PAStruct news Interview of the second second

Newsletter of the Indian Association of Structural Engineers

June 2019

Message from the President



Dear Members,

"The Future Does Not Fit In The Containers Of The Past" — RishadTobaccowala. I came across this famous quote recently. Though this was quoted by my bright young niece in a different context, for me it seemed to make a lot of sense in the context of Structural Engineering as well. So I wanted to pass it on to my fellow members of IAStructE. Clearly this quote is applicable in our profession. It's about change.

The number of structural engineers of professional standing is fast declining in the country with the passage of time. The old guards are refusing to embrace new digital technology while the young and bright civil engineering graduates do not find structural engineering attractive enough and are shifting to other higher paying professions like IT, Computer Science ...etc. This is a dangerous trend. I am not sure how to reverse this trend. I am still searching for an answer. But surely we need to do something about it to save this noble profession.

Meanwhile we are happy to inform that the refresher course on "Building Sustainable Structures: Green Concepts", which started on 18th May 2019 is successfully concluded by end of this month. We hope to announce our next refresher course soon. Members are requested to suggest topics of their interest in which they would like us to conduct refresher courses in future.

The news reports of recent fires that have affected our buildings have been shocking. The fire which engulfed the four-storey building at Surat running a private coaching centre, killed 22 students, either due to suffocation or falling off from the windows in an attempt to escape fire. This fire tragedy is a wake-up call for all the metropolitan cities in India that has innumerable coaching centres, running inside such hazardous buildings. I was wondering how we as structural engineers, could help to prevent such tragedies from happening again.

Perhaps the Governing Council in general and Events Management Committee in particular can think of conducting a refresher course on Fire Safety - exploring how structural engineers can address wildfire risks, including analyzing methods for fire damage assessment

Thanks and Regards

(AlokBhowmick)

Newsletter Editorial T	ear	m	
Chief Editor	:	Er. Anal Sheth, Member IAStructE & Assistant Professor, CEPT University	
Editorial team member	s:	Er. Manoj Mittal, Immediate Past President, IAStructE & Chief Mentor, Shelter Consulting Engineers	
		Er. Bhavin Shah, GC member IAStructE, & CEO, VMS Engg & Design Services Consultants.	
		Er. Rajiv Ahuja, GC member, IAStructE & Independent Consultant (Highwa	
		Er. Maulesh Shah, Member IAstructE & Sr. Associate, VMS Engg & Design	
		Services Consultants	
Newsletter Contents			
 Information about Information about Committee meetin 	the the g(s	e new Governing Council Publication committee)	
 Technical sessions Refresher Course 			
IAStructE Journal:	Ca	ll for articles	
Call for newsletter	ac	lvertisement	
Featured Article New IAStructF mer	nba	ers	
 About IAStructE 			
Membership Inform	nat	ion	
	τ	or feedback/comments for publications	
Governing Council Me	mb	ers for the term 2019-21	
President	:-	Mr. Alok Bhowmick, Managing Director, B&S Engg. Consultants Pvt. Ltd, Noida	
Immediate Past Presiden	t:-	Mr. Manoj Mittal, Chief Mentor, Shelter Consulting Engineers, Noida	
Founder President & Chairman Emeritus	:-	Mr. Mahendra Raj, Managing Director, Mahendra Raj Consultants Pvt Ltd, New Delhi	
Honorary Secretary	:-	Dr. (Ms) Talakokula Visalakshi, Prof.& Head, Civil Engg. Dept., Bennett University, Greater Noida	
Honorary Treasurer	:-	Mr. Sitaram Aggarwal, Individual Consultant, New Delhi	
Vice Presidents: North	:-	Mr. Vipul Ahuja, CEO & Director, Ahuja Consultants P Ltd, New Delhi	
South	:-	Dr. Ramancharla Pradeep Kumar, <i>Professor, Earthquake Engg Research</i> Centre, IIIT, Hyderabad	
West	:-	Mr Umesh Rajeshirke, Managing Director - Spectrum Techno Consultants Pvt Ltd, Navi Mumbai	
East	:-	Dr. K. K. Ganguly (Co-opted), Director, Development Architects P Ltd, Kolkata	
Elected members	:-	Mr. B. P. Ranga Rao, General Manager - CDR, NCCBM, Faridabad	
	:-	Mr. Bhavinkumar Shah, CEO, VMS Engg & Design Services Consultants (P) Ltd, Ahmedabad	
	:-	Mr. Deepak Bansal, Joint General Manager (Projects), HUDCO, New Delhi	
	:-	Dr. Dulal Goldar, Principal (Retd.), Delhi College of Engineering, New Delhi	
	:-	Mr. Ganesh Juneja, Managing Director - Juneja Techno Consultants P Ltd, New Delhi	
	:-	Dr. Harshavardhan Subbarao, Chairman & Managing Director, Construma Consultancy Pvt Ltd, Mumbai	

