped cross-section (see Figure 2). The superstructure is supported by 7 numbers of stay cables placed at 8m spacing on the deck level. The cables are connected to the pylon from either side through a composite steel anchorage(links) and form a semi fan-harp arrangement

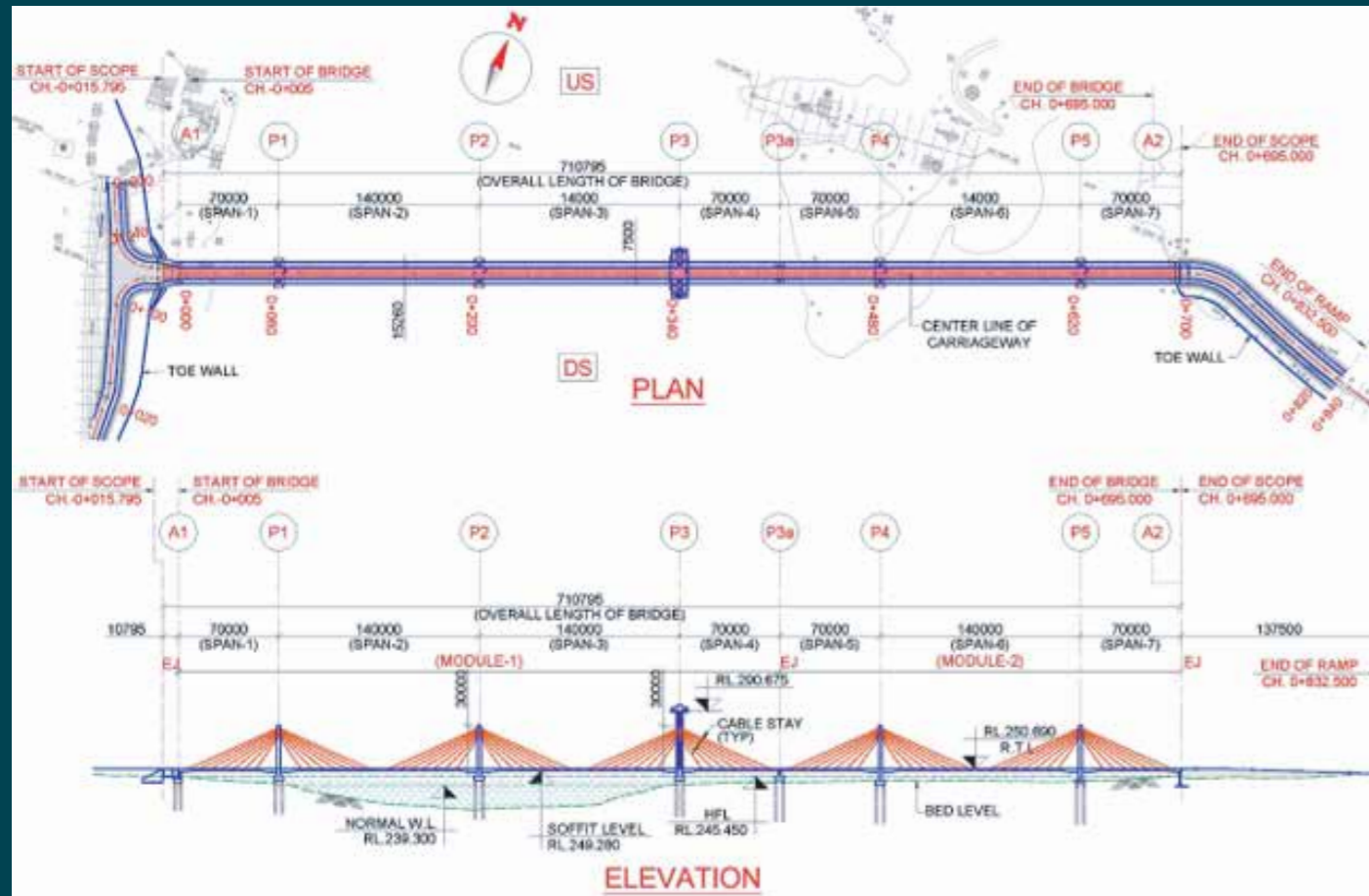
The twin RCC pylons are 30m high above the deck level and are connected at two levels by RCC tie beams. The twin pylons rest on a common pile and foundation whose piles are socketed into the hard rocky strata.

