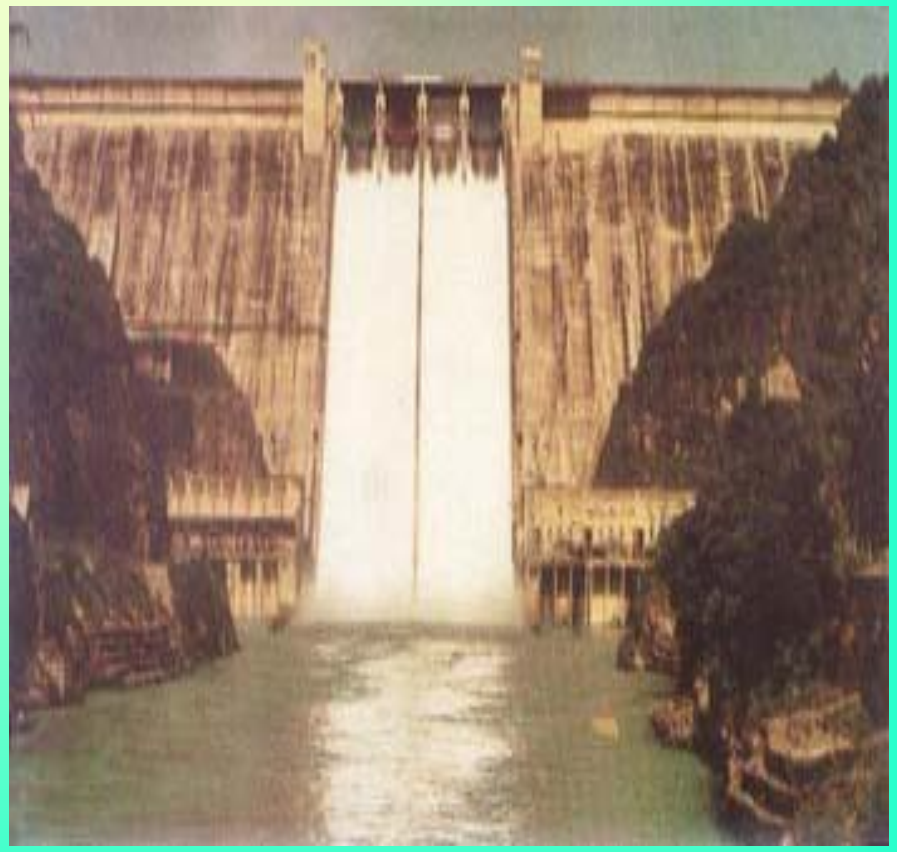
Bhakra Dam Project

One of the Highest Straight Gravity Dams in the World.

- **Salient details** : The dam which took over eight years to complete has been built entirely with ACC Cement , over 1600 thousand tonnes has been used.Also involved placing of 3.8 million cum concrete.Some 8 million acre feet of water is impounded in the Govindsagar lake behind the dam.
- The 3000 mile long network of canals will extend irrigation to 3.6million acres .
- Location : On sutlej river in Punjab.
- Height : 740 ft (227m)
- Cost : About Rs 171 crore.



Periyar Dam Project-Idukki Kerala

Double Curvature parabolic asymmetrical Concrete Arch Dam , first of its kind in India.

- **Special Features** : Precooling of aggregates to 12.6 degree to 15.5degree by chilled water on coarse aggregates and chilled air on fine aggregates was done in a insulated building prior to mixing.Temperature control of concrete was done by thermocouples embedded in the concrete, prior to grout injection at the required 21degree .
- Consultant : Surveyor Nennigar & Chennevert of Canada
- Contractor : Hindustan Construction Company Limited.

Bahai Temple-New Delhi
(the 20th Century Taj Mahal)

An Outstanding Contemporary construction remarkable for its architectural and structural concepts.

- Special Features: The lotus flower pattern was chosen by the architect for the project visited numerous holy temples and shrines in India & Srilanka before arriving at the final design. It took almost 18 months for the best of the computers in London to transform the design, to be understood by an Indian worker.
- Contractor: ECC (L&T) Construction Company Limited .
- Client : National Spiritual Assembly of the Bahai of India.
- Architect : Fariburz Sahba & Associates, London.
- Consultant : Flint & Neill Partnership.

