

# NATIONAL AWARD COMPETITION FOR STUDENTS 2023



Civil / Structural Engineering Students  
For Best Innovative Structural Steel Design

*Competition Theme:*

*Steel Intensive Trade Fair Centre*



Institute for Steel Development & Growth

## Announcement for NACS (C) 2023

# NATIONAL AWARD SCHEME FOR CIVIL/STRUCTURAL ENGINEERING STUDENTS FOR BEST INNOVATIVE STRUCTURAL STEEL DESIGN

THEME: **STEEL INTENSIVE TRADE FAIR CENTRE**

### THE INSTITUTE

The Institute for Steel Development and Growth (INSDAG) is a not for profit, member-based organization, promoted and established at Kolkata by the Ministry of Steel, Government of India and the main steel producers of the country. Some of the major roles of the Institute are: awareness about benefits of steel and steel usage; preparing guidebooks, handbooks to facilitate cost effective design and construction by professionals; upgrading competence and skills of professionals by organizing refresher courses / training; communicating the benefits of steel vis-à-vis other competitive materials through life cycle cost studies etc.; regular interaction with Bureau of Indian Standards, Indian Road Congress and RDSO (Railways) for expediting revision in steel related codes for efficiency and cost effectiveness; providing requisite thrust to increased usage of steel and a host of other activities.

To work in unison  
with all the  
stakeholders  
in the Steel Industry  
so as to evolve  
ways & means for  
more efficient  
use of steel  
and provide  
optimum value to the  
customer

### THE COMPETITION

This National Level “Competition for Civil / Structural Engineering Students for Best Innovative Structural Steel Design” organized by INSDAG is entering into 23<sup>rd</sup> consecutive year. This Competition aims at enkindling the thoughts and skills of the students to come with efficient designs reiterating the multifarious advantages of steel intensive construction such as flexibility in design, economic and ecological benefits, speedy construction, cost effectiveness, life cycle cost benefit etc.

Owing to the keen interest generated among the students, INSDAG is pursuing the task of arranging an interesting and challenging competition every year for the students of Civil / Structural Engineering studying in the Colleges all over India with a view to recognize, appreciate and finally reward the talents of would-be Civil / Structural Engineers for “Excellence in Structural Steel Design”.

### THE BRIEF

The Brief on the subject of the Competition is available in this brochure along with the Announcement.

### THE PRIZE

1st Prize (1 no.)	:	Rs. 50,000/- + Certificate
2nd Prize (2 nos.)	:	Each Rs. 30,000/- + Certificate
3rd Prize (2 nos.)	:	Each Rs. 20,000/- + Certificate

Participation certificate will be provided to all the eligible participants.

### ELIGIBILITY

Full Time Undergraduate & PostGraduate Degree Courses.

- UG students (final year / pre-final year): Team of maximum 4 (four) students in the team
- PG students: 2 PG / 1(one) PG +maxm. 3(three) UG students

### THE SELECTION

Four Zonal Selection Committees (one each from the East, West, North and South Zones) consisting of renowned academics and professional engineers are entrusted the task of preliminary screening of the entries received in each zone. In this Initial Round, 16 (sixteen) best entries will be selected (preferably four from each zone) based on overall merit of the proposals, in accordance with the criteria formulated by the Committees.

Sixteen individuals/groups of the short-listed entries will be invited to Kolkata to display and present important aspects of their entry before the Central Selection Committee during the Final Round of Competition expected to be held around January – February 2023. The top five proposals will receive the Prizes.

### ENTRY / APPLICATION

The last date of receiving of Expression of Interest (EOI) is 15<sup>th</sup> October 2023 and final Entry for the Zonal Round of Competition is 15<sup>th</sup> November, 2023. The Expression of Interest (EOI) shall be sent to INSDAG, Kolkata and the entries shall be directly sent to the respective Zonal Coordinators at the addresses mentioned hereafter with intimation to INSDAG, Kolkata.