Flected members (cont	
Elected members (cont.) :- Prof. Mahesh Tandon, Managing Director, Tandon Consultants P Ltd, New Delhi
	:- Dr. Manamohan R Kalgal, Technical Advisor, UltraTech Cement Ltd, Bangalore
	:- Mr. Rahul Patel, Director, Rahul Patel & Co. (P) Ltd, New Delhi
	:- Mr. Rajiv Ahuja, Independent Consultant (Highway & Bridges), Gurgaon
	:- Dr. Samarjit Chatterjee, Individual Consultant, New Delhi
	:- Ms. Sangeeta Wij, Managing Partner, SD Engineering Consultants LLP, New Delhi
	:- Dr. (Ms) Shilpa Pal, Associate Professor, Civil Engg. Dept., Delhi Technological University, Delhi
	:- Mr. Subhash Chand Mehrotra, Advisor & Consultant, Mehro Consultants, New Delhi
	:- Mr. Sushil Dhawan, Former Chief Engineer, CPWD, New Delhi
	:- Mr. Vineet Lochan Gupta, C.E.O., Save Techno Engineers, Gurgaon
Co-opted members	:- Mr. Srikumar Ghosh, Former Chief Advisor & Director(Emeritus),CES (I) P Ltd, New Delhi
	:- Dr. Abhay Gupta, Director, Skeleton Consultants Pvt. Ltd., Noida
	:- Mr. R Gogia, Principal Consultant, Engineering Project Consultants, New Delhi
Publication Committe	e (IAStructE)
NAME	Designation
Mr. Manoj Mittal	Chairman, Publication Committee and immediate Past President, IAStructe & Chier
Mr. Manoj Mittal	Mentor - Shelter Consulting Engineers
Mr. Alok Bhowmick	Mentor - Shelter Consulting Engineers President, IAStructe& Managing Director - B&S Engineering Consultants Pvt Ltd
Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abbay Gupta	Chairman, Publication Committee and Immediate Past President, IAStructe & Chier Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt, Ltd
Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma	Chairman, Publication Committee and Immediate Past President, IAStructE & Chief Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar	Chairman, Publication Committee and Immediate Past President, IAStructe & Chief Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD Fellow member IAStructE & Head, Earthquake Engineering Research Centre, IITT
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar	 Chairman, Publication Committee and Immediate Past President, IAStructe & Chief Mentor - Shelter Consulting Engineers President, IAStruct& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD Fellow member IAStructE & Head, Earthquake Engineering Research Centre, IITT Hyderabad
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar Mr. Rajiv Ahuja	 Chairman, Publication Committee and Immediate Past President, IAStructE & Chief Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD Fellow member IAStructE & Head, Earthquake Engineering Research Centre, IITT Hyderabad Governing Council member, IAStructE & Independent Consultant (Highway & Bridges)
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar Mr. Rajiv Ahuja Mr. Amandeep Garg	 Chairman, Publication Committee and Immediate Past President, IAStructe & Chief Mentor - Shelter Consulting Engineers President, IAStruct& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStruct & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStruct & Former, Spl. Director General, CPWD Fellow member IAStruct & Head, Earthquake Engineering Research Centre, IITT Hyderabad Governing Council member, IAStruct & Independent Consultants (Highway & Bridges) Member IAStruct & Director, Creative Design Consultants & Engineers Pvt. Ltd.
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar Mr. Rajiv Ahuja Mr. Amandeep Garg Ms. Anal Sheth	 Chairman, Publication Committee and Immediate Past President, IAStructE & Chief Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD Fellow member IAStructE & Head, Earthquake Engineering Research Centre, IITT Hyderabad Governing Council member, IAStructE & Independent Consultants (Highway & Bridges) Member IAStructE & Director, Creative Design Consultants & Engineers Pvt. Ltd. Member, IAStructE & Assistant Professor, CEPT University
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar Mr. Rajiv Ahuja Mr. Amandeep Garg Ms. Anal Sheth Committee Meeting(s)	 Chairman, Publication Committee and Immediate Past President, IAStructE & Chief Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD Fellow member IAStructE & Head, Earthquake Engineering Research Centre, IITT Hyderabad Governing Council member, IAStructE & Independent Consultant (Highway & Bridges) Member IAStructE & Director, Creative Design Consultants & Engineers Pvt. Ltd. Member, IAStructE & Assistant Professor, CEPT University
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar Mr. Rajiv Ahuja Mr. Amandeep Garg Ms. Anal Sheth Committee Meeting(s)	Chairman, Publication Committee and Immediate Past President, IAStructE & Chief Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD Fellow member IAStructE & Head, Earthquake Engineering Research Centre, IITT Hyderabad Governing Council member, IAStructE & Independent Consultant (Highway & Bridges) Member IAStructE & Director, Creative Design Consultants & Engineers Pvt. Ltd. Member, IAStructE & Assistant Professor, CEPT University
Mr. Manoj Mittal Mr. Alok Bhowmick Dr. S. Chatterjee Dr. Abhay Gupta Mr. A. K. Sharma Dr. R. Pradeep Kumar Mr. Rajiv Ahuja Mr. Amandeep Garg Ms. Anal Sheth Committee Meeting(s) <i>IAStructE Publication (</i> The meeting of the Putaken. It was decided such as Commentary a	Chairman, Publication Committee and Immediate Past President, IAStructe & Chief Mentor - Shelter Consulting Engineers President, IAStructE& Managing Director - B&S Engineering Consultants Pvt Ltd Chief Editor - SED & Governing Council member, IAStructE Governing Council member, IAStructE & Director, Skeleton Consultants Pvt. Ltd Fellow member IAStructE & Former, Spl. Director General, CPWD Fellow member IAStructE & Head, Earthquake Engineering Research Centre, IITT Hyderabad Governing Council member, IAStructE & Independent Consultant (Highway & Bridges) Member IAStructE & Director, Creative Design Consultants & Engineers Pvt. Ltd. Member, IAStructE & Assistant Professor, CEPT University Committee meeting held on 04.06.2019 Jublication Committee was held on 04 June 2019, in which various decisions were I to publish the various technical documents for practicing structural engineers nd Explanatory Handbooks on various codes. Some of them are :

