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**STEEL
CONSTRUCTION
SUMMIT**

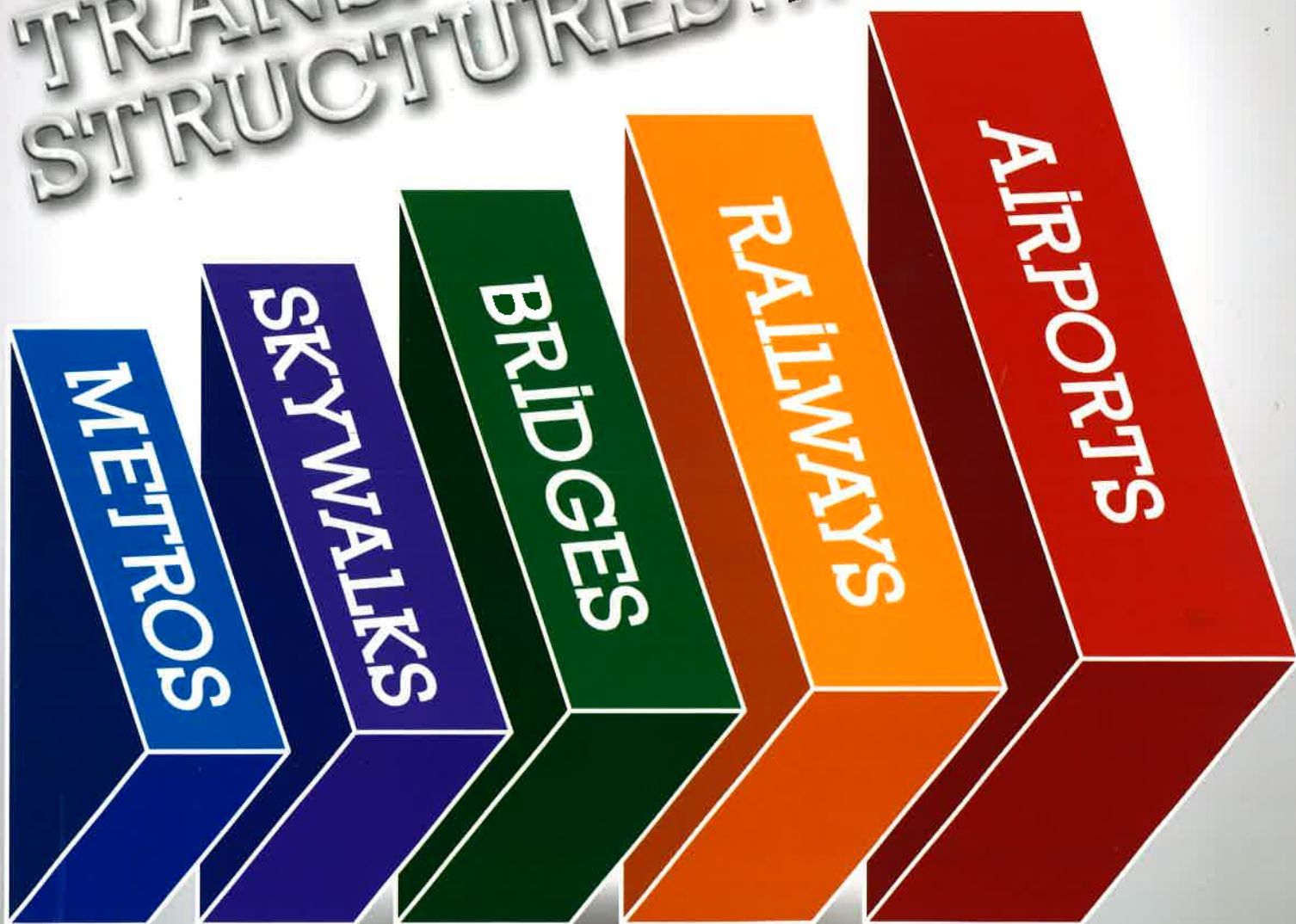


**STEEL DAY
MUMBAI**

**STEEL
STRUCTURES
& METAL
BUILDINGS**

nerve of steel construction

**SPURRING UP
TRANSPORT
STRUCTURES...**



WITH STEEL



KEY
FACTS

Client

PWD Nashik
(on behalf of Govt of Maharashtra
and Hindustan Aeronautics Limited)

Design & MEPF Services
Stantec Consulting Pvt. Ltd.