KALIABHOMORA BRIDGE ON RIVER BRAHMAPUTRA – TEZPUR(ASSAM)

The Challenge given ever changing flow patterns of the river

- Cost : Rs 20 crore
- Length : 3.015 Km
- **Special Features** : The river Brahmaputra known for its vagaries and unpredicted flow pattern allowing only 150 working days, posed a great challenge for the execution of this Bridge. In spite of Many challenges, Hindustan Construction completed the bridge 4 months ahead of schedule.
- The project has again received *Award for Excellence* for the most outstanding concrete structures in India, instituted by American Concrete Institute (Maharashtra Chapter) (1991).
- Owners : North East Frontier Railway.
- Contractor :
  Hindustan Construction Company Limited

New Council Hall -Gandhinagar Gujarat

Special Features :

The new assembly hall form the central core around which the secretariat complex is built and consistent with the philosophy of planning at Gandhinagar, the architectural treatment and effects are achieved with the use of structural forms themselves.

Architect : Chief Town Planner and Architectural Advisor , Capital Project

Consultants : STUP Consultants Limited .

Contractors : Rajesh builders

Owner : Govt of Gujarat

Sabarmati Cooling Towers – Ahmedabad

First RC Cooling Towers for a power Station in India

- **Special Features** : The first three towers were built in 1935, and the first major rivers were done to the timber cooling stacking 1948. As mentioned earlier, the timber members were replaced by preacst units in the next round of construction.Quality of the concrete, finishing and workmanship are of high standard.The towers are 60 years after being built are in excellent working condition.
- Patentees of the design : L.G.Mouchel & Partners.
- Owners : Ahmedabad Electricity Company Limited.
- Contractor : Gammon India Limited.

Airport Hangar Santa Cruz

Unique Cantilevered folded Plate Roof

- Year of Construction : 1972
- Special Feature : Roof structure 151.4m x 91m, symmetrically divided by an expansion joint located at half the width.The Cantilever folded plate roof is believed to be world record for such structures.
- Special Consultants : STUP Consultants Limited , in conjunction with STUP , Paris
- Contractors : B.E.Billimoria & Company.

Third Railway Crossing Bridge- Thane Creek

Pneumatic Caisson method for the foundation, precast,prestressed concrete box girders superstructure.

- Length : 1.9km
- Across : Thane Creek Connecting Mumbai to Navi Mumbai.
- Special Features : Pneumatic caisson method used for the foundation .RCC well is cast on a submersible barge near the jetty under controlled dry conditions.The barge is then floated in position during high tide and sunk when the caisson floats free.Human & material locks are next attached.Workers under the pressure chamber and loosen clay with water jets before excavating the rock with jack hammers.Blasting is not permitted.The well is then socketted in rock.The girders were launched from the barge at high tides.
- The project has again received *Award for Excellence* for the most outstanding concrete structures in India, instituted by American Concrete Institute and also from Indian Instituition of Bridge Engineers
- Contractors : AFCONS Infrastructure Limited.
- Owners : Indian Railways.

Bhima Aqueduct –Maharashtra

Precast Elements assembled into a pipeline and prestressed both transversely and longitudinally

- The aqueduct, with a discharge of 42.5 cumecs, is 947m in length The truncated circular cross section which is 4.8m in diameter achieves high hydraulic and structural efficiency and reduces transverse effects, mainly due to membrane forces, easily taken by transverse prestressing.

  Rapid and economic construction was achieved by adopting the free cantilever method, using precast match cast epoxy glued prestressed segments.

  The aqueduct is supported on hollow circular piers 40m high, constructed with climbing forms.
- Owners : Irrigation Department, Govt of Maharashtra.
- Consultants : STUP Consultants Limited.
- Contractor : Atur India Private Ltd.

ECC Administrative Building-Chennai

Large Unobstructed Column free areas supported on prestressed hollow pyramids

- The office building is a four-storeyed structure resting on four hollow prestressed inverted pyramids which, in turn, are supported on four hollow core shafts. In the first stage only two of the upper storeys were constructed.
- The configuration of a typical floor in plan is derived from four 21.6m x 21.6m squares placed in line along one of the diagonals and approximately 15.27m apart with a central square 10.8m x 10.8m which houses stairs, toilets and an elevator system.
- This building received the Most Outstanding Structure Award as one of the five most outstanding structures built in the last four years, world-wide, from the XIIth Congress, June 1994, of the Fédération Internationale de la Précontrainte (FIP).

