

NATIONAL AWARD COMPETITION FOR STUDENTS 2017 - 2018



**Civil / Structural Engineering Students
For Best Innovative Structural Steel Design**

Competition Theme :
Steel Intensive Innovative Car Service Station



Institute for Steel Development & Growth

Announcement for NACS (C) 2017 2018

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

THEME: STEEL INTENSIVE INNOVATIVE CAR SERVICE STATION

THE INSTITUTE

The Institute for Steel Development and Growth (INSDAG) is a non-profit making 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 18th consecutive year. This Competition aims at enkindling the thoughts and skills of the students to come up 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.) : ₹ 35,000/- + Certificate
2nd Prize (2 nos.) : Each ₹ 25,000/- + Certificate
3rd Prize (2 nos.) : Each ₹ 15,000/- + Certificate

Participation certificate will be provided to all the eligible participants.

ELIGIBILITY

The “Competition” is open to all the **final year/pre-final year Civil/Structural Engineering Students** (individual participant/a group of maximum four students) from any AICTE approved University / Engineering College in India offering Full Time Undergraduate Degree Courses. Students studying **Full Time Post Graduate Course in Civil/Structural Engineering** can also participate as an individual participant or in a group with a maximum of three other **final year/pre-final year Undergraduate Civil/Structural Engineering 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 (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 November - December 2018. The top five proposals will receive the Prizes.

ENTRY / APPLICATION

The **last date of receiving of Expression of Interest (EOI) is 31st July 2018 and final Entry** for the Zonal Round of Competition is **20th September, 2018**. 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. Sudib Kumar Mishra, Assistant Professor
Department of Civil Engineering
Indian Institute of Technology, Kanpur
Kalyanpur, Kanpur, Uttar Pradesh - 208016
Email: smishra@iitk.ac.in

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

Dr. S Arul Mary, Associate Professor
Civil Engineering Department
Thiagarajar College of Engineering
Madurai - 625015, Tamilnadu
Email: avemarie60@gmail.com, samciv@tce.edu

EAST ZONE (WB, Bihar, Jharkhand, Odhissa, Assam, Chhattisgarh, Tripura, Meghalaya, Manipur, Arunachal Pradesh)

Dr. Subrata Chakraborty, Professor
Department of Civil Engineering
Indian Institute of Engineering Science & Technology
Shibpur; P.O. - Botanic Garden
Howrah - 711103, West Bengal
Email: schak@civil.iests.ac.in; schakbec@gmail.com

WEST ZONE (Rajasthan, Gujarat, Maharashtra, Goa)

Prof. A J Shah, Associate Professor
Applied Mechanics Department
Sardar Vallabhbhai National Institute of Technology
Ichchhanath, Surat - 395007
Email: ajs@amd.svnit.ac.in

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

Institute for Steel Development & Growth
'ISPAT PRAGATI BHAWAN'
793, Anandapur, Kolkata - 700107
Phone : 033-24434045 / 47; 033-2443 4409
Email: ins.steel@gmail.com; insdag@redifmail.com
Coordinator: Arijit Guha /Nibedita Dey (9830566354)

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).
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 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) 2017 - 2018

INTRODUCTION

Now-a days Car servicing stations are an integral part for car showroom for any car selling company. Generally the major component of the car service station consists of a car wash campus well as servicing workshop wherein hydraulically operated lifting platform is used. It will also consist a staff office, viewing gallery/ air-conditioned waiting chamber for the car owner or customers, some stores and security offices at gate.

APPOINTMENT AS CONSULTANT

INSDAG wishes to provide most economical and aesthetically pleasing schemes and all relevant design and detail drawings thereof, to a Car Dealer/ Car selling Company. Considering that you have been appointed as a structural consultant for this project and have been asked to furnish structural solution for “**Steel Intensive Innovative Car Service Station**”, the task is to prepare a report that should have the following scope:

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

Client/ Architect has specified the following requirements for the proposed project:

1. Site Location : Surat, Gujrat
2. Area of Service Station : 50 m × 70 m
3. Column/ Bay Spacing : 6 m (minimum)
4. Minimum clearance, FFL to bottom Chord of Truss if any : 6 m
5. Maximum depth of Truss (if any) : 4 m
6. Gable end of Roofing area truss : open
7. Width of ramp if any : 4 m
8. Roof Structure : To be covered with Colour Coated Steel Sheet
9. Bracings : Allowed at long side only

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 E250) or high tensile steel (grade E350 / E410)
3. 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 –1987
- b. Live Load on Deck - as per IS: 875 Part 2 –1987

3. Wind Load:

Basic wind speed to be considered as 50 m /sec. as per IS: 875 Part 3 – 1987 (Please check against Surat).

4. Seismic Load:

Seismic Zone to be considered as Zone – III as per IS: 1893 – 2002 (Please check against Surat location).