- 4. Commentary on Explanatory Handbook IS : 13920
- 5. Handbook on IS 875 (part III)
- 6. Commentary on Explanatory Handbook on IRC 6
- 7. Documents on Learning from Structural Failures Case Studies

The members who are interested in contributing in the above or any other documents may please write to us at iastructe@gmail.com.

Technical Lecture

Technical Lecture by Mr. Aman Deep, Director, Creative Design Consultants & Engineers Pvt. Ltd on the topic "Retrofitting Design of Udaipur Station Building" was organized on 7th June 2019 at New Delhi.



Refresher Course on "Building Sustainable Structures: Green Concepts"

The Refresher Course on "Building Sustainable Structures: Green Concepts" was organized from 18th May 2019 to 29th June 2019 at Bennett University, Greater Noida. It was organized by IAStructE in collaboration with Bennett University and sponsored by AEON Integrated Building Design Consultants LLP. This was a 28 hrs course with a lectures held on Saturday morning from 09:30 AM to 01:45 PM. It was attended by 31 delegates, which included Academicians, Students, Engineers and Architect. Dr Talakokula Visalakshi and Mr Deepak Bansal, IAStructE GC members were the Course Coordinators. Lectures were delivered by the following eminent speakers:

- Mr. Manoj Mittal, Consulting Civil & Structural Engineer & Immediate Past President IAStructE
- Mr. Sanjay Pant, Director & Head Civil Engg., Bureau of Indian Standards
- Prof. Shashank Bishnoi, Associate Professor, Civil Engg. Department, IIT Delhi
- Prof. Suresh Bhalla, Professor, Civil Engg. Department, IIT Delhi
- Dr. T. Visalakshi, Professor & Head, Civil Engg. Dept. Bennett University
- Mr. Vipul Ahuja, CEO & Director, Ahuja Consultants P Ltd
- Prof. B. Bhattacharjee, Professor, Civil Engg., IIT Delhi
- Mr. Amor Kool, Director, Kaleidoscope
- Mr. B. P. Ranga Rao, General Manager CDR, NCCBM
- Dr. Vishal Garg, Professor & Head, Building Science, IIIT Hyderabad
- Mr. Ashish Jain, Partner and Mr Saurabh Goyel, Director, AEON Integrated Building Design Consultants
- Ms. Priyanka Kochar, Regional Manager, Green Business Certification Inc (GBCI India)
- Mr. Deepak Bansal, Jt. General Manager (Projects), HUDCO

