www.iastructe.co.in

December 2022

MESSAGE FROM THE PRESIDENT



Dear Friends,

Greetings!!

Hope you are doing well. You shall be happy to know that IAStructE is very actively engaged in routine technical lectures, webinars, publication of newsletters, CROSSFAL & Structural Engineering Digest. All these activities have rich technical

contents & are being appreciated by the fraternity. You may find details of such activities & publications in this newsletter and on our website. SED on Structural fire safety is in advanced stage of publishing and will be released in next ten to fifteen days. Next issue is dedicated to the theme of "Structural Engineering for Sustainable Development" with Mr. Vijay R. Kulkarni as Guest editor. You may like to contribute your papers and case studies for the same. Recently second issue of CROSSFAL has been released. Hope you shall find it useful. You may contribute any structural failure for publication. As you know identity of the reporter and the project is not disclosed. It is purely for learning purposes.

From January 2023 IAStructE is starting a new program of accreditation of engineers as 'Chartered Structural Engineer IAStructE'. It will be open to all structural engineers having 5 years of experience with minimum bachelor's degree in Civil engineering. It will be on voluntary basis but membership of IAStructE shall be mandatory to get this accreditation. It will be two stage process. Initial Professional development (IPD) assessment interview followed by a written examination of actual problem solving. It will be mandatory to clear both the stages. This accreditation shall be renewed every 5 years based on CPD. It is an extremely ambitious program. Details of this program shall be posted on website and on social media platforms on January 1, 2023. It is likely to raise the standards of structural engineering practice in the country. If interested, then apply as soon as possible and share this information with others.

Very soon IAStructE will start the process of elections for the new Governing Council. If eligible and interested do participate in it actively. New Leadership is always good for innovative ideas and new initiatives and hence for the growth of any organisation.

I encourage you to send your feedback on our activities and suggestions for further improvements.

Best regards, May Kyme Manoj Kumar Mittal

President-IAStructE

FROM THE EDITOR'S DESK



Season's greetings and New Year 2023 Wishes to all the readers!!

Let's all hope this new year brings more health, prosperity, new beginnings, new aspirations and new hopes. For the association this month is all about the

achievements of our members Mr. Alok Bhowmick, Mr. V. N. Heggade, Prof. Mainak Ghosal and Ms. Sangeeta Wij, who have been honored by different awards and recognitions.

Do follow, subscribe and like IAStructE events on all digital platforms.

Thanks & Regards,

Dr. Visalakshi Talakokula

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Webinars / Events Conducted:

Webinar on "Health Monitoring of Bridges through Instrumentation"

A Webinar on "Health Monitoring of Bridges through Instrumentation" by Er. G. K. Sahu, Sr. Principal Scientist, Bridge Engineering & Structures Division, CSIR-CRRI was organized on 24 December 2022. The lecture was moderated by Dr. Lakshmy Parameswaran, Sr. Former Chief Scientist, CSIR - CRRI.

The YouTube link to watch the webinar is given below: https://youtu.be/mR7cmZ41IzM



Fig. 1. Glimpses from Webinar

FORTHCOMING EVENTS

Event	Topic	Speaker	Date & Timing
Online Course	STRUT & TIE MODELS IN STRUCTURAL CONCRETE. Series of 13 recorded lectures. Registration Link: http://iastructe.co.in/online-refresher- course.php	Speakers for this online course are members of the fib WP2.2.4 "Strut and tie modelling" and authors of the fib Bulletin 100 "Design and assessment with strut-and-tie models and stress fields: from simple calculations to detailed numerical analysis".	21 January 2023 to 11 February 2023 (every Saturday from 03 PM to 06 PM)

Call for papers for CROSFALL:

CROSFALL Editorial Board invites reports for the forthcoming issues. Interested candidates can sent the reports about structural safety issues related to all types of structures (i.e. buildings, bridges, tunnels, industrial structures etc.) in the built environment. The reporting can be related to:

- Structural failures,
- Poor Design and Detailing, Lack of Seismic Safety in planning
- Safety concerns about high risk erection schemes at Site
- Safety concerns on Temporary Works
- Near misses, or observations relating to procedures followed at site, which may lead to failures or collapses.