## The Zonal Coordinators

**NORTH ZONE** (J&K, Punjab, NCR, Haryana, UP, MP, Uttarakhand, HP)

**Dr. Pabitra Ranjan Maiti**, Associate Professor  
Civil Engineering Department  
Indian Institute of Technology, BHU  
Varanasi, UP - 221005  
Email : [pramaiti.civ@iitbhu.ac.in](mailto:pramaiti.civ@iitbhu.ac.in)

**SOUTH ZONE** (Kerala, TN, AP, Karnataka)

**Dr. M V Anil Kumar**, Associate Professor &HoD,  
Civil Engineering Department  
Indian Institute of Technology Palakkad  
Ahalia Integrated Campus, Kozhippara  
P. O Palakkad Kerala - 678557  
Email: [anil@iitpkd.ac.in](mailto:anil@iitpkd.ac.in)

**EAST ZONE** (WB, Bihar, Jharkhand, Odisha, Assam, Chhattisgarh, Tripura)

**Dr. Avik Samanta**, Assistant Professor  
Civil Engineering Department  
**Associate Centre in Charge**, Centre for  
Earthquake Engineering Research  
Indian Institute of Technology Patna  
Patna , Bihar - 801106  
Email: [asamanta@iitp.ac.in](mailto:asamanta@iitp.ac.in)

**WEST ZONE** (Rajasthan, Gujarat, Maharashtra, Goa)

**Dr. Tekcham Gishan Singh**, Assistant Professor  
Civil Engineering Department  
Indian Institute of Technology Jodhpur  
NH 62, Surpura Bypass Rd,  
Karwar, Rajasthan 342030  
Email: [tekcham@iitj.ac.in](mailto:tekcham@iitj.ac.in)

**Expression of Interests (EOI) and Intimation for Submission to INSDAG shall be made to the following address:**

**Email:** [ins.steel@gmail.com](mailto:ins.steel@gmail.com)

**Contact : Nibedita Dey (098305 66354)**

## SUBMISSION

The participants are advised to send their entries / applications containing the following:

1. General Arrangement and Design drawings showing Plan, Elevation and Sectional views highlighting the structural systems of the proposed structure. (Recommended scale for detail views should not be less than 1: 10). Submission both in PDF and AutoCAD.
2. Detail drawing(s) showing Structural Steel details: truss members, beams, column, bracings, claddings, etc. in accordance with 'Design Scope'. All drawings should be drawn in AutoCAD or similar software.

3. Drawing sizes should be **A3** only and should be presented in hard and soft copies (PDF).
4. Design calculations (A4 size paper) should be complete in all respects and neatly presented. Use of standard analysis software like STAAD, SAP etc. is desirable. **Design checks for the selected sections (atleast one from each type) shall be presented manually preferably in Excel spreadsheets.** Analysis of at least one frame/truss must be done in 2D in case of plane framed structure. Connection design, typical detail of important junction, splice detail and detail sketches must be submitted.
5. All computer input and output files are to be submitted in soft form only.
6. A brief write-up (Max. 2000 words, duly typed on A4 size paper) on the work (consisting of considerations / assumptions, description of the proposal, highlights / special features, etc.) duly authenticated by HOD / Principal shall be submitted.
7. Preparations of Perspective views, walkthroughs (videos) are not required and will not carry any marks.
8. A brief resume of the student(s) / applicant(s) containing name, address, phone / fax / e-mail, name of University / College, year of study and registration / roll number of the participant(s), and recent passport-size photographs (for each participant) should be submitted in soft copy only.
9. A certification from the Principal / HOD / Registrar of his / her Institute on office pad declaring bonafides under office seal / stamp should also be submitted.

## OTHER RULES

1. **To be eligible for participation in the Competition it is essential for each student to enroll himself / herself as a student member of INSDAG before submitting application/entry to the respective Zonal Coordinators.**
2. Originality of work is essential and the application will be disqualified, if found otherwise.
3. The decision of the Expert Committees will be final and binding. Canvassing in any form will lead to disqualification.
4. Outstation (Institutions situated outside greater Kolkata) candidates appearing for the Final Round of Competition at Kolkata will be reimbursed with to-and-fro Air Conditioned (AC) 3-Tier/Chair Car Rail Fare by the shortest route on production of proof of travel. Accommodation in Guest House / Hotel will be considered depending upon availability.
5. Family members and relatives of Expert / Selection Committee and INSDAG Employees are debarred from taking part in this Competition.
6. All the entries / proposals received by INSDAG at all stages of the above Competition will be treated as property of INSDAG and will not be returned to the participants. Moreover, INSDAG will not take any responsibility in case of missing of any documents / communications from any side while in transit.