The Panel Discussion & Question Answer session was organized on 29th June 2019 the last day of lecture, in which Mr Alok Bhowmick, President IAStructE, Mr Vivek Bhushan Sood, Chief GM (Civil), Indian Railway Stations Development Corporation Ltd, Dr Priyadarshini, Associate Professor, Bennett University, Mr Deepak Bansal, Jt. GM- HUDCO and Dr T. Visalakshi, Professor & HOD (Civil), Bennett University, were invited as Panellists.



Panel Discussion in progress

Call for articles	Call for advertisement in Newsletter	
The Chairman and other members of the SED Editorial Board invite article contributions for the quarterly journal of the Indian Association of Structural Engineers, the Structural Engineering Digest. Write to iastructe@gmail.com for \$	The association invites sponsored advertisement for the IAStructE newsletter. The rates for advertisement in the IAStructE monthly Newsletter are as follows: Half page Rs. 7,000/- per issue, 10% rebate for quarterly, 20% rebate for half yearly and 30% rebate for yearly booking. Full page Rs. 10,000 per issue, 10% rebate for quarterly, 20% rebate for half yearly and 30% rebate for yearly booking.	
 Sponsored Advertisement Deadline for submission in next issue: 1st September 2019 		
Submission template and ethics statement can be availed by emailing <u>iastructe@gmail.com</u> .	(Kindly note that the GST @ 18% shall be payable on reverse charge)	
Featured Article(s):		

Pedestrian Bridge Collapse at Florida International University, Miami, FL - Report of Investigation of March 15, 2018

In April 2018 newsletter of IAStructE, we had reported in detail about the collapse of this pedestrian bridge at Miami, Florida. Just to recap, on March 15, 2018, at approximately 1:45 p.m., a pedestrian bridge under construction in Miami, Florida, collapsed. One employee and five motorists were fatally injured, and another employee permanently disabled, when the bridge fell as the motorists waited for the traffic light underneath the bridge and as the employees were performing work activities on top of the bridge structure. The bridge at the present stage of construction consisted of a single concrete truss spanning approximately 174 feet (53m) and weighing approximately 930 tons. It was placed over the piers just five days prior to the collapse. An adjoining span of concrete truss was to be constructed next over the canal to make a continuous bridge of 289 feet (88m). The concrete bridge was cast at a nearby off-site location using what is known as Accelerated Bridge Construction (ABC) and then transported to its final location. ABC provides minimal traffic disruption. The bridge was financed through federal grants, and constructed at the campus of Florida International University (FIU) in Miami. The FIU project was a class A Local Agency Program (LAP) project. The bridge would connect the FIU campus with the City of Sweetwater where many FIU students reside.



The Occupational Safety and Health Administration (OSHA) conducted an investigation into this collapse and prepared a report, which is now available in public domain. The 115-page report by the Occupational Safety and Health Administration, obtained Tuesday by the Miami Herald, finds plenty of blame to spread around for the collapse of the bridge last year while under construction. The report can be downloaded from the link :

https://www.osha.gov/doc/engineering/pdf/2019_r_03.pdf

The summary of conclusions drawn as a result of the investigation is as follows :