Reports do not have to be about current activities so long as they are relevant. Small scale events are equally important - they can be the precursors to more major failures. Report might relate to a specific experience or it could be based on a series of experiences indicating a trend. No concern is too small to be reported and conversely nothing is too large. Reports should aim to include information that will help others to learn from the safety issue identified.

To submit the report please go through the following link: www.iastructe.co.in/crosfall.php

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Call for papers for the theme based issue of SED journal:

SED Editorial Board invites article contributions for the forthcoming issue of the Structural Engineering Digest on the following themes, which shall be published in e-book format. Details are as under:

- ★ January March 2023 issue: Theme: Structural Engineering for Sustainable Development Guest Editor: Er. Vijay R. Kulkarni
- ★ April June 2023 issue: Theme: Liquid Retaining Structures Guest Editor: Mr. L. K. Jain

Interested professionals may send their abstract on any of the above issues along with their photograph and brief resume latest by 15 January 2023 or at the earliest convenience. Articles are invited from i) Members of IAStructE; ii) Specialists in the field even though they are not members of IAStructE.

Interested authors/contributors may kindly mail to iastructe@gmail.com regarding i) Broad guidelines on areas of coverage; ii) size of the article; iii) format of paper submission. As per the laid down procedures all the papers shall be sent to the referee for review and the comments will be informed to the authors for incorporating the same. Papers shall be published after peer review & approval of SED editorial board.

Advertisement Tariffs:

	Rates for advertisement	Advertisement Size
Full Page	Rs. 10,000 per issue, 10% rebate for quarterly, 20% rebate for half yearly and 30% rebate for yearly booking	9.5 inch x 7 inch
Half Page	Rs. 7,000/- + 18% GST per issue, 10% rebate for quarterly, 20% rebate for half yearly and 30% rebate for yearly booking.	4.75 inch x 7 inch
1/8th of a Page	Rs. Rs. 2,000/- + 18% GST per issue, 10% rebate for quarterly, 20% rebate for half-yearly, and 30% rebate for yearly bookings. (Only for IAStructE Members)	Standard size of Business Card

Structural Engineering Digest (being published in PDF format)

Message from IAStructE Social Media & Digitization Committee

Let's get "DIGITIZED"

With all new look of our website and media handles, please follow us on all major media platforms. For joining us, below mentioned links to be pasted in browser. Let's join hands together to promote the profession of Civil Engineering.

- 1. on TWITTER as IAStructE: https://twitter.com/iastructe
- 2. on Facebook as IAStructE: https://www.facebook.com/IAStructE-100114022302316

3. on LinkedIn:-The group is defined as Indian Association of Structural Engineers-IAStructE

https://www.linkedin.com/groups/6646248/

4. **on YouTube** as **IAStructE Webinar:-** Subscribe and press bell icon https://www.youtube.com/channel/UCvv7ojXO9Dxq1WtP_yHZTKw



IAStructE Publications ():

1. Commentary with Worked Examples for IRC: 6-2017: It is a document having commentary with worked example on IRC: 6-2017 (The code for Loads & Load Combinations for design of Highway Bridges). This commentary is in two separate volumes. Volume-1 pertains to the Commentary while Volume-2 pertains to Illustrative Worked Examples. It has 48 worked examples demonstrating application of various codal clauses

IAStructE/TD-CC/2020/02	IAStructE/TD-CC/2020/01
COMMENTARY WITH WORKED EXAMPLES	COMMENTARY WITH WORKED EXAMPLES
FOR IRC:6-2017	FOR IRC:6-2017
STANDARD SPECIFICATIONS AND	STANDARD SPECIFICATIONS AND
CODE OF	CODE OF
PRACTICE FOR ROAD BRIDGES	PRACTICE FOR ROAD BRIDGES
SECTION II : LOADS & LOAD COMBINATIONS	SECTION II : LOADS & LOAD COMBINATIONS
(SEVENTH REVISION)	(SEVENTH REVISION)
NOVEMBER 2020	NOVEMBER 2020
VOLUME 2 OF 2 : ILLUSTRATIVE WORKED EXAMPLE	VOLUME 1 OF 2 : COMMENTARY

It's a priced document and hence not freely downloadable.