# BRIEF OF NACS (C) 2023

## INTRODUCTION

Construction Industry in India is witnessing a phenomenal growth in all sectors of utility, be it the infrastructure, industrial, or commercial sector for the last few years. All these are evident from the visible growth that is taking place all around mostly in the urban environment. The urban society is witnessing this phenomenon through a wide spectrum of development mostly in the field of construction of urban amenities, like roads, bridges flyovers, commercial centers like shopping malls and multiplexes and last but not the least various state-of-the-art signature structures and buildings like world class Auditoriums, Art Galleries, Exhibition Halls etc. These places mainly act as the cultural nerve centers of the city.

## APPOINTMENT AS CONSULTANT

One of the reputed structural consultants in India has been short listed to design a Trade Fair Centre having an exhibition hall of 23,750 sq. ft. and 2 storied Banquet and Display area. INSDAG has been able to convince the client that steel intensive design will not only complete the project in a much lesser time because of faster construction but also it will be cost competitive and more aesthetic and will have longer life than any of the other alternative methods of construction.

In view of the challenge taken up by INSDAG to implement the aforesaid benefits of steel intensive construction to the client, INSDAG seeks your expertise in providing Analysis, Design, Detail Engineering and Estimation of a “**Steel-Intensive Trade Fair Centre**”

1. Development of an Economical and Aesthetic structural scheme within the specified requirement.
2. Structural design engineering and Detail drawings for the developed structural scheme.
3. Bill of materials.

## FACILITIES

The client has specified the following requirements for the proposed project:

1	Site Location	:	Kolkata
2	Building Dimension ( Length x Width )	:	70.55 m x 40 m
3	Building Height		As per design
4	Minimum span of roof structure along width of the building in Exhibition Hall area	:	40 m
5	Minimum spacing of column along length of the building	:	As per design
6	Minimum column spacing along 40 m width of the building in Banquet Hall area	:	10 m
7	Minimum spacing of column along length of the building in Banquet Hall area	:	As per design
8	Minimum Clear Height at Exhibition Hall area	:	10 m

9	Clear Height in Banquet area	:	4 m ( or as standard practice)
10	Height of plinth/Floor Level from existing GL	:	0.6 m
11	Material of Façade/ Roof	:	Colour Coated Steel Sheet/ As applicable
12	Floor in Banquet/ Conference Hall area	:	Steel- Concrete Composite
13	Roof Shape	:	Innovative
14	Minimum Clear Height at Entry/ Exit Gate	:	3 m
15	Provision of Roof Top Solar Panel	:	Consider Solar Panel Load
16	Minimum columns no with more open space is required	:	Showing advantage of Steel

### **MATERIALS FOR CONSTRUCTION**

1. Foundation system : R.C.C. of minimum grade M25
2. Structural members like columns, beams, members and bracing systems : Structural steel of mild steel (grade E250BR or higher grade as required and applicable)
4. Roof & Cladding : Standard Colour Coated Steel Sheet (Galvalume)

### **STANDARD SHAPE OF THE STRUCTURE**

While considering the shape and arrangement of the Structure, aesthetics, economy as well as structural integrity of the entire system has to be considered.

### **DESIGN LOADS**

#### **1. Dead Load:**

Dead load will be the weight of the structure itself along with all permanent weight carried by it.

#### **2. Live Load:**

- a. Live load on Roof - as per IS: 875 Part 2 latest version
- b. Live Load on Deck - as per IS: 875 Part 2 latest version
- c.

