

Announcement for
**AWARD SCHEME FOR CIVIL/STRUCTURAL ENGINEERING
STUDENTS FOR BEST INNOVATIVE STRUCTURAL STEEL DESIGN
FOR THE YEAR 2003 - 2004**

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 organising 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 has entered into the 4th Year of Competition. 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.

In view of the excellent response received from the students, the Institute has decided to pursue 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. 15,000/- + scroll of honour
2nd Prize (2 nos.) : Each Rs. 10,000/- + scroll of honour
3rd Prize (2 nos.) : Each Rs. 5,000/- + scroll of honour

All those who are unable to win the above Prizes in the Final Round will be given a technical book as a consolation prize. Participation certificate will be provided to all the 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 3 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 (a maximum of 2 students from each group) 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 July, 2004. The detailed programme, when finalized, will be intimated to the Colleges/participants sometime in May-June, 2004. The top five proposals will receive the **Prizes**.

ENTRY / APPLICATION

The **last date of receiving Applications/Entries** for the Zonal Round of Competition is **31st March, 2004**. The entries shall be directly sent to the respective **Zonal Centres** at the addresses mentioned hereafter with intimation to INSDAG, Kolkata.

NORTH ZONE

Dr. (Mrs.) Pratima R Bose, Professor & Head
Civil and Environmental Engineering Department
Delhi College of Engineering &
The Zonal Coordinator (North Zone)
INSDAG's Civil/Structural Engg. Award Scheme
Bawana Road, Delhi - 110042
Email: prbose@satyam.net.in

SOUTH ZONE

Dr. Ramesh Reddy, Professor
Civil Engineering Department
University College of Engineering &
The Zonal Coordinator (South Zone)
INSDAG's Civil/Structural Engg. Award Scheme
Osmania University
Hyderabad - 500007
Email: rameshreddy@hotmail.com

EAST ZONE

Dr. S Saha, Professor
Civil Engineering Department
Bengal Engineering College & The Zonal Coordinator
(East Zone)
INSDAG's Civil/Structural Engg. Award Scheme
Attn.: Alok Baishya
INSDAG
'Ispat Niketan', 1st Floor
52/1A Ballygunge Circular Road, Kolkata- 700019
Email: insdag@cal2.vsnl.net.in

WEST ZONE

Dr. L M Gupta, Professor
Applied Mechanics Department
VNIT & The Zonal Coordinator (West Zone)
INSDAG's Civil/Structural Engg. Award Scheme
Nagpur - 440011
(Email: lmgupta_vrce@yahoo.co.in)

Intimation to **INSDAG** shall be made to the following address:

Director General

Institute for Steel Development & Growth
'Ispat Niketan', 1st Floor
52/1 A Ballygunge Circular Road, Kolkata - 700019
Phone 033-4614045/4047/2486 0855/58
Fax: 033-4614048
Email: insdag@cal2.vsnl.net.in

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 of the proposed structure, including stability bracing systems. (Recommended scale for detail views should not be less than 1: 10).
2. Detail drawing(s) showing Structural Steel details/ RCC details (for composite slab only), shear connector, beams, columns, bracings, bolted/welded joints, stairs, hand

railings, side cladding etc. in accordance with 'Design Scope'. All drawings shall not be bigger than A1 size and should be presented in printed form.

3. Design calculations (A4 size paper) should be complete in all respects and neatly presented. Use of standard software analysis package like STAAD, GT STRUDL etc. is permitted. Manual analysis is also acceptable. However, all the design checks for the selected sections should be done by manual method only.
4. All computer input & output files (in soft and hard copy form) are to be submitted.
5. 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 should be submitted.
6. A brief resume of the student(s) / applicant(s) containing name, address, phone / fax / e-mail number, name of University / College, year of study and registration / roll number of the participant(s), and 2 nos. recent passport-size attested photographs (for each participant) etc. should be submitted.
7. A certification from the Principal/HOD/Registrar of his / her Institute on office pad declaring bonafides under office seal/stamp should 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 of any kind will lead to disqualification.
4. Outstation candidates appearing for the Final Round of Competition at Kolkata will be reimbursed to-and-fro second class sleeper Rail Fare by the shortest route on production of proof of travel. Accommodation in Guest House/Hostel will be considered depending upon availability. Only two (2) students shall be considered per group for this purpose.
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 FOR THE COMPETITION ON THE BEST INNOVATIVE STRUCTURAL STEEL DESIGN UNDER INSDAG'S SCHEME FOR STUDENT COMPETITION FOR THE YEAR 2003 - 2004

INTRODUCTION

A leading company, having a chain of shopping stores, has just decided to set up one more shopping mall at Bangalore. The company has already acquired land on Airport Road for this purpose.