The cable-stayed bridge is analysed and designed for 2-lane vehicular live load with a design speed of 80 kmph and pedestrian live load on the 3m wide footpath. Loading on the bridge is considered as per IRC:6-2017 and the design of RCC elements is carried out in limit state method as per IRC:112-2011. The adequacy of stay cables is ensured as per requirements of fib 89.

Construction stage analysis is carried out in SOFiSTiK by modelling the various stages of construction, activation and deactivation of loads and elements as per the designed sequence of construction.

Cantilever form traveller (or travelling formwork) is used for cantilever construction of cast-in-situ bridge superstructures that are inaccessible to conventional methods of construction. **The cable stayed bridge over Wainganga river at Ambhora is one of the very few bridges where all state-of-the art methods** for deck construction of river bridges are simultaneously adopted. Behavior of the cable stayed bridges during cantilever construction employing various method is thoroughly studied. The form-traveller design offers versatility in terms of its utility

CONSTRUCTION OF EXTRA-DOSED RCC BOX BRIDGE ACROSS RIVER MAHI, RAJASTHAN



LOCATION OF THE PROJECT : Dungarpur, Rajasthan



Credits

Client:

Public Works Department, Rajasthan
SPS Construction India Pvt. Ltd.

Contractor:

NA

Design Architect:
Structural Design Consultant

SPECTRUM Techno Consultants Pvt Ltd
Chaitanya Projects Consultancy Pvt.
Ltd.

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The construction of a multi span extradosed cable stayed bridge over river Mahi was undertaken to establish the state highway link from Village Chikli to Village Anandpuri Road in district Dungarpur of the Rajasthan State. The location of this bridge is an important tourist and pilgrimage destination with lush green surroundings and backwaters of Kadana Dam.

The bridge has an overall length of 906m and deck width of 12m to accommodate 2 lanes of vehicular traffic and a 1.5m +1.5m footpath for pedestrians. The structural arrangement of the bridge comprises a single module of 576m extradosed bridge with span arrangement of 72m+144m+144m+144m+72m and 6 x 30m length approach portion on Chikli side and 5 x 30m length approach portion on Anandpuri side.

The most challenging part of the project was the 576m long extradosed portion which was required to be continuous. However, due to short height of piers, the design became challenging owing to the increased rigidity of the system due to integral structure with continuity.

An innovative approach was adopted wherein the central two pylons were made integral with the superstructure and the outer two pylons were rested on large sliding bearings having capacity of 4000 Mton each. This innovation led to the creation of a hybrid system thereby reducing the longitudinal effects of the integral system.

CONSTRUCTION OF 6 KM LONG EXTRADOSED BRIDGE OVER RIVER GANGA



LOCATION OF THE PROJECT : Jharkhand

Credits

Client:

National Highways Authority of India
Dilip Buildcon Ltd

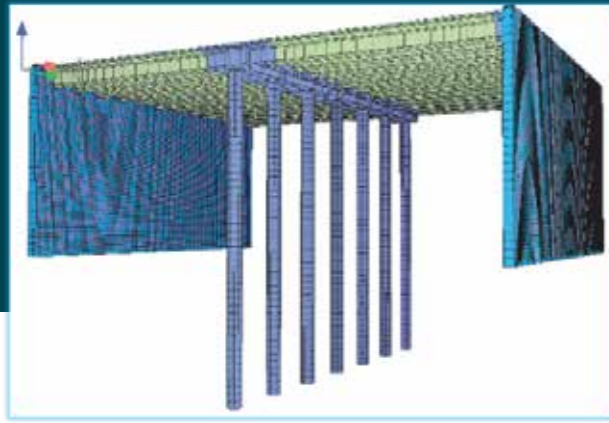
Contractor:

NA

Design Architect:
Structural Design Consultant

SPECTRUM Techno Consultants Pvt Ltd
SA Infrastructure Consultants Pvt. Ltd





ELEVATED CORRIDOR WITH EXTRADOSED BRIDGE IN THE JABALPUR CITY OF MADHYA PRADESH

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Dwarka Expressway Package-I has been proposed for the improvement of the junction between Dwarka Link Road and National Highway NH-8. The total package length is approximately 13.22 km, comprising 14 alignments, out of which 12 are shallow tunnels and 2 are elevated viaducts. The main expressway consists of an eight-lane divided carriageway of "Shallow Tunnel" configuration.