#### **3. Wind Load:**

- a. Basic wind speed to be considered for the specified location as per IS: 875 Part 3 latest version

#### **4. Seismic Load:**

- a. Seismic Zone for the mentioned location as per IS: 1893 latest version

## 5. Other Loads:

Temperature variation of 15°C has to be considered. Please consult relevant specification for other specific loads and action points.

## GUIDELINES

The following guidelines should be taken into consideration:

1. Items designed in accordance with design scope, should be checked for axial, bending, shear, bearing stresses etc. as applicable. Equivalent stresses and any other stresses necessitated by the relevant codes should also be calculated.
2. Deflection calculated should be within stipulations given in relevant IS code.
3. For designing of Base Plates and Anchor Bolts, grade of concrete to be considered as mentioned above.
4. For foundation design consider Safe Bearing Capacity as 200.0 kN/m<sup>2</sup> at 3.0m from GL. No tension in bearing pressure due to uplift for DL+WL condition is allowable.
5. While selecting the steel sections for use, please refer INSDAG website or any manufacturer's website for availability.

## DESIGN SCOPE

For designing the building, the following scope of work needs to be undertaken:

1. Layout Plan, Elevation and Sectional views should show the arrangement facilities provided.
  - d. Beams & Columns: Sections, such as MB/MC [refer IS 808, built-up sections or parallel flange sections ], Tubular Sections [refer IS 1161 and IS 4923 will be preferred.- latest versions to be used
  - e. Truss members: IS 808, IS 1161 and IS 4923 - latest versions to be used
2. Connections: All connections shall be either welded connection or bolted connection using mild steel or high tensile black bolts, turned bolts or HSFG bolts.
3. The design and detailing of the following items shall be done:
  - a. Analysis of the structure in 2D or 3D as applicable.
  - b. Foundation System
  - c. All Columns / Girders / Beams
  - d. All Truss members / Arch members, Posts, Purlins and Girts
  - e. All Bracings, Struts and cables / steel ropes.
  - f. Connection designs for Critical joints
  - g. Any other members conceived in the scheme.
4. Bill of Materials: A bill of materials (in A4 sheet) should be prepared for all items under design scope to determine the quantity of materials required.

## EXCLUSIONS

Structural bearings for supports and all allied services like electrical fittings.

## **DESIGN STANDARDS**

### **1. Design**

- Steel design - As per IS: 800 -2007 & NBC 2016 ( for latest revision)
- Concrete design - As per IS: 456 -2000
- Live load - As per IS: 875 Part 2 -1987
- Wind load - As per IS: 875 Part 3-2015
- Seismic load - As per IS: 1893 -2016

### **2. Material**

- Rolled sections and plates - As per IS: 2062 – 2011
- SHS/RHS - As per IS: 4923 – 2017
- CHS - As per IS: 1161 – 2014

### **3. Welding**

- Symbols for welding - As per IS: 813(Part 1) – 2018
- Weld joint details - As per IS: 9595 – 1996

### **4. Fasteners**

- High strength structural bolts - As per IS: 3757 – 1985 (Reaffirmed 2019) & IS: 4000 – 1992 (Reaffirmed 2017)
- Hexagon Head Bolt -As per IS: 1363 (Part 1)– 2019
- Foundation bolts - As per IS: 5624 – 1993