The proposed structure should be able to create immense visual impact from interior as well as exterior viewpoint so as to infuse interest and curiosity among the people. The structure must match the client's functional requirements and should be elegant and cost effective.

APPOINTMENT AS CONSULTANT

INSDAG has been able to convince the client about the utility of steel intensive construction leading to numerous benefits such as elegance, lightweight, early completion, quick return on capital investment, life cycle cost benefit etc.

You have been appointed as a structural engineer for the project and have been asked to go ahead with structural solution for an **“Eye Catching G + 4 Steel Intensive Shopping Mall”**. Your task is to prepare a report that should have the following scope:

1. A description of the structural arrangement of the building.
2. A clear recommendation to the client about the scheme selected, with reasons for your choice.
3. A detailed structural design as enumerated in the 'Design Scope' section.

PROJECT FACILITIES

The client has provided the followings details, which need to be taken into consideration:

1. *Site* : The front portion of the land is bounded by 30 metres wide road and adjoining buildings surround the other three sides. Keeping requisite open space along the periphery of the plot as stipulated in the corporation regulations, the length of the building should not exceed 40 metres.
2. *Nos. of storeys* : The building shall be G + 4 storey with provision for car parking and utilities such as generator room, pump room etc. on the ground floor only.
3. *Area* : The covered area per floor should be 500 sq. m. Total covered area excluding ground floor should not be less than 2000 sq. m.
4. *Floor opening* : An opening of 20 m² should be provided at the centre of the building on second, third and fourth floor to provide a reasonable view of the floor immediately below to the customers. Appropriate safety guards or hand railings should be provided along the periphery of the opening for safety reasons.
5. *Lifts* : 2 numbers of lifts shall operate from the first floor and travel up to the fourth floor. The lifts shall have a carrying capacity of 10 persons each. A space of 1.8m x 2.5m should be provided for accommodating the cage of each lift. The lifts should be placed side by side.
6. *Stair* : One number stair shall run continuously from the first floor to the roof level. The other stair (architecturally pleasing) should be located in the front portion of the building leading from ground floor to first floor only.

Tread of the stair should be 280mm x 1500mm. The height between treads should be not more than 150mm.

7. *Toilets* : One number each of area about 15 m² should be provided on second and fourth floors.
8. *Trial room* : About 10 sq. m area needs to be provided on first and third floors where clothing section is planned.
9. *Side cladding* : Glazed curtain walls shall be provided as the cladding material all along the periphery of the building.

GUIDELINES

The following guidelines need to be taken into consideration:

1. Floor to floor height except ground floor should be taken as 3.5m. Clear headroom of 2.2m is necessary for the ground floor.
2. The total depth of composite slab is not to be less than 100mm.
3. Depth of steel beam should not exceed 400mm.
4. Design of maximum column free space taking into account codal provisions will be given more credit. Maximum depth and width of the beam need not be greater than 500mm and 300mm respectively.
5. Beams, columns, composite slabs and other items to be designed in accordance with 'Design Scope' Section 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.
6. For design of steel-concrete composite slab, grade of concrete should not be less than M25.
7. Deflection calculated should be within acceptable limits as specified in the code.
8. Arrangement of fire protection and air-conditioning need not be shown.
9. Stairs can be designed using stringers of plates/rolled channels with pre-cast concrete/colour coated steel sheets as treads. For hand railings and posts, CHS or SHS/RHS may be used.

DESIGN SCOPE

The following scope is to be taken into consideration for designing the shopping mall:

1. *Beams & Columns* : Sections such as ISMB, built-up I sections or parallel flange universal section should be used. Only one number each: peripheral and interior beams & columns should be designed (for stress and deflection check) considering the most heavily loaded member under worst load combination. However, analysis needs to be done for the complete framework.
2. *Floor slabs & Roof* : Steel-concrete composite slab (concrete over steel beam) should be designed (for one floor only) using stud/angle/channel shear connectors welded to top flange of steel beams. More credit will be given if designed using trapezoidal profiled steel sheeting (with indentations) as tension reinforcement.
3. *Connections* : Beam to beam and beam to column connections (designed one each for worst loading) should be designed as either bolted or welded (fillet or butt welded type). All bolts should be of high strength type.
4. *Bracings* : For better stability of the structure against horizontal forces owing to wind and earthquake, rolled angle or channel/SHS/RHS/CHS should be used in design.
5. *Base connection* : Connection (one each for peripheral and interior columns) of column with base plate should be designed using foundation bolts. The bearing capacity of the soil may be taken as 18 tonnes per square metre at a depth of 1.5m below ground level.

