Announcement for
AWARD SCHEME FOR CIVIL/STRUCTURAL ENGINEERING STUDENTS FOR BEST INNOVATIVE STRUCTURAL STEEL DESIGN FOR THE YEAR 2004 - 2005

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 oragnising 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 5th Year of the 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.

The Institute 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. 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 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 (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, 2005. The detailed programme, when finalized, will be intimated to the Colleges/participants sometime in May-June, 2005. 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, 2005**. 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
Civil and Environmental Engineering Department
Delhi College of Engineering &
The Zonal Coordinator (North Zone)
INSDAG's Civil/Structural Engg. Award Competition
Bawana Road, Delhi - 110042
Email: prbose@satyam.net.in

SOUTH ZONE

Dr. Ramesh Reddy,
Professor & Principal
University College of Engineering &
The Zonal Coordinator (South Zone)
INSDAG's Civil/Structural Engg. Award Competition
Osmania University
Hyderabad - 500007
Email: rameshrreddy@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 Competition
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 Competition
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 (INSDAG)
'Ispat Niketan', 1st Floor
52/1 A Ballygunge Circular Road, Kolkata - 700019
Phone 033-24614045/4047/2486 0855/58
Fax: 033-24614048/24861013
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: sleepers, main girders, cross girders, bracings, splices, bolted / welded joints, 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 also be submitted.

OTHER RULES

1. o 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 NATIONAL COMPETITION ON THE BEST INNOVATIVE STRUCTURAL STEEL DESIGN UNDER INSDAG'S SCHEME FOR STUDENT COMPETITION FOR THE YEAR 2004 - 2005

INTRODUCTION

Railways have always been the largest consumer of steel in the country. Steel has been put to use extensively for decades in various applications by Railways. Steel sections are widely used in engines, coaches, platforms, maintenance and car sheds, office buildings, rail over bridges and bridges.

Fast track construction, lightweight, easy maintenance, handling ease, etc. have been some of the prime reasons for tilt in favour of steel intensive construction.

APPOINTMENT AS CONSULTANT

The Railways have standard modules for various spans of steel bridges ranging from 9.2 m to 76.2 m. The steel bridge super structures are either plate girder type or open web type. The railway workshops fabricate spans of 9.2 m, 12.2 m, 18.3 m, 24.4 m and 30.5 m of plate girder type and 30.5 m, 45.7 m, 61 m and 71.2 m open web type (truss type).

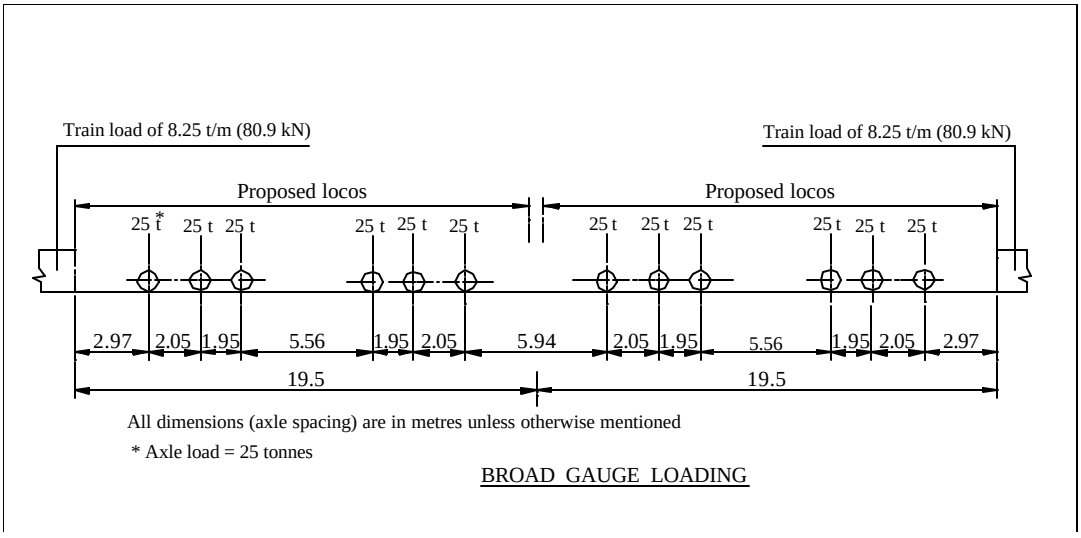
In view of the majority of bridges constructed having span less than 30 m, INSDAG wishes to provide additional choice to the Railways by providing design and detail drawing of 28 m span (c/c of bearings) bridge. Considering that you have been appointed as a structural consultant for this project and have been asked to furnish structural solution for **"Design of an Elegant Steel Railway Bridge for 28 m Span",** the task is to prepare a report that should have the following scope:

1. Structural design and detail engineering of deck type plate girder (superstructure) option for single track.
2. Structural design and detail engineering of through open web type girder (superstructure) for single track.
3. Bill of materials for both the above options.

