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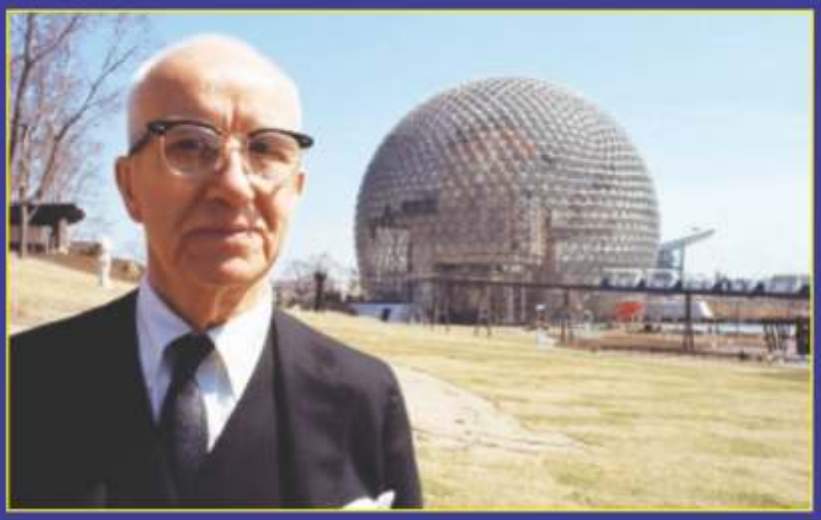

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Seminar report on "Innovations in Structural Design and Construction" at WorldBuild-India, on Saturday 22nd April 2017, Bombay Exhibition Centre Mumbai

(See page 8)

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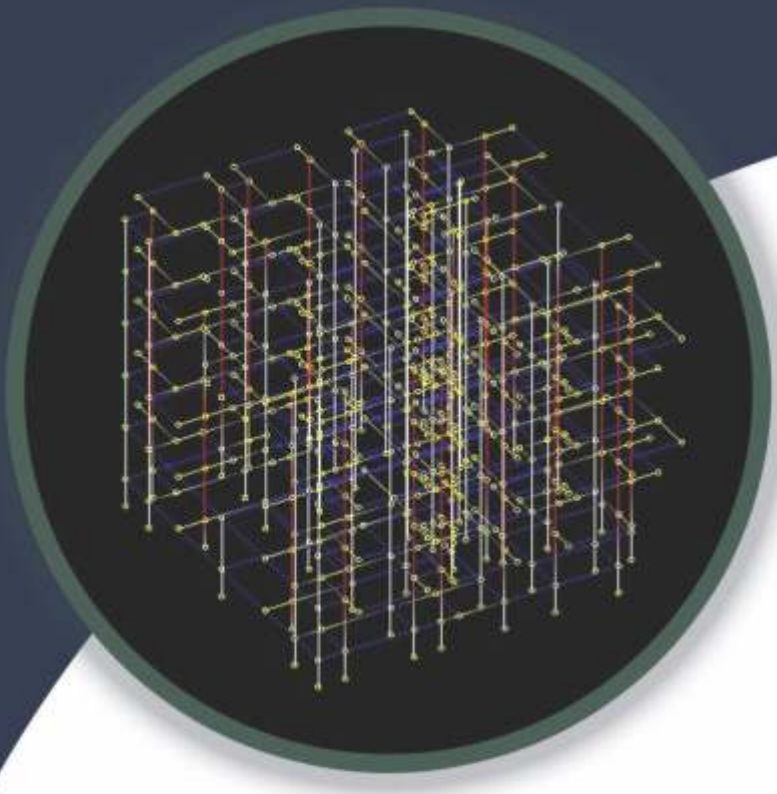

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Fraternity News

WELCOME TO NEW MEMBERS

(Jan. – Feb. – Mar. 2017)

M – 1537	Vaibhav Ramesh Parab	M – 1545	Swati Gopalrao Ghadge
M – 1538	Umesh Hari Bhujbalrao	M – 1546	Rakesh Shantilal Firodiya
M – 1539	Nishant Suresh Borse	M – 1547	Satheesh Kumar Martha
M – 1540	Pramod Arun Wagh	M – 1548	Manoj Ashok Baraskar
M – 1541	Abhinav Sanjay Hapse	M- 1549	Arivanantham.T
M -1542	Aksha Kumar an K M	M – 1550	Swati Chandrakishore Harshe
M -1543	Nitin Vijay Lale	M – 1551	Mandar Dattatraya Ambekar
M -1544	Satish Basavaraj Thalange	PM - 36	Amol Indrakumar Bora

Patrons : 36	Organisation Members : 23	Sponsor : 8
Members : 1551	Junior Members : 43	IM : 01

TOTAL STRENGTH 1662

- ❄ Structural; Designing & Detailing
- ❄ Computer Software
- ❄ Materials Technology, Ferrocement
- ❄ Teaching, Research % Development
- ❄ Rehabilitation of Structures
- ❄ Construction Technology & Management
- ❄ Geo-Tech & Foundation Engineering
- ❄ Environmental Engineering
- ❄ Non Destructive Testing
- ❄ Bridge Engineering & Other related branches

1. To restore the desired status to the Structural Engineer in construction industry and to create awareness about the profession.
2. To define Boundaries fo Responsibilities of Structural Engineer, commensurate with remuneration.
3. To get easy registration with Governments, Corporations and similar organizations all over India, for our members.
4. To reformulate Certification Policies adopted by various authorities, to remove anomalies.
5. To convince all Govt. & Semi Govt. Bodies for directly engaging Structural Engineer for his services.
6. To disseminate information in various fields of Structural Engineering, to all members.