Mahatma Gandhi Setu-Patna Bihar

Longest River Bridge in the world when Built

- Length : 5.575m
- Special Features : In the post monsoon session bamboo mat groynes were placed 1 km upstream to induce silting at the foundation positions resulting in water depth being reduced to about 3m from 20m.Foundation work was then started, resulting in savings of at least one working session of production time.
- Short line match cast segments with epoxy joints were adopted for the first time in India.
- Cost Rs : 65 crores at 1972 prices.
- Owners : Public Works Depts., Govt of Bihar .
- Contractor: Gammon India Limited

Third Godavari Bridge-Rajahmundhry

Longest bow string Arch Girder Bridge on Railway Network

- Length : 2.73km
- Special Features : The bow girders were cast in seven casting steps of 6940mm each, with a closing pour of 1000mm at the top to complete the arch.The tie girders of 97m length are single cell PSC box sections of 2300mm depth.The government load is the half the span liv load on the bridge. Year of Construction : 1995.
- Contractors : Hindustan Construction Company Limited.
- Owners : Indian Railways.

Wheel & Axle Plant Bangalore

Embodying Advanced Design & Construction Technology

- Special Features : Precast prestressed concrete tied arch girders.Precast , reinforced concrete folded plate roof elements.Insitu connoidal shells.
- Contractors : National Projects Construction Corporation Limited, NBCC & Gannon Dunkerley & Company Limited.
- Owners : Indian Railways.
- Architect & Consulting Engineers : STUP Consultants Limited.

Jawaharlal Nehru Stadium Cochin

- Seating capacity : over 50,000
- Special Feature : The structure rests on 2070 piles of 500mm diameter driven to depth of 42mIt is the only stadium of its kind in the country with three tiered gallery affording the best viewing angle of 17 degree , the height of the uppermost seat from play ground being 21.28m.The viewing distance gets reduced because of the three tiered structure.
- Area Lighting : Four arena lighting masts have been place at the top of the stadium.These 60-70 degree bend arch shaped pipes have been fabricated from 12mm sheets with rolled doubler plates to strengthen them.
- Prime Contractors : Hindustan Steelworks Construction Limited.
- Architect C R Narayana Rao
- Owner : Greater Cochin Development Authority, Cochin

Akkar Bridge

First All Concrete Cable Stayed Bridge in India

- Length : 154m with a single central span.
- Special Features : A severe seismic zone and a deep valley with a ferocious river current required a bridge with a minimum number of foundation and a lightweight superstructure.A cable stayed bridge meet these requirements eminently.stay cables manufactured at site, for the first time anywhere in the world.
- Contractor: Gammon India Limited.
- Owners : Sikkim PWD.
- Specialist Consultant : Schlaich & Partners, Germany.

RCC Chimney- Trombay Power Station

Tallest Concrete Chimney in India

- Height : 275m, the tallest concrete structure in India to date.
- Special Features : The structure was completed with outer diameters of 19.86m at the bottom, and 7.6m at the top.The structure was completed to a very tight schedule with stringent quality control.The chimney height is the statutory height of the environmental authorities and will keep the surrounding thickly populated area free from pollution.High strength concrete was placed at great heights using slip form construction.
- Owner : Tata Electric Companies,

  Consultant : Tata Consulting Engineers
- Contractors : Hindustan Construction Company Limited.

Bulk Silos at Nhava Sheva

Extensive precasting was used to complete the four parabolic silos within the stipulated time

- **Salient Features**. : The silos are located in a reclaimed area with filling of 6 to 7 m depth.All Silos are prestressed both transversely and longitudinally..Maximum size of precast units was 15 tones for the fertilizer Silo and 30 tonnes for the others.
- Owner: Nhava Sheva Port Trust
- Project Consultants : Howe India Private Limited.
- Main Contractor : Consortium of Klockner of Germany, Raxon of Finland and Hyundai of South Korea.
- Sub Contractor : Gammon India Limited.