PROJECT DATA

The followings details are available from Railways, which need to be taken into consideration:

1. Span :28 m (c/c of bearings)
2. Spacing of stringers (supporting the sleepers) : 1900 mm (for open web girder type)
3. Max. spacing of steel sleepers : 600 mm c/c
4. No ballast, channel sleepers seating on top of structural member
5. Broad gauge dimension (rails head to head inside distance) : 1676 mm
6. Rail size : 90R (Head width = 67 mm; Base width = 137 mm; Height = 143 mm), wt. @ 45 kg/m



All dimensions (axle spacing) are in metres unless otherwise mentioned

* Axle load = 25 tonnes

BROAD GAUGE LOADING

DESIGN LOADS

1. Dead Load :
Dead load will be the weight of the structure along with permanent weight carried by it.

2. Live Load :
Live load may be considered as having a maximum axle load of 245.2 kN (25 tonnes) for locomotives and a train load of 80.9 kN/m (8.25 t/m) on both sides of the locomotive (see Fig. in previous page).

The live load on a cross girder will be equal to half the total load for bending in a length L, where "L" is equal to twice the distance over centers of cross girder.

3. Impact Factor :
For single track span, the dynamic factor = 0.15 + ?8 / (6 + L)?, where "L" is

a. The loaded length of span in metres for the position of train giving the maximum stress in the member under consideration.
b. 1.5 times the cross girder spacing in case of stringers (rail bearers)
c. 2.5 times the cross girder spacing in case of cross girders
d. For calculating the dynamic factor for steel sleepers, dynamic factor = 7.32 / (B + 5.49), where B = spacing of the main girders in metres.

4. Longitudinal Force :
Longitudinal force due to braking (force resulting from application of brakes to all braked wheels) or tractive effort (force due to the driving wheels of the locomotives). These forces are to be considered as acting horizontally on top of rail.

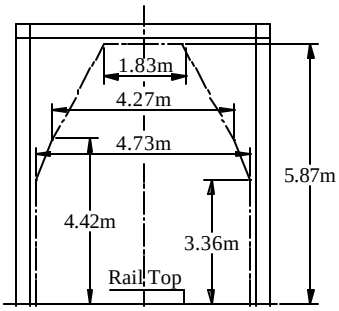
Braking force = 613 kN Tractive effort = 899 kN

5. Racking Forces :
Lateral bracings of the loaded spans shall be designed to resist, in addition to wind loads specified, a load due to racking force of 5.88 kN/m treated as moving load. This lateral load needs to be taken into account when calculating stress of chords or flanges of main girder.

6. Wind Pressure :
The wind pressure for the bridge shall be taken as 1.47 kN/m^2 (150 kg/m^2).

The area of the moving load shall be taken as from 600 mm above rail level to the top of the highest stock for which the bridge is designed. The force coefficient of sections shall be as per IS: 875 (Part 3).

Sl. No.	Location of the leeward girder	Multiplication factor
1.	Spacing with windward girder not exceeding half depth	0
2.	Spacing with windward girder exceeding half depth and up to full depth	0.25
3.	Spacing with windward girder exceeding full depth and up to one and half times depth	0.50
4.	Spacing with windward girder exceeding one and half times	1.00



REQUIRED CLEARANCES
WITH STRUCTURAL MEMBERS
(shown by centre lines)

7. Seismic Loads :
The seismic forces shall be computed as per IS: 1893 – 2002. The structure may be considered for the most critical zone, i.e. Zone V.

Horizontal seismic force due to live load on the bridge shall be ignored when acting in the direction of traffic but when acting in the direction perpendicular to the traffic, this may be considered for 50% of the design live load without impact.

GUIDELINES

The following guidelines need to be taken into consideration:

1. 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.
2. Depth of the plate girder section should not exceed span/10.
3. Deflection calculated should be within span/600 for loads due to dead load and live load without impact.