Local Architect
P G Patki Architects

Project Management Consultant
C M Belekar Architects & Planners

Structural Consultant
Damle & Thakurdesai

Contractor
Harsh Construction Pvt. Ltd.

Project Area
22 acres

Built-up Area
8267 sqm

Max Height
14m

Steel Tonnage
250 MT (Roof Framing)

NEW PASSENGER TERMINAL BUILDING

NASHIK

The new Passenger Terminal Building at Ozar Airfield is an initiative by the Government of Maharashtra and Hindustan Aeronautics Limited (HAL) to provide civil aviation facility to the city of Nashik. This modestly sized terminal will provide complete Departure and Arrival services for commercial airlines while using the existing airstrip originally built for and used by the Indian Air Force.

Capturing the Inspiration

Man has always endeavoured to fly and the birds have been the key inspiration to famous scholars such as Archytas and Leonardo Di Vinci. Drawing upon the visual of a bird's wings in flight, the modular façade of Nashik Airport Terminal Building seeks to capture the same stance and spirit of momentum.

Design of the terminal building was an amalgamation of two contradictory influences – the historic & religious heritage



of Nashik City and the context of HAL's fighter aircraft facility being used for civil aviation. The underlying philosophy has been to create an 'iconic gateway to the city' and the age-old precedent of an arched entrance gate to a community. The 'arch', apart from being a historic element, is also one of the most efficient long-spanning structures.

Simplified Design to Execute

A bunch of steel arches spring out from one point in 8 directions creating conical columns at 32m spans. A series of these arches create the skeleton for a doubly curved roof with the low points at each of the columns and the high points at the tip of the arches. The modular and repetitive circular geometry simplifies the fabrication process and controls construction cost. This dramatic steel structure thus efficiently provides long un-interrupted spans and has an inherent monumentality. However, in contrast to this monumental grandeur, use of modernistic materials like steel and glass was proposed to introduce an industrial and futuristic character at the same time.

Creating Sense of Transparency

The exterior envelope is expressed as a minimal glass curtain wall which thermally encloses the interior spaces, however, is transparent enough to not interfere with the predominant structure and roof. The internal cabins and offices are expressed as independent structures underneath the roof and most of the passenger areas are accommodated in open concourses divided with glass partitions only.



Passenger facilities planned within the terminal comprise of departure concourse with check-in desks, baggage handling, security check area, departure holding area, VIP and frequent flyer lounges, arrival concourse with baggage reclaim belts along with other amenities such as retail and restrooms. The primarily single storied building has a roof area admeasuring 8267 sqm, out of which 5472 sqm is enclosed on the ground floor with an additional 970 sqm on a mezzanine level, and the rest is available as canopies on all 4 sides. Designed for a peak-hour-passenger count of 300 pax, the space planning complies with IATA congestion standard 'D'.

Value-Engineering The Building System

The Nashik Airport project started off with ambitious goals to create a state-of-the-art passenger terminal, although with tight budgets and schedule. Given the constraints, a holistic design is created while aggressively value-engineering the building systems and specifications without compromising on the passenger experience. With national security constraints at the HAL premises, the siting of the building was pre-determined and the Apron was only accessible via transporter buses and no aerobridges could be planned.

The philosophy has been to resemble the age-old arched gateways marking a city's entrance, however, with modern iconicity that transcends into the future. The building was completed at a cost of INR 84 crore including civil works, building services, basic interiors and site development within a time-period of 18 months. Stantec's multi-disciplinary office with all design disciplines such as architecture, interior design, landscape architecture and building engineering under one roof, played an important role in achieving the same.