New Delhi TV Tower

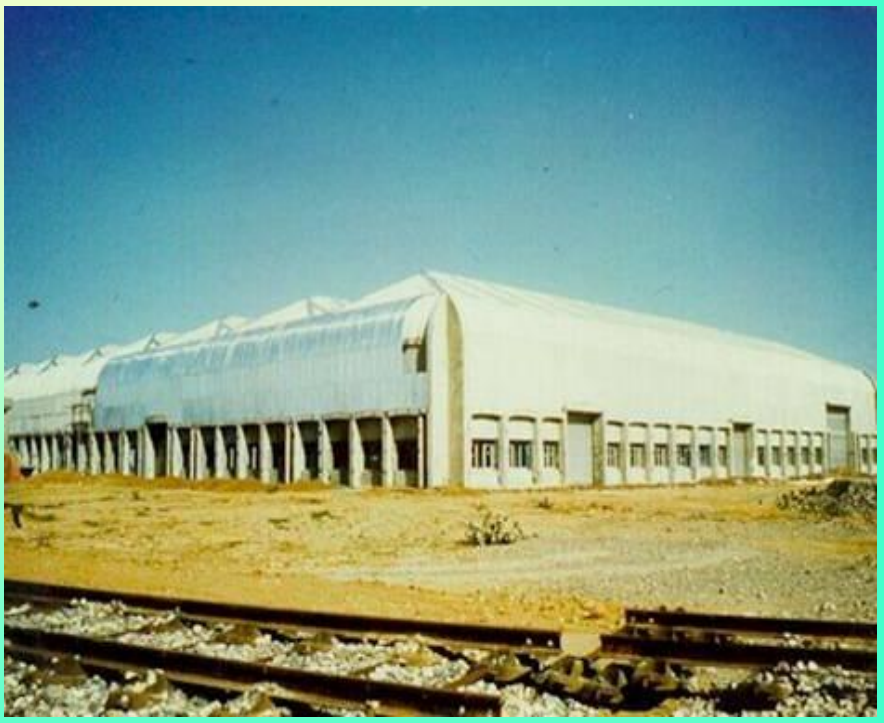
Tallest in Asia using Bygging slipform technology for the first time in India

- **Salient Features** : An attractive four storied sky pod with revolving restaurant and viewing gallery.is located at a height of 147.5m.The floor at the elevation of 150.5m has a diameter of 13.1m and serves as a microwave dish platform to facilitate live telecasts in the radius of 60km from the tower.
- Client : All India Radio.
- Proof Checking : Zerna Schnellenbach and Partner, Germany.
- Contractor : National Buildings Construction Corporation Limited.

Rail Coach Factory –Kapurthala

Precast elements extensively used for the largest factory constructions.

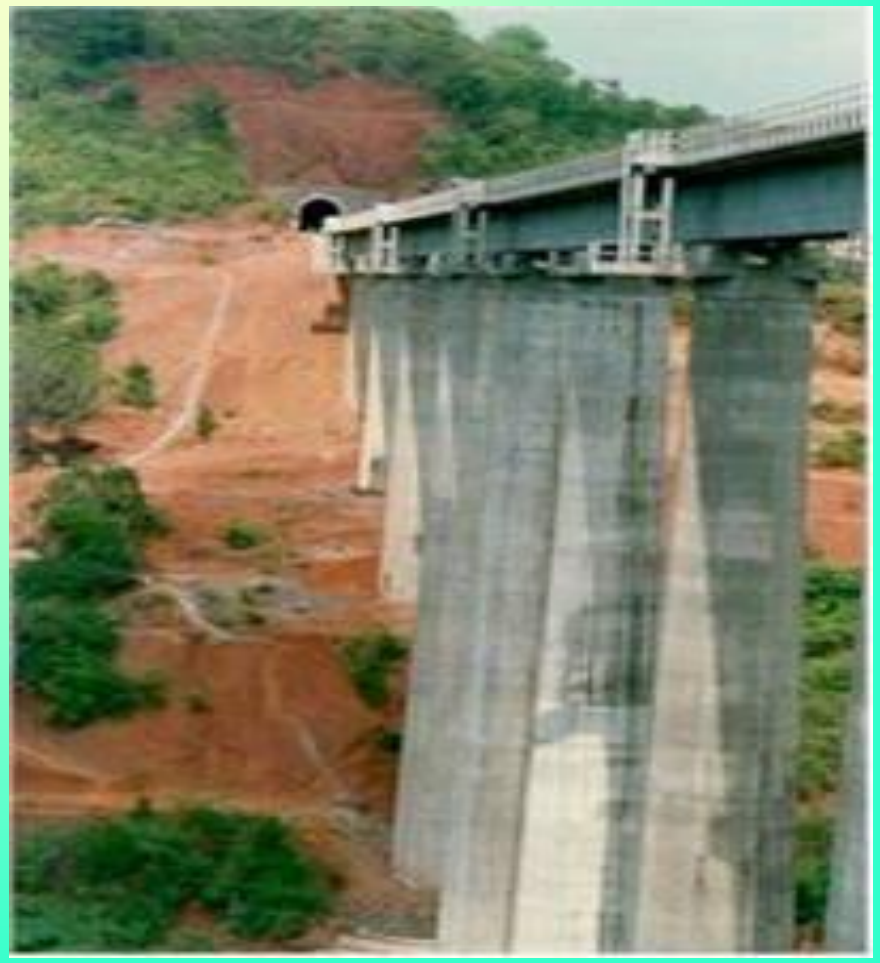
- **Salient Features** : This unusually large project consisting of 18 buildings was finished within the stipulated time of 2 years inspite of disturbing situation prevailing in the state. The layouts and structural schemes of the buildings were standardized to speed progress. The stressed-skin design of the structural steel roof allowed each roof panel of 20m x 12m weighing 5.5T to be prefabricated and lifted into position. At a steel consumption of only 25 kg/m2 this was one of the lightest roofs possible for these spans
- Client : Indian Railways.
- Contractor : Hindustan Construction Company Limited