- 1. FIGG Bridge Engineers (FIGG), the Engineer of Record (EOR), failed to recognize that the bridge was in danger of collapsing when it inspected it hours before the collapse. The concrete truss had developed numerous wide and deep structural cracks jeopardizing the integrity of the bridge. The EOR should have immediately instructed that the bridge be shored at appropriate locations and SW 8th Street be closed. At the time of collapse, the post-tensioning bars were being re-tensioned at the specific instructions of the EOR.
- 2. The bridge had structural design deficiencies that contributed to the collapse during construction stage III. The cracks on the bridge occurred due to deficient structural design.
- 3. The morning of the incident, EOR held a meeting with project participants after evaluating the cracks over the course of the previous two days. At that meeting, the EOR acknowledged that his computations could not replicate the cracks and therefore, he did not know why the cracks were occurring. The Construction Engineer and Inspector (CEI) of the project advised the EOR at this meeting that the cracks were lengthening daily. Despite these admissions and the knowledge that the cracks were growing in size, EOR stated more than once that the cracks did not present any safety concerns.
- 4. The magnitude of the cracks warranted that SW 8th Street be immediately closed, and the concrete truss be shored and supported at multiple intermediate locations to reduce the loads in the north diagonal and the node until final evaluations were done and remedial measures implemented.
- 5. Networking Engineering Services, Inc. dba Bolton Perez and Associates, Inc. (BPA) was retained by FIU to be the CEI of the project. BPA failed to classify the cracks, which were structural in nature, in accordance with the Florida Department of Transportation (FDOT) requirements. BPA, as a CEI, was expected to exercise its own independent professional judgement in accordance with their contract with FIU and FDOT requirements. With intimate knowledge of extensive cracking on the bridge, BPA failed to recognize that the bridge was in danger of collapsing, and did not recommend to FIU, MCM or others to close the street and shore the bridge, regardless of the opinion held by the EOR.
- 6. Munilla Construction Management, Inc. (MCM), the design-build contractor, was aware that the cracks were "getting larger" as reported by MCM superintendent and quality control personnel on March 12 and 14, 2018. On March 13, 2018, EOR stated in an email to MCM, among the list of facts, that "since Saturday (March 10, 2018), MCM has been monitoring the cracks and they have not grown in size." MCM should have immediately informed EOR on March 14, 2018, that this assumption was not valid. Despite this oversight on the part of MCM, EOR was provided with photographs and measurements of the cracks in the days leading up to the collapse and was specifically informed by BPA during the morning meeting on March 15, 2018, that the cracks were lengthening.
- 7. MCM, the design-build contractor, deferred to the decision of EOR and failed to exercise its own independent professional judgement, as a constructor of the bridge, to close the traffic on SW 8th Street until the cause of the cracks were conclusively determined by EOR and peer reviewed. MCM had extensive construction experience in concrete structures and had intimate knowledge of the magnitude of cracks, which were growing in size daily. MCM's deference to EOR in light of the conclusion No. 6 above, and failure to exercise their own independent judgment with regard to implementing necessary safety measures were unreasonable.
- 8. The evaluations of the cracks by EOR, and his recommendation to re-tension the posttensioning bars of diagonal 11, were not included in the original design and therefore should have been subject to peer review.

- 9. The consultant retained by EOR to conduct independent peer review of the EOR's design, as per FDOT requirements, did not check the structural integrity of the bridge under different construction stages, a violation of the FDOT requirements. The independent check was performed only under the final design stage when all segments of the bridge were constructed and completed.
- 10. EOR failed to provide construction documents to Louis Berger at 30%, 60% and 90% of completion of construction documents, in accordance with the FDOT requirements.
- 11. EOR should have known that the consultant who conducted the peer review did not check the structural design of the truss design at stage III, as required by FDOT, meriting extra safety precautions by EOR.
- 12. EOR should have known that the truss was a non-redundant structure and if one diagonal member failed, the entire bridge could collapse. Given the nature and extent of the cracking and the non-redundancy of the bridge design, necessary safety precautions should have included closing the roadway below the bridge and immediately providing shoring to the bridge at suitable locations until a complete evaluation was done.



The article has been compiled by Er. Alok Bhowmick. He is the President of the IAStructE and Managing Director of B&S Engg. Consultants Pvt. Ltd. He is a hardcore structural engineering professional and a team member of various committees on Indian standards for civil and structural engineering.

A Biomimicry illustration

The Eastgatecentre, Zimbabwe: A green concept adopted from nature

The recent course successfully concluded by the IAStructE on "Building sustainable structures: Green Concepts" brings to mind this interesting biomimetic inspiration of the termite mound adapted in the Eastgate centre in Harrare, Zimbabwe to benefit as a passive and low energy heating and cooling system. Architects and structural engineers have a great deal to learn from nature. The interdisciplinary study of biology and technology is often coined under the term "Biomimicry" or "Biomimetics"; as defined by the biomimicry institute, it is an "approach to innovation that seeks sustainable solutions to human challenges by emulating nature's time-tested patterns and strategies. The goal is to create products, processes, and policies—new ways of living—that are well-adapted to life on earth over the long haul."