DESIGN SCOPE

The following design scope is to be taken into consideration for designing the 2 options:

I. For Plate Girder Option

1. Built-up " I " section main girder
2. Cross frame
3. Lateral bracings
4. Steel sleepers
5. Main girder splice (bolted)

II. For Through Type Girder Option

1. Chords including splice design (bolted)
2. Diagonals and verticals
3. Lateral bracings
4. Steel sleepers

EXCLUSIONS

1. Though fatigue is a very important criteria for arriving at the final section, it has been excluded from the scope of design.
2. Forces due to curvature, eccentricity of track, temperature effect need not be considered in design.
3. Footpath on bridge is not required.
4. Girders up to 35 m span do not require any provision for camber as per steel bridge code stipulations.
5. Bearing design is excluded from the scope of design.

DESIGN STANDARDS

1. Design
   - ? Steel design ? As per IRS Steel Bridge code / IRC: 24 – 2001 / IS: 800 – 1984 & IS 806 - 1968
   - ? Seismic load design ? As per IS: 1893 – 2002
2. 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 – 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
   - ? HSS bolts design examples ? SP 6(4) – 1969

NOTICE OF INTENT FOR PARTICIPATION

(To be submitted by December 31, 2004)

NATIONAL AWARD COMPETITION FOR STUDENTS OF CIVIL/STRUCTURAL ENGINEERING

YEAR 2004-2005

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 ……Year ……
Home address ……
Tel. No. …… E-mail: ……

Student's name ……Year.……
Home address ……
Tel. No. …… E-mail: ……

Student's name ……Year..……..
Home address ……
Tel. No. …… E-mail: ……

Student's name ……..Year……
Home address ……..
Tel. No. ……. E-mail: ……

I/We agree to participate in the Competition organized by INSDAG for the Year 2004-2005 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 & 2486 0855/0858
Fax: (033) 2461 4048 & 2486 1013

IMPORTANT INFORMATION

Avail student membership (one time payment of Rs. 200/-) of INSDAG and get the opportunity to participate in this National Level High Profile Competition along with a Technical Book titled "INSDAG GUIDE FOR THE STRUCTUURAL USE OF STEELWORK IN BUILDINGS" worth Rs. 850/- and many more benefits…

COMPETITION TOPIC:

DESIGN OF AN ELEGANT STEEL RAILWAY BRIDGE

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

LIST OF COLLEGES PARTICIPATED FOR THE YEAR 2003-2004 COMPETITION

No.	College	No.	College
1.	Bengal Engineering College, Howrah, West Bengal	19.	Crescent Engg. College, Chennai
2.	Jadavpur University, Kolkata	20.	PSG College of Technology, Coimbatore
3.	Indian Institute of Technology, Kharagpur, West Bengal	21.	S L N College of Engg., Raichur, Karnataka
4.	S V P Mandal's College of Engg, Malegaon, , Maharashtra	22	Bharath Institute of Science & Tech. , Chennai
5.	K B P College of Engg,, Satara, Maharashtra	23.	Raja College of Engg & Tech, Madurai
6.	Amrutvahini College of Engg., Sangamner, Maharashtra	24.	Karunya Institute of Technology, Coimbatore
7.	D Y Patil College of Engg., Pune, Maharashtra	25.	College of Engg., Chennai
8.	Govt. College of Engg., Aurangabad	26.	Periyar Maniammai College of Technology for Women, Tiruchirapalli
9.	M S Bidve Engg. College, Latur, Gujarat	27.	Government College of Engg., Tirunelveli, Tamil Nadu
10.	Govt. College of Engg., Aurangabad	28.	B V B College of Engg. & Tech., Hubli, Karnataka
11.	G.S.Mandal's Marathwada Institute of Technology, Aurangabad	29.	Shri Dharmasthalai Manjunath College of Engg & Tech, Karnataka
12.	Indian Institute of Technology, Mumbai	30.	Osmania College of Engg., Hyderabad
13.	Goa Engg. College, Goa	31.	JNTU College of Engg., Kaninada, AP
14.	K.I.T. College of Engg, Kolhapur, Maharashtra	32.	AMA College of Engg., Thiruvannamalai, Tamil Nadu
15.	Government Engg. College, Thrissur, Kerala	33.	Delhi College of Engg., Delhi
16.	Malnad College of Engg., Hassan, Karnataka	34.	Institute of Technology, Varanasi
17.	Kumaraguru College of Technology, Coimbatore	35.	Faculty of Engg. & Tech., Jamia Millia Islamia, Delhi
18.	Government College of Engg., Salem		

Last Date for Receiving ' NOI ' – December 31, 2004

Last Date of ' ENTRY ' Submission - March 31, 2005

Participate & Be a Proud Winner Like Others !!!