Panval Nadi Viaduct

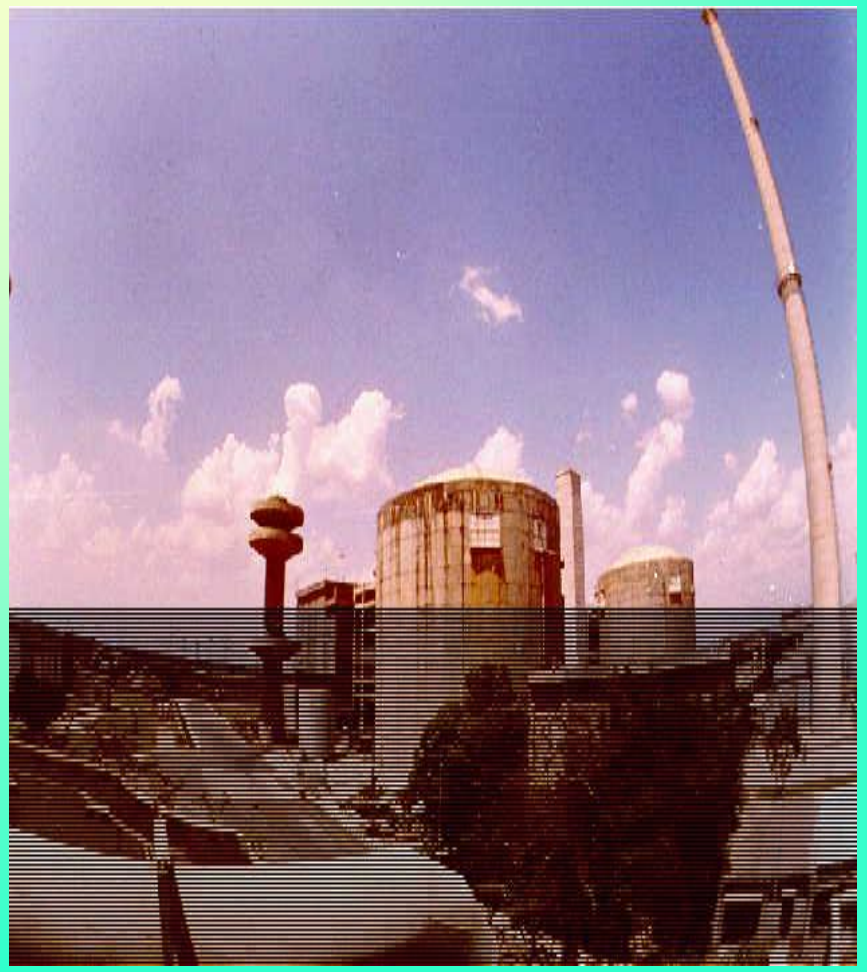
Asia's highest Viaduct

- This is a 424m long railway bridge for a single line of broad gauge track. The bridge superstructure is a single-cell continuous prestressed concrete box girder with nine intermediate 40m spans and two end spans of 30m each. The substructure consists of hollow octagonal reinforced concrete piers resting on open foundations. The tallest of the piers is about 64m above bed level. The abutments are spill through.
- In 1995, this bridge received the Most Outstanding Concrete Structure in India Award from the American Concrete Institute (Maharashtra India Chapter) and also an award from the Indian Institute of Bridge Engineers.
- An image of the bridge was also used on a commemorative postage stamp.
- Contractor : L&T (ECC) , Chennai