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.
7. *Exclusions* : Design of stairs, lift well design, foundation design and details, design for fatigue and vibration are excluded from scope of design of the shopping mall.

BASIS OF DESIGN

a. *Loading*

1. Dead Load
 - Self wt as calculated
 - Glazing panels 0.5 kN/m^2 (of glazed area)
 - Duct and false ceiling 1 kN/m^2
2. Imposed Load
 - Floor UDL 4 kN/m^2
 - Floor Concentrated Load 3.6 kN
3. Wind Load
 - Basic wind speed to be considered as 33 m/sec . as per IS: 875 Part 3 – 1987
4. Earthquake Load
 - As per IS: 1893 Part 1 – 2002, Bangalore will come under Seismic Zone II

b. *Standards*

1. Loads
 - Dead load → As per IS: 875 Part 1 – 1987
 - Live load → As per IS: 875 Part 2 – 1987
 - Wind load → As per IS: 875 Part 3 – 1987
 - Seismic load → As per IS: 1893 Part 1 – 2002
2. Design
 - Concrete design → As per IS: 456 – 2000
 - Steel design → As per IS: 800 – 1984 & IS: 806 – 1968
 - Composite construction → As per IS: 11384 – 1985
3. Material
 - Rolled sections and plates → As per IS: 2062 – 1999 & IS: 8500 – 1991
 - SHS/RHS → As per IS: 4923 – 1985
 - CHS → As per IS: 1161 – 1979
4. Welding
 - Symbols for welding → As per IS: 813 – 1986
 - Weld joint details → As per IS: 9595 – 1996
5. Fasteners
 - High strength structural bolts → As per IS: 3757 – 1985 & IS: 4000 – 1992
 - HSS bolts design examples → SP 6(4) – 1969
 - Foundation bolts → As per IS: 5624 – 1993

CRITERIA FOR JUDGING

Sl. No.	Stage of Evaluation	Evaluation Committee	Marks Allotted	Selection
1	Stage I	Concerned zonal committee	200	4 best ranking entries qualify for Stage II
2.	Stage II	Other 3 zonal committees	600 (200 marks each committee)	-
3.	Stage III (Presentation round)	Central selection committee, Kolkata	200	
4.	Final selection	- do-	Total marks 1000 (Sl. No. 1 to 3)	Prizes to best 5 entries

NOTICE OF INTENT FOR PARTICIPATION

(To be submitted before December 31, 2003)

NATIONAL AWARD SCHEME FOR STUDENTS OF CIVIL/STRUCTURAL ENGINEERING YEAR 2003-2004

If you wish to participate in the Competition, you should complete this form, detach and return to the address given below in a sealed envelope.

Name of the college

University

Name of guiding faculty/HOD

Signature of guiding faculty/HOD

Student's name

Home address

Tel. No. E-mail:

Student's name

Home address

Tel. No. E-mail:

Student's name

Home address

Tel. No. E-mail:

Student's name

Home address

Tel. No. E-mail:

I/We agree to participate in the Competition organized by INSDAG for the Year 2003-2004 and request you to enroll our name(s) in your database for record purpose. We also agree to become student member(s) of INSDAG by paying Rs. 200/- each (one time only) by demand Draft in favour of "Institute for Steel Development & Growth" payable at Kolkata (Membership form and draft are attached / shall be sent separately).

Signature(s) 1. 2.

3. 4.

Please send to:

Director General
Institute For Steel Development & Growth (INSDAG)
'ISPAT NIKETAN', 1st Floor
52/1A Ballygunge Circular Road
Kolkata – 700019
Ph: (033) 2461 4045/4047/4066/4076
Fax: (033) 2461 4048

COMPETITION TOPIC:

DESIGN OF EYE CATCHING STEEL INTENSIVE SHOPPING MALL



Who Knows!

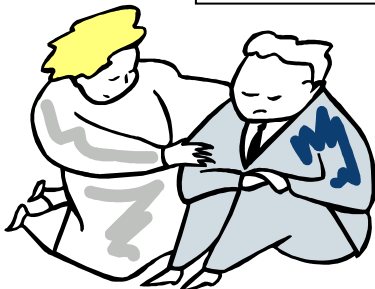
This year YOU may be one of the Award Winners



Last date of submission March 31, 2004

Act Now!

Avoid Last Minute Disappointment!!!



Need assistance regarding competition 'Brief'!

Don't hesitate, contact INSDAG immediately