Sustainable design has also been an important goal and some of the most effective solutions such as optimum U-value building envelope, VRF air-conditioning, and building management systems have been incorporated. Clerestory windows bring natural daylight into the centre of the departure concourse minimising the energy demand for lighting.

Wise Use of Steel

The tubular steel used for the roof weighs only about 250 metric tonnes since the use of steel has been limited to purlins and

trusses. The primary load carrying members (columns and beams) are in reinforced concrete, thus, saving the cost of fire-proofing structural steel. The landside canopy cantilevers out by 8m with the help of a 112m long triangular truss in the transverse direction supported at every 16m.

The roof has insulation sandwiched between the standing seam aluminium top sheet and trapezoidal bottom sheet (galvalume coated steel) which is perforated for good acoustics inside the large concourse space. The façade consists of high performance DGU glazing, zinc and granite dry-cladding. Use of natural and recyclable materials such as glass, granite, and metal roofing and ceiling systems has also been maximised. The parabolic landside and airside canopy features, till date, one of India's longest standing seam aluminium roof panels (122m) without any joints.

The existing runway was upgraded to 3500m length and is now able to handle large aircrafts. With additional parking, improved fire-fighting equipment and medical facilities, HAL has already started air cargo operations. The terminal building was completed and inaugurated on 3rd March 2014.

Features within the Building

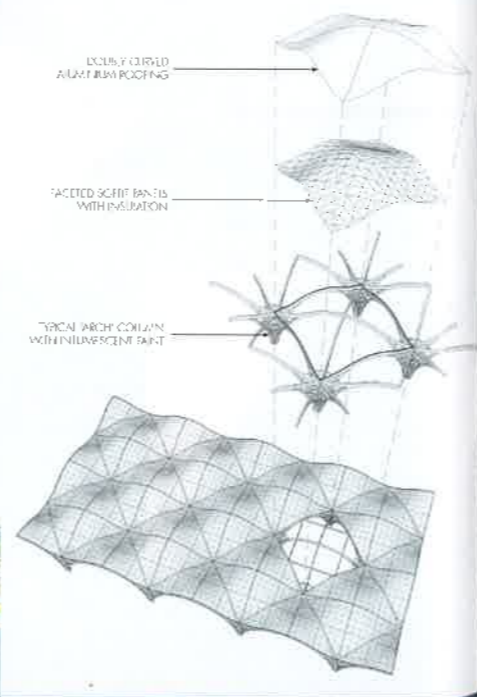
Airport terminal building is ground floor structure with part mezzanine. The building is having all the sophisticated equipment and facilities like HVAC, electricals, fire protections system, CCTV surveillance, public address system another automotive machineries and equipments including sewage treatment plant. The overall length and breadth of airport terminal building including extended roof structure and pavement is 128.40 m x 64.40 m = 8268.96 sq. m. + overhang area 2860.92 sq. m.

In addition to airport terminal building, separate services building of ground floor structure (34.70 m x 10.60 m) to accommodate various electrical equipments, sewage treatment plant, underground sump, HVAC plant & basement of area 334.92 sq. m is provided. The wall structure is in external glazing of height 11 m, glass partition 3.6 m and 230mm & 110mm thick brick work. The airport building is provided with latest technology baggage handling system to meet international standards.



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JAYESH HARIYANI, Senior Principal, INI Design Studio (formerly Stantec Consulting Pvt. Ltd.)



Building Highlights:

- Airport terminal building for peak hour density for 300 passengers (150 arrival & 150 departure)
- Building size is 64.40 m x 128.40 m
- Roof is designed with special aesthetics to have international elevation standards
- Two lane drive way to airport terminal building with suitable landscape
- Proper parking facility opposite to airport terminal building and plaza