Containment Structures for Narora/Kakrapar Atomic Power Projects

- To protect the environment from radioactivity in case of Loss of Coolant Accident) the inner containment(IC) housing the nuclear reactor is designed to withstand high pressure and temperature resulting from LOCA without permitting leakage of air-steam mix.
- Inner leak-tight pressure boundary is a 40230mm diameter cylindrical prestressed concrete structure designed for 14.4t/m2 internal pressure.Outer RCC structure enclosing this creates small annular volume of the air maintained at negative pressure in which small leakages from IC is trapped.This double Containment philosophy guarantees net zero leakage to environment.
- Contractor : Hindustan Construction Company Limited
- Consulting Engineers : STUP Consultants Limited.
- Owner : Department of Atomic Energy



Farakka Barrage Project –West Bengal

Longest Barrage Constructed according to "The Guinness Book of Structures"

- Length : 2.245m
- **Special Features** : The Barrage is listed as the longest barrage in the Guinness Book of Structures : Bridge, Tunnels, Dams by John H Stephens.
- Contractor :
- Hindustan Construction Company Limited for 89 complete bays from the left bank of the river Ganga and part of the remaining 20 bays.

Pamban Bridge

Longest Bridge built across the open sea in India

- Location : Across the Palk Strait connecting mandapam on the main land with Rameshwaram island.
- **Specific feature** : These were to cater to the hostile environment of high temperature above 35 deg and spraying od salt laden water.SRC used for foundation binding wire and sheathing ducts , and use of specially transported potable water for mixing and curing.Design Provision according to BS : %400.Special precautions taken while precasting, prestressing and grouting, construction joints were reduced to a minimum, special spherical bearings of specific materials imported.
- Owners : Ministry of Surface transport.
- Designed by : Highways Deptt, Govt of Tamilnadu and Gammon India limited.
- Contractors : Gammon India Limited .

New Council Hall Mumbai

Many Innovative features , some of which not parallel not even in Asia

- Salient Features : The whole complex consists of 4 different structural cum architectural components – abasement 7.3m deep with a diaphragm wall, central circular building housing the 3 halls, 50m high , podium, 10m high surrounding the circular blocks and a tower block 79m high
- Special lighting, reinforced sound system and acoustical treatment to the 3 main halls are some of the other special features.
- Total Cost : Rs 100 million.
- Design : Government of Maharashtra (Architect office).
- Other designs : PWD , Govt of Maharashtra.
- Civil Contractors : Rodio Foundation, Hazarat & Company, Engineering Construction Corporation Limited for the foundation & Superstructure.

Stock Exchange Building Mumbai

The 130m Tall twin towers for the Bombay Stock Exchange with its distinctive shaped inverted cone for the trading floors.

- The internal appearance of the building resembles a truncated cone.The entire construction done using systematic DOKA formwork.The butterfly wing shaped tower block has a 90m high centred core built by the slipform method in 35 days of uninteruppted work.The circular trading hall has a capacity for 3500 brokers.The central hall is acoustically designed to absorb the dim generated during trading.
- Owners : Bombay Stock Exchange
- Architect : Chandrakant Patil.
- Consulting Engineers : Hadkar Prabhu & Associates.
- Strcutural Contractors : L & T (ECC).
- Main Contractor : Billimoria Contracting Co

Nehru Centre Mumbai

An Eye Catching Landmark of the city

- Main Features : A first apart of the building which houses the mechanical area, workshop, cafeteria, auditorium and underground water tank is about 81m 61m with a large garden & sloping terrace. A second part measures 76m x 61m mainly houses the exhibition halls, 9290m2 in area at different levels.The entire structure rest s on pile foundation 1000kn to 5000kn capacity.
- Owners : Nehru Center
- Architects : I.M.Kadri
- Contractors : Billimoria Contracting Co.
- Structural Engineers : Dr V.S.Kelkar & Associates.

Mumbai Pune Expressway

India's First Slip form concrete , Access Controlled Expressway