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, 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 Foundation Bolts, grade of concrete to be considered as mentioned above.
4. For foundation design consider Safe Bearing Capacity as 200.0 kN/m² 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.
2. Beams & Columns: Sections, such as MB/MC [refer IS 808-1989(2004)], built-up sections or parallel flange sections [refer IS 12778-2004], Tubular Sections [refer IS 1161-1998 and IS 4923-1997] will be preferred.
3. Truss members: IS 808, IS 1161-1998 and IS 4923-1997
4. Connections: All connections shall be either welded connection or bolted connection using mild steel or high tensile black bolts, turned bolts or HSFG bolts.
5. 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 / trestles and Girders / Beams
 - d. All Truss 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.
6. 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
- Concrete design - As per IS: 456 - 2000
- Live load - As per IS: 875 Part 2 - 1987
- Wind load - As per IS: 875 Part 3 - 1987
- Seismic load - As per IS: 1893 - 2002

2. Material

- Rolled sections and plates - As per IS: 2062 - 2011
- SHS/RHS - As per IS: 4923 - 1997
- CHS - As per IS: 1161 - 1998

3. Welding

- Symbols for welding - As per IS: 813 - 1986
- Weld joint details - As per IS: 9595 -1996

4. Fasteners

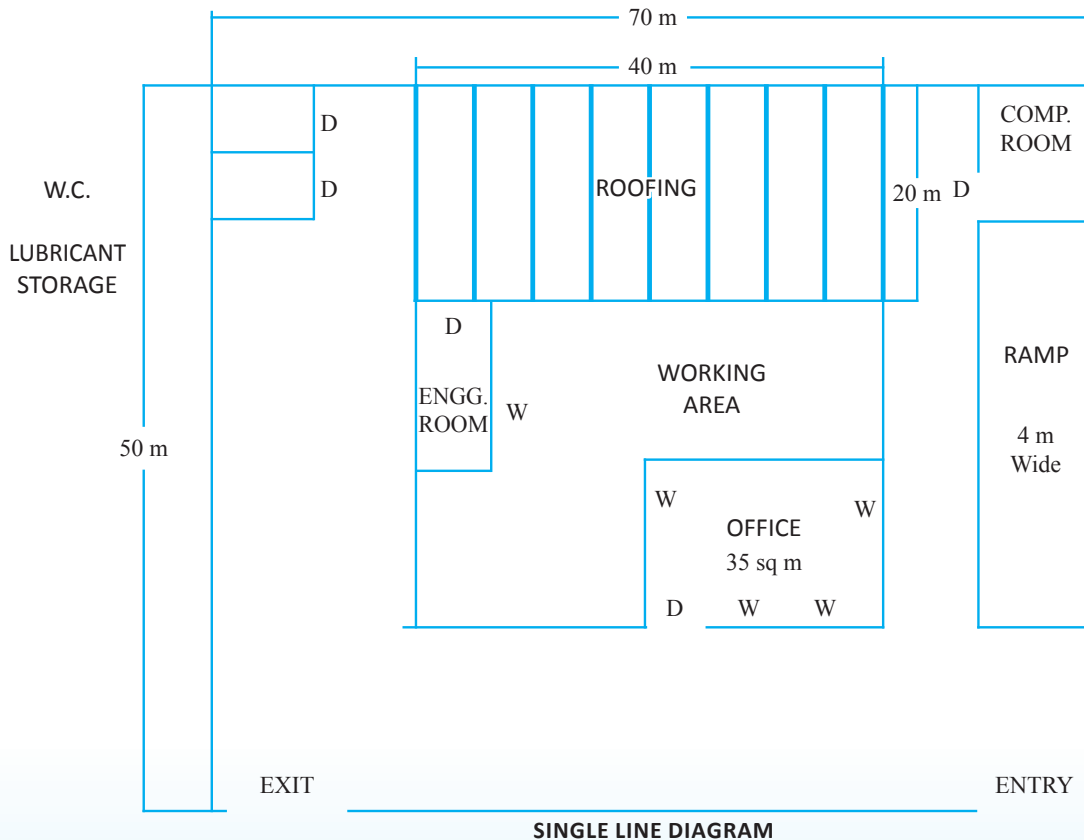
- High strength structural bolts - As per IS: 3757 - 1985 & IS: 4000 – 1992
- Foundation bolts - As per IS: 5624 -1993

Checklist for Submission

SI No Description

- 1 Content page for report and all submissions
- 2 All pages and drawings are to be numbered
- 3 All soft copies are submitted on a CD (i.e. drawings, input and output files of analysis, excel spreadsheets for design checks etc). Soft copies should be sent the zonal coordinator through email also.
- 4 Hard copy report alongwith all required drawings.
- 5 Bonafide certificate in hard copy.
- 6 Student details alongwith photos in soft copy.

SCHEMATIC PLAN FOR CAR SERVICE STATION



Visit us at www.steel-insdag.org

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