Mound-building macro-termites construct vertical mounds out of soil, saliva, and dung, with some mounds in Africa measuring up to several meters high. The mounds generally resemble chimneys, with some mounds having large vents while others lack large openings but have porous walls. Inside these mounds, worker termites can dig a complex array of tunnels of various sizes. The termites themselves live in nests below ground in colonies that can contain up to a million individuals. The termite mounds function much like mammalian lungs and act as accessory organs for gas exchange in the underground nests. The soil has a large thermal capacity, meaning it can absorb or lose large amounts of heat energy before experiencing any changes in temperature. In a way, the soil around the termite nest acts as a "buffer" against daily changes in outside temperature.

The mound structure facilitates gas exchange in the underground colony. The main mechanism is through internal air currents driven by solar heat. As outside temperatures change throughout the day and the sun strikes different surfaces on the mound, temperature gradients develop between the mound periphery and center. These temperature gradients create currents of rising and falling air inside the mound. The direction of these currents varies as temperature gradients change throughout the day. Wind energy from unsteady airflows outside the mound also plays a secondary role in ventilation. The internal airflows promote mixing between air in the mound and air in the nest, ultimately facilitating gas exchange in the nest. This growing understanding of macrotermite mound structure and function is inspiring new biomimetic technologies in energy-saving climate control systems.

The Eastgate Centre in Harare, Zimbabwe, is an example of this green architecture and ecologically sensitive adaptation. The country's largest office and shopping complex is a marvel in its use of biomimicry principles. The mid-rise building, designed by architect Mick Pearce in collaboration with Arup engineers, has no conventional air-conditioning or heating, yet stays regulated year round with dramatically less energy consumption using design methods inspired by indigenous Zimbabwean masonry and the self-cooling mounds of African termites!

The Eastgate Centre, largely made of concrete, has a ventilation system which operates in a similar way. Outside air that is drawn in is either warmed or cooled by the building mass depending on which is hotter, the building concrete or the air. It is then vented into the building's floors and offices before exiting via chimneys at the top. The complex also consists of two buildings side by side that are separated by an open space that is covered by glass and open to the local breezes. Air is continuously drawn from this open space by fans on the first floor. It is then pushed up vertical supply sections of ducts that are located in the central spine of each of the two buildings. The fresh air replaces stale air that rises and exits through exhaust ports in the ceilings of each floor. Ultimately it enters the exhaust section of the vertical ducts before it is flushed out of the building through chimneys.

The Eastgate Centre uses less than 10% of the energy of a conventional building its size. These efficiencies translate directly to a saving of \$3.5 million by avoiding an air-conditioning system and 20 % lower operational costs of the building users.

Sources of content and pictures: https://inhabitat.com https://biomimicry.org https://asknature.org



The article has been compiled by Anal Sheth. She is a structural engineering graduate of University of Illinois, Urbana Champaign, USA with a professional experience of 5 years in the USA and a decade of academic and research experience at CEPT University, Ahmedabad. Her interests include sustainable materials, structures and transportation systems. Additionally, she is also interested in the documentation and redevelopment of heritage structures.

New IAStructE members

FELLOW" Grade Members

M/S No	Name	Designation, Organization	City		
F-452	Mr. Praveen Vasishth	Structural Engineer, Sudha Technical Consultants Pvt Ltd	New Delhi		
F-453	Mr. Shishir Bansal	Chief Project Manager, DTTDC	New Delhi		
F-454	Mr. Uttam Sen	Deputy Director, Lea Associates South Asia Pvt. Ltd	New Delhi		
F-455	Mr. Runal Kanti Bhattacharyya	Chief General Manager, Lea Associates South Asia Pvt. Ltd Chief General Manager, Lea Associates South Asia Pvt. Ltd	New Delhi		
F-456	Mr. Sanjay Mandal		New Delhi		
F-457	Mr. MangalTalukdar	Deputy General Manager, Lea Associates South Asia Pvt. Ltd	New Delhi		
"MEMBER" Grade Members					
M/S No	Name	Designation, Organization	City		
M-273	Mr. Gaurav Maroo	Structural Engineer, McDermott International	Gurgaon		
M-274	Mr. Amitra Sudan Nandi	Sr. Structural Engineer, McDermott International Sr. Structural Engineer, McDermott International Sr. Structural Engineer, McDermott International	Gurgaon		
M-275	Mr. Naresh Kumar Dagur		Gurgaon		
M-276	Mr. Das, Debjyoti		Gurgaon		
M-277	Ms. Monali Bose	Sr. Engineer (Structures), Lea Associates South Asia Pvt. Ltd	New Delhi		
"ASSOCIATE MEMBER" Grade Members					
M/S No	Name	Designation, Organization	City		
AM-283	Mr. Mohit	Structural Engineer, McDermott International	Gurgaon		
AM-284	Mr. Yaseen Ahmad	Managing Director, Building Creators & Consulting	U.S. Nagar (Uttarakhand)		
AM-285	Mr. BhupeshSingla	Deputy Engineer(Highways), Lea Associates South Asia Pvt. Ltd	New Delhi		
AM-286	Mr. Mayank Kumar Singh	Sr. Engineer (Highways), Lea Associates South Asia Pvt. Ltd	New Delhi		

