

Prestige Trade Tower

Cover Feature

an elegant and functionally efficient tower



Prestige Trade Towers is located at Palace Road, near the famous Sophia Girls High School and the prestigious Bangalore Golf Course. The project comprises of a 4-storey retail podium of approximately 123,000 sq ft with an Office Tower rising 20-storey above. The ideal location is well connected to 5 star hotels such as Le Meridian, ITC's Windsor Manor and Taj West End. The project occupies a unique location within the city's urban fabric, a prominent business address that draws upon a verdant green context. The tower provides for approximately 360,000 sq ft of office space, with floor plates ranging 11,000-20,000 sq ft approximately. The upper levels offer expansive views of the city and of the golf course located to the North West. The Prestige Group has all clearance from various Government authorities and there were no restrictions imposed.

The architectural intent is to establish a vocabulary in line with the project requirements, site context and climatic influences. The intention is to evolve a functionally efficient tower, which in its architectural expression is understated, yet elegant. An elegant domed skylight topped rotunda addresses the main street on the East. Direct access to the upper retail and fine dining levels from grade is afforded by a series of cascading, classically styled stairways.

The iconic tower structure maintains crisp classical proportions progressing vertically as a series of stepped volumes, capped by a distinctive back lit celebratory top, a luminous beacon on the city's skyline. To meet the functional requirements of the design brief, a variation of a rectangular shaped plan is proposed with a central circulation and services core. This arrangement ensures that even though the floor plates are very large, the buildings can be articulated to not appear very massive. The geometry ensures that large areas within the building benefit from natural light and illumination. It has the first three floors dedicated to retail therapy; the fourth floor has a wide variety of world cuisines to select from and also, above the terrace floor is the state of the art Helipad facility, which has now become quintessential for the globe trotting businessman.

FABRICATION NEWNESS

Anshul Singhal, *Director, JSW Severfield Structures Ltd*



Situated off Palace Road, in the commercial hub of Bangalore city, this commercial building comprises 2 basements+ground+24 levels along with a Helipad. We are involved in the connection design, fabrication and erection of 2800 MT of structural steelwork, in addition to the supply and fixing of metal decking. As the crane lifting capacity at some location is less than 10T, whereas lifting beam self weight is more than 10T, we designed these beams in 460 grade of steel to get self weight of beam less than 10T.



A composite structural steel system has been adopted to offer combined benefits that optimize construction time and employ slender elements in the tower design, that efficiently utilize the large 11mtr spans. Prestige Trade Tower aims at being one of the commercial landmarks of the Silicon Valley of India, Bangalore. The goal is to surpass all commercial spaces done before, and put Bangalore on the world map with a world class Business Centre. This tower aims at being a beacon in the commercial space offered within the city of Bangalore.

Prestige Trade Tower is located enroute to the International Airport from the CBD. As such it makes an attractive proposition for large MNCs and IT companies with frequently traveling executives. Given the mixed nature of the neighborhood which has a fair sprinkling of residential complexes, the development also is designed to suit retail businesses on the first four floors. Prestige Trade Towers aims to be 'Best in Class' of the commercial and retail developments of the city.

Safety, Security, Sustainability, Innovation
CCTV arrangements have been made at all entrance and exit points of the property as well as all towers. Solar water heaters are provided to take advantage of solar energy for hot water supply into toilets. Solar lighting is also provided along the external driveways. A Sewage Treatment Plant is provided and water from the plant is used for gardening and flushing purposes. Recharge pits are provided all over the property for rain water harvesting.

Energy Efficiency and Eco-friendly Measures

- Lights
- Climate Control
- Water
- Recycling
- Conservation

The following measures were adopted to conserve the nature of environment:

- To conserve fresh water and to reduce the

water demand, Sewage Treated Plant (STP) has been established and STP treated water is reused for secondary purposes like flushing and gardening

- Energy is conserved through non conventional energy usage like solar water heater, solar lighting for landscape, walkway and common area
- Roof top rainwater is harvested is reused for secondary purposes for car wash, common area floor wash and for gardening. Storm water runoff is routed to recharge pits to recharge the ground water table
- Good cross ventilation is ensured in the building design to reduce the need for power consumption
- Extensive plantation has been done to enhance and to improve the aesthetic surroundings and to manage ambient temperature naturally. Care has been taken to choose and plant native species, which can survive without extra watering
- In-house management has been adopted for biodegradable solid waste
- Energy efficient devices like LED, CFL, VFT and VAV are used
- Storm water management executed before and after construction
- Water Conservation executed by adopting recycle and reuse technology
- Resource conservations executed by adopting recovery, recycle and reuse technology
- Good cross ventilation is ensured in the building design
- Provision of cantilever balconies and sunshades
- Provision of thermal insulation for the terrace area
- Medium size windows for better natural light and ventilation
- Maximum setback and huge buffer of green space is ensured to provide extensive green areas post completion
- Sprinkling of recycling water on dust generating materials