The proposed expressway provides direct connectivity between New Delhi Airport and the residential areas of Dwarka. Since the entire Package-I alignment runs parallel to the New Delhi Airport, the Airports Authority of India (AAI) raised objections to the construction of elevated corridors within this zone. Consequently, a shallow tunnel configuration was proposed for this stretch.

Shallow tunnels are underground structures in which the finished road level is located at a shallow depth ranging from approximately 1.0 m to 15.0 m below the existing ground level. This shallow tunnel system is one of its kind in India due to its large span and the parallel movement of traffic above the tunnel structure.

The construction methodologies adopted for the shallow tunnels include the Top-Down approach as well as the Open Cut & Cover method, depending upon the site location and constraints. The alignments proposed under the Top-Down construction methodology comprise diaphragm walls (D-walls) on either side, supporting either precast pre-tensioned slabs, precast post-tensioned slabs, or cast-in-situ deck slabs forming the top deck structure.

The elevated structures are proposed using precast post-tensioned segmental box girders supported on cast-in-situ piers and pile foundations.



LOCATION OF THE PROJECT : Madhya Pradesh

Credits

Client:	Public Works Department Madhya Pradesh.
Contractor:	NCC Limited
Design Architect: Structural Design Consultant	STUP Consultants Pvt. Ltd. Force Structural Engineers Pvt. Ltd.
PMC Consultants:	AECOM Asia Company Limited



INDORA CHOWK-DIGHORI CHOWK ELEVATED CORRIDOR, NAGPUR

Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

This project comprises approximately 6 km of elevated roadway, including four ramps, a 62 m diameter elevated rotary, railway overbridges, and associated road improvements. Developed in a congested urban environment, the corridor significantly enhances traffic flow and connectivity while crossing critical railway infrastructure.

The landmark structure of the project is a 385.5 m long extradosed cable-stayed bridge with a span arrangement of 96 m + 193.5 m + 96 m. The bridge consists of a prestressed concrete segmental box girder deck monolithically connected to reinforced concrete pylons. Stay cables transfer a portion of the deck loads to the pylons, enabling the construction of the 193.5 m main span while maintaining a slender and efficient structural form.

To satisfy railway clearance requirements and severe alignment constraints, the bridge was constructed using cast-in-situ segmental technology with form travellers, while the pylons were erected using jump-form construction. The project also includes steel bowstring girders with spans up to 70 m, demonstrating the integration of concrete and steel long-span bridge systems within a single corridor.

The project represents a significant achievement in Indian bridge engineering and is among the longest concrete extradosed bridges constructed over an operational railway station, showcasing advanced design and construction techniques for urban transportation infrastructure.



LOCATION OF THE PROJECT : Nagpur

Credits

Client:	NATIONAL HIGHWAYS AUTHORITY OF INDIA
Contractor:	NCC Limited
Design Architect:	FORCE STRUCTURAL ENGINEERS PVT LTD
Structural Design Consultant	SA INFRASTRUCTURE CONSULTANTS PVT. LTD





Description of the project, highlighting the significance of the project, innovativeness, exclusiveness in design concept and construction method etc.

The Indora Chowk–Dighori Chowk Elevated Corridor is an 8.9 km long urban highway project being developed by the National Highways Authority of India (NHA) on NH-353D in Nagpur, Maharashtra. The project aims to provide a signal-free transport corridor, reduce congestion, improve travel efficiency, and support the city’s expanding transportation needs.

The corridor comprises elevated flyovers, grade separators, ramps, service roads, retaining structures, and railway crossings, including two Road Over Bridges (ROBs) and two Road Under Bridges (RUBs). A distinguishing feature of the project is the use of multiple advanced bridge systems within a single urban corridor, including open-web steel girders, composite steel girders, prestressed concrete I-girders, segmental box girders, and Ultra-High Performance Fibre Reinforced Concrete (UHPFRC) U-girders with spans up to 90 m.