The documents are available for sale @ Rs 1200/- for Volume 1, and @ Rs 800/- for Volume II. Members of IAStructE and IRC will be entitled for a discount of 10% on this amount. Interested professionals who wish to purchase the commentary may kindly register with the following link or contact IAStructE Secretariat at iastructe@gmail.com:

Registration link: http://iastructe.co.in/new-iastructe-publication.php.

2. Guidelines for Structural Audit, Assessment, Evaluation and Strengthening of Existing buildings Structures: This document will guide structural engineers in proper assessment of building structures before issuing structural stability certificate. These guidelines may be used by IAStructE members, all other structural engineers, house owners, housing society welfare associations, clients and corporation engineers for understanding structural audit of the private and public building structures. The Guideline focuses on the urgent need to strengthen risk resilience of buildings from any kind of risks due to earthquake and other hazards. It is hoped that this document will be useful to ensure that all structures across the country remain safe from any kind of disaster risk.



It's a priced document and hence not freely downloadable.

The price of this e-document is Rs 200/-. Interested professionals, who wish to obtain the soft version of the Guideline in pdf format, may register with the following link. Registration Link: http://iastructe.co.in/guidelines-for-structural-audit.php

3. Commentary on IS: 13920: The commentary is available on **www.iastructe.co.in** under IAStructE Professional Documents. IAStructE member can access this document after login.

4. Commentary on IS: 1893 Part 1: The commentary is available on www.iastructe.co.in under IAStructE Professional Documents. IAStructE member can access this document after login.



Members Achievements:

1. M/S B&S Engineering Consultants Pvt. Ltd., headed by Mr. Alok Bhowmick has been felicitated by The Institution of Engineers (India) as "IEI Industry Excellence Award 2022" for demonstrating outstanding performance with a high order of business excellence on 16th December 2022 during the 37th Indian Engineering Congress, organized at Chennai.

Mr. Alok Bhowmick has also successfully completed the requirements of the certified Consulting Practitioner program by FIDIC and has been recognized as a FIDIC Certified Consulting Practitioner.



Fig. 2 Mr Alok Bhowmick receiving the award with his team

2. Mr. V. N. Heggade, GC Member, IAStructE has & former Executive Director of STUP Consultants has been felicitated by COEP Tech Alumni Association the 28th Award for excellence in Bridge Construction and Design in Architecture in the memory of bridge construction expert SB Joshi. During the program, Mr. V. N. Heggade also gave detailed information about the design, careful planning, and implementation technology challenges and solutions for Namaste Bridge, bridges over various rivers, flyovers in Delhi.



Fig. 3 Mr V N Heggade receiving the award



Prof. Mainak Ghosal, GC Member, IAStructE has been awarded a Best Researcher Award for his contribution and honourable achievement in innovative research on welding technology by Scifax Information and Analytics Pvt Ltd.



Ms. Sangeeta Wij, GC Member, IAStructE has been received a recognition as Champion of Civil Engineering for the exemplary work towards the betterment of construction of India from Association of Infrastructure Industry (India).

IA StructE Library 🖾



Fig 4. IAStructE Library

IAStructE has set up a library at K-69 A, Basement Kalkaji, New Delhi. It has a collection of good technical books and journals related to civil & structural engineering. Members staying in the vicinity are encouraged to utilize this facility, and if you want to contribute your books and journal to the library you are always welcomed.



Structural Engineering – Getting Ready for the Future! By Mr. Harish Kumar S. N. (LAM-IAStructE)

Structural Engineers are always in competition with the nature. Every creation has co-relation with the things that we see around us. A simple leaf shows how nature has provided each component its desired position and purpose. A leaf acts like a simple cantilever, the soffit of which is under compression.



Figure 1a: Leaf of a Banana Plant



Figure 1a shows the leaves of a banana plant. The thicker midrib at the bottom very efficiently resists the tension.