- DG stack height as per CPCB norms
- Solid waste management within the site

Marketing

Prestige generally follows a build to suit strategy rather than a build-first-sell-later policy for commercial developments. Prestige Trade Towers is situated on Palace Road and is well accessible from all parts of the city. It has been built to suit the needs of large corporate offices that are looking for ergonomically designed spaces with well organized and ample parking facilities. As such, most of the space has already been taken by leading corporate organizations even before completion through word of mouth and below the line marketing methods.

Structural Design

M/s. Mahimtura Consultants Pvt Ltd (MCPL) is appointed as a Principal Structural Design Consultant entrusted upon with the structural consultancy for the entire Prestige Trade Tower. As a Principal Consultant on board, MCPL's scope of work includes carrying out structural analysis, concept and final design, preparation of tender document, issue of construction drawings and site supervision as and when required.

Composite Structure

The tower main frame structure was designed as a composite structure, using high grade structural steel sections and floor slab in form of self supporting decking sheet. The structural steel concept adopted was shallow deck floor system. The structural members shall be procured, tested, cut and fabricated at JSW's fully equipped and most modern workshop located at Bellary. Subsequently, the fabricated steel sections shall be transported to project site for its immediate erection at designated location/floor level.

Beams with Cut-outs to Run Services Through

Beam depths are restricted to a max of 800 mm so

Client Prestige Group	Architect RSP Architects	Structural Engineer Mahimtura Consultants Pvt Ltd	Structural Steel Works JSW Severfield Structures Ltd	Main Civil Contractor NCCCL	Steel Tonnage 2,800 MT
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ENGINEERING DELIGHT

Hiten Mahimtura, *Director*, Mahimtura Consultants Pvt Ltd

“ Steel structure is the answer to today’s construction industry to achieve speed of construction, slender and sleek structural elements, optimum utilization of the space with more flexibility, less labour requirement, a real task being faced by all, good quality standards, and thereby, achieving excellent quality. Nowadays low carbon steel with micro alloys are available which is more environment friendly. With all the above mentioned points, there is a direct and indirect saving in the cost of construction. ”

that the end user gets maximum possible headroom and at the same time services are passed through the multiple cutouts in the beam web portion.

Fire Protection & Steel Encasement

The entire exposed structural steel work with in the building area is proposed to have a 2-hour fire protected using Spray Vermiculite treatment. The columns and exposed steel in the outer area is encased with concrete.

Challenges/Complexities

Project Location

The project is situated in the business district area of Bengaluru city, in the vicinity of Golf Course. The plot coverage is approx 2.5 acres. It is a bit congested plot with tall, massive, old trees standing midway. Further, the plot is surrounded by either habitats or busy road at the entry point.

Soil Condition, Strata, Basement Raft

The soil nature was not so good in respect to the SBC. It encountered sandy soil throughout the bore depth. Another important point was existence of high water table at 2 meter level. Therefore, to counter low SBC, a raft was proposed under the building footprint.

Basement Extent, Depth & Excavation

The project has a double basement with total excavation depth extending upto 13.00 meter level. Double basement extent covers the entire plot leaving some 3 to 5 meter space from the plot boundary. Therefore, retaining the soil, so as to continue with obstruction free construction, was another major concern.

Well Point De-watering System

It was made mandatory in the tender that the contractor shall design, install, operate and maintain the well point dewatering system to lower the water table at least 500 mm below the excavation level so as to get a clear working construction area.

Shoring System

In view of a double basement, retaining the sandy

soil so as to continue with obstruction free construction was another major concern. This was resolved by resorting to designing of a shoring system with piles of 700 mm, 900 mm and 1200 mm dia and length of pile was 17 m, all along the periphery, restrained in position by another line of protection in form of columns functioning as braced bollards. The shoring system is designed in view of non existence rock till the founding depth.

Waterproofing Excavation

Waterproofing of the substructure and making it watertight is being achieved by providing a membrane enveloping the basement and thus, achieving a tanking effect. Besides, the concrete elements in contact with soil are also provided with waterproofing properties by adding an admixture to concrete as an integral waterproofing.

Actual Construction Activity & Phase Wise Construction

Methodology and sequencing for carrying out actual construction of a building with total 26 levels in a sort of congested space was another challenge which was envisaged at the planning stage only. The construction shall be planned in a phased manner, taking the RCC core in the tower first (advancing at least by 5-6 floors compared to other steel floors) followed by rest of the tower area in structural steel. Outside the tower portion also, areas shall be taken up in a phased manner, in a sequential order.