## Checklist for Submission

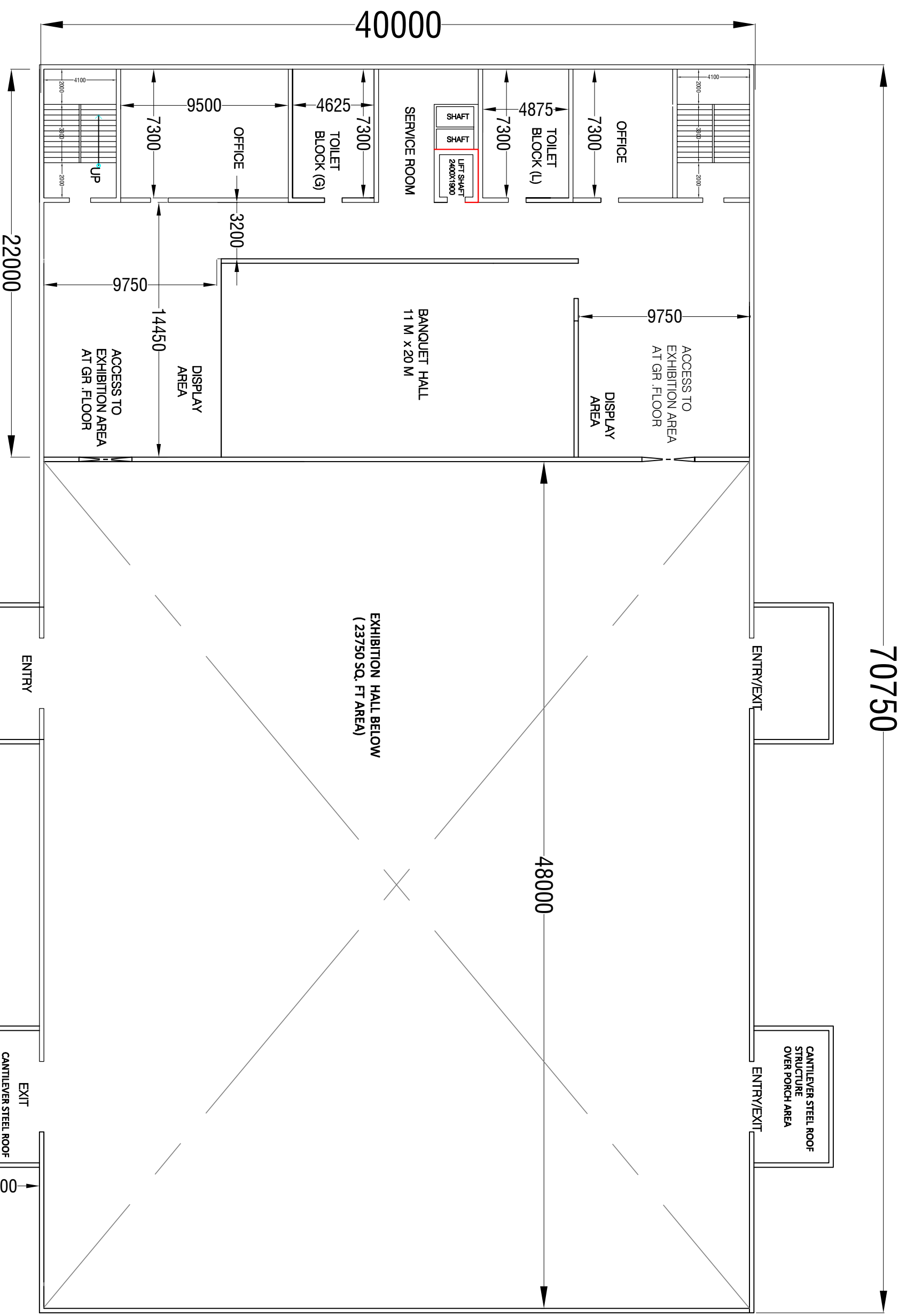
<b>Sl No</b>	<b>Description</b>
1	<b>Content page for report and all submissions</b>
2	<b>All pages and drawings are to be numbered</b>
3	<b>All soft copies are submitted on a CD (i.e., drawings, input and output files of analysis, excel spreadsheets for design checks etc.)</b>
4	<b>Hard copy report along with all required drawings.</b>
5	<b>Bonafide certificate in hard copy</b>
6	<b>Student details along with photos in soft copy.</b>

Visit us at [www.steel-insdag.org](http://www.steel-insdag.org)

The Announcement and the Brief of this year's Competition is also available at INSDAG website for free download



# Schematic Plan For Steel Intensive Trade Fair Centre



## GROUND & FIRST FLOOR PLAN



# EXPRESSION OF INTEREST FOR PARTICIPATION

(To be submitted by **October 15, 2023**)

## NATIONAL AWARD COMPETITION FOR STUDENTS OF CIVIL/STRUCTURAL ENGINEERING YEAR 2023

**For participation, please complete this form, detach and return to the address given below in a sealed envelope.**

Name of the college .....

