



2023

NATIONAL AWARD COMPETITION FOR STUDENTS

For the best Innovative use of Steel in Architecture

Architectural Designing of a
R&D CENTRE AT VISAKHAPATNAM STEEL PLANT



SITE PLAN



Latitude: 17°38'35.57"N

Longitude: 83°10'8.40"E

DESIGN THEME

ARCHITECTURAL DESIGNING OF A R&D CENTRE AT VISAKHAPATNAM STEEL PLANT.

Research and Development centre undertakes R&D projects in diverse realms of Iron & Steel Technology under the categories of Plant Performance Improvement (PPI), Product Development (PD), Scientific Investigation and Development (SID), Basic Research (BR) and Technical Services (TS).

It provides customers with prompt, innovative and cost-effective R&D solutions; develop and commercialize improved processes and products; continually enhance the capability of its human resources to emerge as a centre of excellence. The major efforts are directed towards cost reduction, quality improvement and value-addition to products of plants and providing application engineering support to products at customers' end. It also takes initiatives to develop special steel products utilizing the modernized production facilities at steel plants.

- The plain land on which the R&D centre is located on Visakhapatnam Steel Plant nearby main road. Proposed site dimension for R&D building is 140m X 140m. The site plan with schematic drawing is attached.
- The R&D building shall be aesthetically pleasing and planned to construct with latest technology and green materials.
- The building shall be steel intensive green building with platinum rating.
- Local climatic conditions shall be considered in order to provide structure with thermal comfort and energy efficiency and economy.
- A centralized computer system is to be provided.
- Use of solar energy in the R&D building shall be explored for lighting of important places to save electrical energy.
- Proper location of Electrical Transformer, HVAC, Pump House, Sump, Septic Tank etc. shall be decided so that these will not create safety hazards to other facilities.
- Proper drainage arrangements in the open spaces of the R&D building shall also be made so that water do not stagnate. The underground drain connecting the main drains outside the plant shall be provided.
- For safety precautions all openings, electrical panels, proper enclosures shall be provided.
- Students can design as per schematic sketch or can provide their own arrangement without changing the outer dimensions and requirements of given projects.

DESIGN REQUIREMENT

Human Resources

- Manpower – Engineers/ Scientists – 150
-Technical Staff - 100

Laboratories (12-15 persons each)

- Microscopy Lab –
- Ceramic lab
- Process lab
- Material characterization lab
- Energy and environment lab
- Phase Transformation lab
- Computational lab
- Modelling and simulation lab
- Corrosion lab
- Advanced Process lab
- Advanced Materials Characterization lab

Pilot facilities (Catering total 50 staff members)

- Coke making
- Agglomeration & Iron Making
- Steel Making
- Raw material characterization & beneficiation
- Metal Forming
- Foundry, Welding etc

Technology Services (8-10 persons each)

- Planning and procurement cell
- Knowledge management cell
- Technology management cell
- IPR activities cell
- Administrative cell and F&A cell

Other facilities

- Library
- Conference Hall / Seminars Halls – Large 2 nos. 250 persons capacity each (Oval/Circular)
- Conference Hall small/ Meeting Room – Small 3 nos. 50 persons capacity each (Oval/Circular)
- Auditorium (two levels) Capacity – 1000 persons (600 lower level and 400 upper level) with stage, screen, two adjoining AC green rooms and adjoining foyer for arranging refreshments / food.
- CCTV Surveillance for entire building inside as well as outside

- Biometric system Plus smart card system for entry and exit of the employees / guests
- Provision of Utilities like air, water, nitrogen, hydrogen etc
- Compressor House
- Provision for Cafeteria
- Centralise AC system
- Water treatment plant
- Transformer
- Security

Finishing Jobs

- Storm water drainage (Boilers)
- Common utilities with BMD
- Sewerage recycling with zero discharge or with partial treatments
- Rainwater harvesting (direct holding and aquifer recharge)
- Electrical (smart with sensor)
- Fire Protection systems
- Use of solar energy, wind energy, geothermal systems and radiant cooling
- Compound walls
- Earthwork and Landscaping

The following mandatory features may be considered to achieve a LEED rating of PLATINUM Category from Indian Green Building Council (IGBC):

- Innovation and Design
- Location and Linkages
- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Air Quality
- Awareness and Education

JUDGEMENT CRITERIA:

The submission would be graded according to the following criteria: -

1. The physical manifestation of the brief into the design – its form and functionality.
2. The innovative and judicious usage of Steel in the design.
3. The presentation of the said design – via. Drawings sheets (for both Zonal and Final Round, if selected) and physical model and 3D sketch-up model in software, walkthrough and PowerPoint presentation (for Final Round only, if selected).

GUIDELINES

- a. ***The proposed R&D Centre will be of international standards in its features, quality, aesthetics and visual impact.***
The Architects are free to evolve the Steel Structures having any suitable shape satisfying the basic requirements furnished in the Brochure.
- b. ***Larger column free areas inside the Structures are desirable.***

The following suggestion may be considered:

- a. One objective of the competition is to explain the basic concept of the design in an easy-to-understand way. Conceptual drawing may be used where necessary.
- b. The proposed drawings of structures should be easy-to-understand visually (e.g. Features, quality, aesthetics and visual impact by colouring where necessary)
- c. Students are free to evolve innovative ideas for the various aspects of the project but satisfying the basic requirements furnished in the Brochure

1.0 The following may be noted while working out the schemes:

- Innovative use of steel to the maximum extent in structural framing.
- Use of steel elements in roofing, cladding, fascia, stairs, main entrance gates and other areas as far as possible along with other construction materials.
- Use of Steel-Concrete Composite Structures may be proposed because it may be desirable to include RCC elements in some locations such as slabs etc.

2.0 Emphasis should be laid on design process and conception of innovative steel structures of various forms tempered with the practicality of putting the concept into reality along with Structural Stability.

3.0 Fire Safety/Lightning Protection norms are imperative. Encasement with concrete may not be adopted.

4.0 Detailed structural design and cost estimation / plumbing & sanitary design and auxiliary services design are outside the scope of the competition.

CODES AND REFERENCES

1. Use of Internet and recent publications for obtaining information on similar Structures worldwide is suggested. However, direct copying is prohibited. (Also refer rules under submission criteria in the announcement section)

The following codes and may be used for reference purpose:

- IS:800, IS:801, IS:806, IS:875, IS:1161, IS:1893, IS:4923, IS:9595, IS:11384 – the latest versions of these codes are to be referred.
- National Building Code-2016
- Participants are free to refer suitable Indian/ Foreign codes as applicable.

All submitted Entries will receive Participation Certificates.

STEEL ELEMENTS

All available Steel Elements may be used for the above purpose. These include:

- Steel Rolled Sections:
Standard Beam Sections / Wide / Narrow Parallel flange Beam Sections, Channel Sections / Angle Sections etc.
- Steel Fabricated / Built-up Sections / Castellated sections
- Rectangular Hollow Sections / Square Hollow Sections / Circular Hollow Sections
- Plates and Flats, Rounds and Squares
- Wire Ropes
- Cold Formed Steel
- Corrugated /Plain/ Embossed Profiled Sheet
- Colour Coated/ Plastic Coated/Galvanized Sheet
- Stainless Steel Sheet and Sections
- High Tensile Steel, Weather Resistant Steel etc