Building Profile & Floating Columns

The building profile is recessed on certain floors making it necessary to provide of floating columns posing complexities in the structural design.

Fabricating Challenge

As the crane lifting capacity at some location is less than 10T, whereas lifting beam self weight is more than 10T, the fabricators, JSSL, designed these beams in 460 grade of steel to get self weight of beam less than 10T.

Scrupulous Planning for Handling



Fabricated Steel Members

Proper planning is being done in regards to the number of cranes to be deployed, it’s probable location and capacity, extent of area coverage by each crane. Besides, the weight of each steel element (column and beams) and its sequencing is also being studied to plan the erection activity.

Structural Fabrication, Testing & Connection

In view of inadequate material handling space at site, the structural steel procurement, its fabrication and testing was done in contractor’s workshop in the outskirts. The prefabricated members shall then be transported to site, lifted and finally erected. The steel connections are kept simple, using bolts.

It is imperative to note that all these constraints and challenges have been taken into account before choosing and finalization of the structural system at Prestige Trade Tower keeping in mind the time deadline, work speed and the cost of construction as well.

Details of Substructure & Superstructure

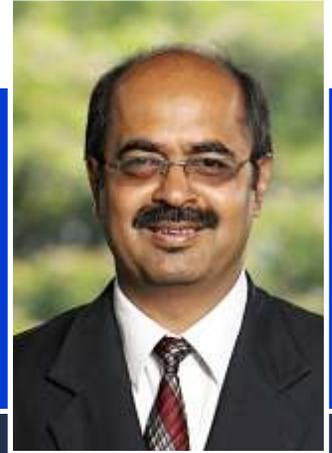
- Total construction area: Approx 7,00,000 sq

CLIENT'S WONDER

Anand Basal, AVP (Projects), Prestige Estate Projects Ltd

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- ft. 2,50,000 sq ft in the substructure and superstructure area is 4,50,000 sq ft.
- Substructure: Two basements with basement height of 7.0 m and 5.0 m respectively. The substructure extent beyond the building footprint is proposed in conventional RCC.
- Superstructure: Three retail levels with 5.5 m height and 20 typical floors with 4.2 m height. Part of superstructure outside building footprint, in the retail zone, is also in conventional RCC.
- Design Proof Check: The structural design was vetted and approved by an external Proof Consultant.
- Total steel quantity: The estimated structural steel quantity is 2,800 MT.

Salient Structural Points

Some of the salient structural points in Prestige Trade Tower are:

Structural System Adopted

Single system with core resisting lateral forces, thus, avoiding bracings on the external face thereby providing a clean look to the building exterior.

Speed of Construction

To enhance speed of construction resort to simple connection details with a bolted connection.

Composite Columns

Design with composite columns is adopted to economize the design, acts as fire protection and saves the cost of expensive cladding.

Composite Decking

The composite decking system is used in order to save on rebar steel quantity.

Self Supporting Slab

The self supporting decking system is provided to reduce construction time; this helped in the design of slab and shuttering & dershuttering process is completely eliminated.

Fabricators

JSW Severfield Structures is involved in the



Tower Facts

- Height of the building: 115 meters
- Aspect ratio: 2.4
- Typical column grid: 11 m x 11 m
- General loading: Live Load - 400 kg/sqm
- Seismic (Earthquake) Zone: 2
- Soil bearing capacity (SBC): 60 T/sqm
- Concrete grades: M 30, M 40, M 50 and M 60
- Structural Steel Grade: 355 Mpa (Built up section out of plates)
- Self Supporting Decking Comflor 60 (From Corus)
- Site Area: 2.5 acres
- built up Area: 4,20,000 sft
- Expected year of completion: 2014.

connection design, fabrication and erection of 2800 MT of structural steelwork, in addition to the supply and fixing of metal decking along with shear studs and edge protection for 395,000 sq ft of floor area.

Structural Elements

Typical primary beams are of size 250 mm wide and 675 mm deep having two big openings of size 400mm x 750mm and two small cutouts of size 150mm x 150mm for passage of services of length 11m whereas; the secondary beams are

160 mm wide and 600 mm deep with two openings of size 400mm x 750mm of length 11m and of grade S355. All the beams have been designed as composite with deck slab of 140 mm thickness (TR60 thickness of sheeting 1mm). The various steel grades used for this project are E350 and E460.

Structural Aspects

2 Basements + Ground + 3 Retail levels and 20 upper levels