A top view of the same leaf is shown in Figure 1b. It is clear from this figure that the midrib has a crosssection like a U beam. This acts as a channel for the rain water to flow from the leaves. With this configuration, the top portion of mid rib can take only tensile forces. It can buckle with compressive forces as the top portion is thin. Nature has kept everything in the right place. Similarly, a building is analogous to a tree with its foundation as roots and so on. In this way, engineers are influenced by nature. Each one's achievement and victory is measured relative to others around them. The same holds true of our performance which is measured against our competitor's.

A designer's vision is restricted within such limits, nature and people at the start of a design. As a structural engineer, we need to see beyond what is around us. This would help us stay ahead in race.

Analyzing the Past

Throwback to 15 years ago, would anyone have imagined the accomplishments we have made today? From what some of the seniors recollect, no one then imagined that drawings could be completed as fast and easy as one can nowadays. There was resistance from many draftsmen to learn drafting software like AutoCAD (in 2D). The ones who adapted to the change had persisted in the industry. Today, it is difficult to find an office where draftsmen are involved in manual sketching. In



Figure 2 Bridge 3D model – Azadpur Metro Station – DC03R Delhi Metro

addition to this change, we are in a decade where we move a step ahead and are creating 3D drawings/illustrations which are useful for the engineers to visualize these structures as it will be on-site.

In structural engineering practice, technology has played a crucial role in solving complex problems, considering the project's time constraints and the need for accuracy. Previously, engineers used to spend enormous time calculating huge stiffness matrices for multiple elements of structures on sheets spread across the room, and preferred to take a conservative approach to avoid unnoticed errors.



Indian Association of Structural Engineers

The transition from manual calculation to using simple programmes formulated in FORTRAN and C, to advanced finite element (FE) packages that could analyse the entire structure within a short time is a classic example of our development. The difference between the FE software used then and now could be the level of analysis depth we intend to look at. The 3D visualization and displacement, and stress plots of the same nowadays make them user-friendly as well.

In a project, the designer and the technician work side by side for two outputs, i.e. a model for analysis and design, and a drawing for site. Coordination among themselves and updating the comments from the reviewer on both these outputs consume more time. In the near future, we could expect a scenario where a 3D print of the structure could be generated simultaneously when the designer completes the analysis. This will help save time and avoid duplication of the structure modeling.

Value Engineering

The advancement in technology has opened up new opportunities for engineers from non-structural practice. Some work done by structural engineers could be easily automated by any individual with fundamental knowledge about the software. This may give the impression that the presence of structural engineers may be less important when similar work can be automated using a computer.

"As structural engineers, we play a critical role in the projects for which we are appointed. If success is judged simply against the need to provide adequate resistance to collapse, then we are very successful, but the value we can bring to a project goes far beyond that."



Figure 3 Marseille Vieux Port, France2

As an engineer, it is our responsibility to help the future stay

sustained with the current developments in the society. To achieve this, we need to ensure that the design we propose is optimized and the materials are reusable. Proposing aesthetically pleasing and yet complicated designs may help us stand out in this competitive world. But, are such outcomes really necessary, and if safety standards are compromised?

Figure 3 shows us a simple and elegant design of a canopy. There is no additional design made to suit the aesthetics that served no purpose. As an Engineer, we need to challenge our client, and convince them of a superior, yet sustainable design that is functional.

By designing elements that could be disassembled after its design life, we not only increase the life span of individual elements, but also help in the easy replacement of those that are damaged.

Collaboration

Inevitable development in transportation like the 'hyper loop' would require collaboration of engineers from multiple disciplines. Keeping ourselves abreast with the progressive development made in other disciplines will help us stay on top. With software incorporating Building Information Modeling (BIM), there is a chance of fewer errors when information from various disciplines can be collated on a single platform.

The algorithms which power the Google search engines someday will serve as a background for design. With a large database of designs and clever learning algorithms, we are in a generation whereby just giving a few parameters as input on a design/analysis problem, we could extract the complete design prediction. This can be a useful tool wherein large number of identical structures must be designed.