A prominent landmark structure is the single-pylon cable-stayed rotary at Ashoka Chowk, designed as a signature gateway for the city. The elevated structures are supported on deep foundations, including monopiles up to 2.0 m diameter, addressing challenging urban geotechnical conditions.

Constructed within a densely populated urban environment, the project requires extensive utility relocation and traffic management while maintaining uninterrupted public movement. The corridor demonstrates the successful application of innovative bridge engineering, advanced concrete technologies, and mechanized construction methods to deliver a high-capacity urban transportation system for Nagpur.

NARMADA BRIDGE ON DELHI-MUMBAI EXPRESSWAY PROJECT



LOCATION OF THE PROJECT : Bharuch, Gujarat
Contractor : Ashoka Buildcon Limited

The Narmada Bridge Project at Bharuch, Gujarat, is a landmark transportation structure executed by Ashoka Buildcon Limited as part of the Delhi-Mumbai Expressway corridor. The bridge is described in the source document as India’s first and longest 8-lane extradosed cable-stayed bridge, with each carriageway extending 2.22 km. The bridge portion is reported at approximately ₹817 crore and the project was completed in a record 33 months despite major challenges including severe flooding in consecutive years and pandemic-related disruption.

The project is significant for its scale, structural complexity and national importance on one of India’s key expressway corridors. The design addresses both heavy traffic loading and demanding exposure conditions near a major river crossing, while also meeting navigational requirements. Its successful delivery under difficult site and external conditions is presented as a major engineering achievement.

Major materials recorded in the source document include approximately 395,410 cubic metres of concrete, 37,799 MT of reinforcement steel, 7,272 MT of structural steel and 3,229 MT of high tensile steel. The project is also noted in the source text as having received national recognition and multiple infrastructure awards.



JK Prestressing Co.

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POST TENSIONING MATERIAL & EQUIPMENT



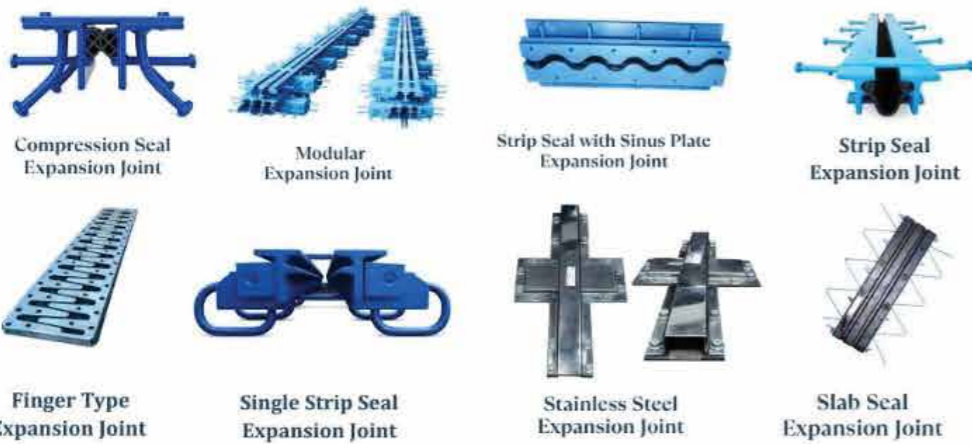
JK ANCHOR CONE JK ANCHOR HEAD JK LIVE WEDGES JK FLAT ANCHOR CONE & FLAT ANCHOR HEAD JK HYDRAULIC PUMP JK HYDRAULIC JACK JK GROUT PUMP WITH AGITATOR JK SCREW TYPE GROUT PUMP WITH AGITATOR JK HDPE SHEATHING

JK REBAR COUPLERS



JK PARALLEL REBAR THREAD COUPLER JK PRECAST COUPLER JK REBAR COUPLER JK BOLTED COUPLER

JK STRUCTURAL EXPANSION JOINT



Compression Seal Expansion Joint Modular Expansion Joint Strip Seal with Sinus Plate Expansion Joint Strip Seal Expansion Joint Finger Type Expansion Joint Single Strip Seal Expansion Joint Stainless Steel Expansion Joint Slab Seal Expansion Joint

SEISMIC DEVICES



Shock Transmission Unit (STU) Viscous Dampers

ENGINEERING PRODUCTS



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Aluminium Anodes Zinc Anodes

DE-WATERING PUMP



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