About IAStructE

The 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 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 centers 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.

How to become a member?

Membership form and details are available at<u>http://www.iastructe.co.in/membership-form.html</u> For membership information and other details contact the Indian Association of Structural Engineers Secretariat.

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. [Released]
- 4 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

IAStructE Secretariat

Indian Association of Structural Engineers

K-69A, Basement, Kalkaji, New Delhi 110019

A recent important letter issued by IAStructE Preparation of Commentary/Handbook on some important BIS & IRC standards



Date: 26th June 2019

Dear Civil/Structural Engineering Friends,

The Indian Association of Structural Engineers (IAStructE) have decided to undertake the task of preparing Explanatory Handbook and Commentary of some of the important codes published by the Indian Roads Congress (IRC) & Bureau of Indian Standards (BIS). The objective of this exercise is to make them easy to understand and hence ensure better compliance of the code. The documents prepared will provide commentary to various clauses of the code, highlight the provisions that are likely to cause confusion among the practitioners, and may be potentially difficult to implement leading to poor codal compliance. There will also be recommendations for modifications in the codal provisions for consideration of IRC/BIS committees.

To begin with, we have taken up the task of preparation of Commentary & Explanatory handbook on the following standards. Name of the Convener to coordinate this exercise is also given against each standard.

S. No.	Title of the Code / Standard	Name of the Convener	
1.	IRC:6-2017 "Standard Specification and Codes of Practice for Road Bridges - Section II, Loads & Load Combinations (Seventh Revision)	Mr. Alok Bhowmick, President IAStructE & MD - B&S Engg. Consultants (<u>bsec.ab@gmail.com</u>) & Mr. Rajiv Ahuja, GC Members IAStructE & Independent Consultant (Highway & Bridges) (<u>rahuja2155@gmail.com</u>)	
2.	IS:875 (part3) "Wind Loads for Buildings & Structures" *	Dr Abhay Gupta, GC member IAStructE & Director, Skeleton Consultants (drabhaygupta62@gmail.com)	
3.	IS:13920 :2016 "Ductile Design and Detailing of RCC structures subjected to Seismic forces"	Mr. Bhavin Shah, GC member IAStructE & CEO, VMS Engineering & Design Services Consultants (<u>bhavin.design@gmail.com</u>)	

*In association with ISWE

We intend to involve experts in the field as well as a wide audience of professionals and academics in this exercise. Intent is not only to seek inputs, but also to create awareness about these documents amongst the structural engineers. This to further inform you that similar work on IS: 1893 part 1:2016 is in advanced stage.

I take this opportunity to request the civil/structural engineers who are conversant with these standards to please examine these standards and forward views/suggestions for the preparation of these documents. You may also share any difficulties which you are experiencing in your profession, in implementing these codes. We will also welcome suggestions / feedback from structural engineers regarding any other national codes and standards for which they want the association to provide commentary.

Last Date for receiving comments is 31/07/2019. Comments if any may please be made in the attached format and mailed to Mr. Vikas Verma through e-mail at <u>iastructe@gmail.com</u>. You may also contact the identified resource persons mentioned above.

With best regards,

Manoj Mittal Chairman, Publication Committee & Immediate Past President-IAStructE

FORMAT FOR SENDING COMMENTS ON IAStructE DOCUMENTS

Comments shall be sent through e-mail to <u>iastructe@gmail.com</u>

Document Title:

Name of the Commentator/Organization: _____

Sl. No. (1)	Clause/Sub- clause/Para/Table/Figure No. commented (2)	Justification (3)	Proposed Change (4)