When such technologies come into existence, we need to move a step forward, and think outside our codal provisions. The existing codes consider an ideal scenario where unforeseen changes in the climatic conditions4 are not considered. For example, the design for earthquake is based on average spectra of all the seismic activities from the past. With increased Global Warming, there is a potential risk that these past records of natural calamities may not be captured. In such cases, we may have to adopt 'performance based design' where the capacity versus demand is assessed based on the occupancy level for the design of that structure.

FIB Model codes serve as a basis for future codes with up to date research activities. They help in challenging our understanding of structural behavior from multiple perspectives, supplemented with background information on every formulation and application rule set by codes.

Conclusion

"Engineering is a combination of simple physics and little bit of common sense."

Before the Tacoma Narrows Bridge collapsed, structural engineers never considered the importance of aero elasticity in civil structures. It was the time spent in digging through the lessons learnt that created such magnificent bridges and skyscrapers. We need to be open to interdisciplinary collaboration challenging our wisdom, and strive to work towards a sustainable future.

References

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- [3] Guglielmo Carra- Three ways structural engineers can help create a zero-waste future, Institution of Structural Engineers blog
- [4] Caroline Field, Engineering for the future a resilience based approach, Institution of Structural Engineers resources center A.D Pandey, Assistant Professor (Retd.), Indian Institute of Technology, Roorkee India.



About IAStructE

Indian Association of Structural Engineers (IAStructE) is the national apex body of structural engineers in India established with the objective to cater to the overall professional needs of structural engineers. The association has become the source of expertise and information concerning all issues that involve structural engineering and public safety within the built environment. It has no commercial aim or objective. IAStructE is purely a professional learned society with the prime objective of supporting and protecting the profession of structural engineering by upholding professional standards and acting as a mouthpiece for structural engineers. IAStructE endeavors to ensure that its members develop the necessary skill in structural engineering and work to the highest standards by maintaining a commitment to professional ethics and standards within structural engineering. IAStructE strives for continued technical excellence; advancing safety and innovation across the built environment. It also strives to make available to the Government, Public Sector and Private Sector - a credible source of well qualified and experienced Structural Engineers. A nationwide database of Structural Engineers has been compiled and is being constantly updated. IAStructE undertakes a broad range of technical activities which are aimed at information sharing and capacity building. The association provides opportunity for all the members to develop various skills in structural engineering and helps members to be at the forefront of structural engineering practice. Towards achievement of its aims and objectives, IAStructE is engaged in organizing the following: CPD Courses for Professionals at all levels Refresher Courses for Fresh Graduate Engineers, Student's orientation program, Seminars/Workshops, Technical Lectures by Experts, Technical Discussions on Contentious Issues. IAStructE is currently operating from four regional centers. These regional centres located in the Eastern, Western, Northern and Southern parts of the country effectively cater to the professional needs of members residing/practicing all over the country.

Membership Benefits

Membership of IAStructE is a sought after professional accreditation. Your membership of IAStructE can help you enhance your intellectual, academic, technical and professional status. It provides inter connectivity to the fellow professionals and the fraternity. Some of the benefits of membership is provided below:

- ★ Complimentary magazine subscription: All members (except Student Members) receive a complimentary subscription to the Institution's flagship publication 'Structural Engineering Digest' (SED). Published quarterly, each issue allows members to remain connected to the association through the provision of technical papers, Industry and Institution News, Featured articles, Professional Guidance on everyday matters affecting the practicing structural engineers.
- ★ Access to the professional documents
- ★ Access to all Technical Lectures, organized every month, at no charge
- ★ Access to Technical Discussions held regularly
- ★ Access to the association's library (Including e-library)
- ★ Discounts in attending Seminars and Workshops organized by the association
- ★ Full on-line access to the current volume and entire e-archive of journal "Structural Engineering Digest (SED)", Refresher Course Materials, Technical Lectures, E-Newsletters and other Technical Resources of the Association.
- ★ Opportunity to network with professional structural engineers of eminence and to meet potential employers in the association.
- ★ Opportunities for professional development

How to become a member?

Membership form and details are available at https://www.iastructe.co.in/membership-grades.php; for more information and other details contact the Indian Association of Structural Engineers Secretariat.