Address .....

Name of guiding faculty/HOD .....

Signature of guiding faculty/HOD .....

Student's name (CAPITAL) Mr./Ms.....  
Year of study: III / IV / PG  
Tel. No. .... E-mail: .....

Student's name (CAPITAL) Mr./Ms.....  
Year of study: III / IV / PG  
Tel. No. .... E-mail: .....

Student's name (CAPITAL) Mr./Ms.....  
Year of study: III / IV / PG  
Tel. No. .... E-mail: .....

Student's name (CAPITAL) Mr./Ms.....  
Year of study: III / IV / PG  
Tel. No. .... E-mail: .....

I/We agree to participate in the Competition organized by INSDAG for the Year 2023 and request you to enroll my/our name(s) in your database for record purpose. Consolidated Payment for whole group is allowed.

### Payment Details: (Online)

NEFT / RTGS / IMPS	QR CODE	UPI
INSTITUTE FOR STEEL DEVELOPMENT & GROWTH, BANK: UCO, Kasba, Branch – Kolkata SB a/c No – 08370100004683, IFSC : UCBA0002081		8334815444@ucobank

Signature(s) 1. .... 2. ....  
3. .... 4. ....

Please send  
scan copy of the EOI form with payment receipt to:  
[ins.steel@gmail.com](mailto:ins.steel@gmail.com)

Institute for Steel Development & Growth (INSDAG)  
'ISPAT PRAGATI BHAWAN'  
793, Anandapur  
Kolkata – 700107  
Phone: 9830566354 / 8420262121

### IMPORTANT INFORMATION

**Avail student membership (onetime payment of Rs. 1000/-) of INSDAG and get the opportunity to participate in this National Level Competition along with benefits like attractive discount in fees of different upcoming training programs and publications & many more...**

## COMPETITION TOPIC:

# STEEL INTENSIVE TRADE FAIR CENTRE

## JUDGING CRITERIA

Sl. No.	Stage of Evaluation	Evaluation Committee	Marks Allotted	Selection
1	Stage I	Respective zonal committee	150	4 Best ranking entries qualify for Stage II
2.	Stage II	Other 3 zonal committees	450 (150 marks each zonal committee)	-
3.	Stage III (Presentation round)	Central selection committee, Kolkata	400	-
4.	<b>Final selection</b>	<b>- do-</b>	<b>Total marks 1000 (Sl. No. 1 to 3)</b>	<b>Prizes to best 5 entries</b>

## PRIZE WINNING COLLEGES IN THE PREVIOUS THREE YEARS

### Year 2022

1st	L. D. College of Engineering, Ahmedabad, Gujarat
2nd-A	L. D. College of Engineering, Ahmedabad, Gujarat
2nd-B	Indian Institute of Technology Roorkee, Uttarakhand
3rd-A	L. D. College of Engineering, Ahmedabad, Gujarat
3rd-B	Kalinga Institute of Industrial Technology, Bhubaneswar, Odisha

### Year 2021

1st	Indian Institute of Engineering Science and Technology, Shibpur, West Bengal
2nd-A	L. D. College of Engineering, Ahmedabad, Gujarat
2nd-B	L. D. College of Engineering, Ahmedabad, Gujarat
3rd-A	Coimbatore Institute of Technology, Coimbatore, Tamil Nadu
3rd-B	Meghnad Saha Institute of Technology, Kolkata, West Bengal

### Year 2019 - 2020

1st	Coimbatore Institute of Technology, Coimbatore, Tamil Nadu
2nd-A	Thapar Institute of Engineering Technology, Patiala, Punjab
2nd-B	Sri Krishna College of Engineering & Technology, Coimbatore, Tamil Nadu
3rd-A	Indian Institute of Engineering Science and Technology, Shibpur, West Bengal
3rd-B	Kalinga Institute of Industrial Technology, Bhubaneswar, Odisha

**Last Date for Receiving 'EOI' – October 15, 2023**

**Last Date for 'ENTRY' Submission – November 15, 2023**

***This is your turn. Go for it!!!***