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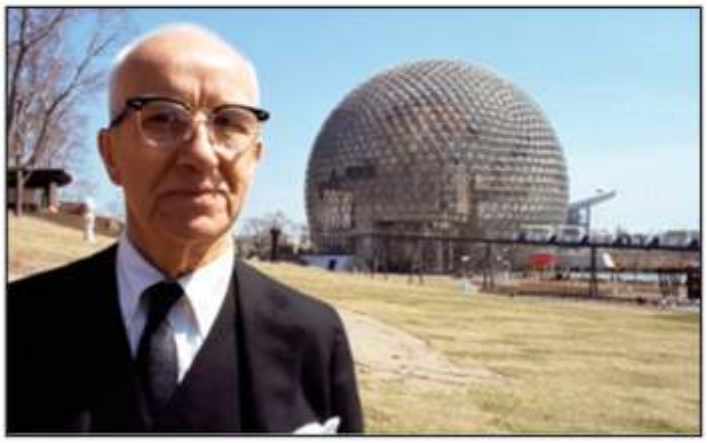
GEM 12: R. Buckminster Fuller, The Great Inventor

Dr. N. Subramanian
Er. Vivek G. Abhyankar



Buckminster Fuller (12th June 1895 – 1st July 1983) and his famous geodesic dome

Interestingly, in this issue, we are discussing about a great inventor, who does not have a formal / professional degree in Civil Engineering, but has contributed to the field of Civil Engineering through his innovative designs!

Hailed as "one of the greatest minds of our times," R. Buckminster Fuller was renowned for his comprehensive perspective on the world's problems. For more than five decades, he developed pioneering solutions that reflected his commitment to the potential of innovative design to create technology that does "more with less" and thereby improves human lives.

Early life

Born in Milton, Massachusetts, on July 12, 1895, Richard Buckminster Fuller belonged to a family noted for producing strong individualists inclined toward activism and public service. "Bucky," as he came to be called, developed an early understanding of nature during family excursions to Bear Island, Maine, where he also became familiar with the principles of boat maintenance and construction.

University Life

Fuller entered Harvard University in 1913, but he was expelled after excessively socializing and missing his midterm exams. Following his expulsion, he worked at a mill in Canada, where he took a strong interest in machinery and learned to modify and improve the manufacturing equipment. Fuller returned to Harvard in the autumn of 1915 but was again dismissed.

Service in U.N. Navy

From 1917 until 1919, Fuller served in the U.S. Navy, where he demonstrated his aptitude for engineering by inventing a winch for rescue boats that could remove downed airplanes from the water in time to save the lives of pilots.

As a result of the invention, Fuller was nominated to receive officer training at the U.S. Naval Academy, where he further developed his ability to study problems comprehensively.

First Patent and Period of Seclusion

In 1926, when Fuller's father-in-law, James Monroe Hewlett, developed a new method of producing reinforced concrete buildings, he and Fuller patented the invention, earning Fuller the first of his 25 patents.

In 1927, after the construction company failed, Fuller was unemployed and contemplated suicide, but had a remarkable realization. Deciding that he had no right to end his own life, he concluded that he had a responsibility to use his experiences and intellect in the service of others. As a consequence, he spent nearly two years in isolation, deep in contemplation about the universe and how he could best contribute to humanity.

Dymaxion™ House

U.S. pilots stand in front of a cluster of Dymaxion Deployment Units, North Africa, 1944 (Source: www.alastairgordonwalltowall.com)

One of Fuller's lifelong interests was using technology to revolutionize construction and improve housing. In 1927, after inventing an easily built, air-delivered, modular apartment building, he designed the Dymaxion™ House, an inexpensive, mass-produced home that could be airlifted to any location. Originally called the 4D House, it was later renamed by a department store that displayed a model of the house. The word "dymaxion" was coined by store advertisers and trademarked it in Fuller's name. It was derived from the words "dynamic," "maximum," and "tension," and became a part of the name of many of Fuller's subsequent inventions. The word became synonymous with his design philosophy of "doing more with less", a phrase he later coined to reflect his growing recognition of the accelerating global trend toward the development of more efficient technology.

Dymaxion Car

The Dymaxion car, featured prominently at Chicago's 1933-1934 World's Fair

His inventions included the Dymaxion Car, a streamlined, three-wheeled automobile that could make extraordinarily sharp turns; a compact, prefabricated, easily installed Dymaxion Bathroom; and Dymaxion Deployment Units (DDUs), mass-produced houses based on circular grain bins.

The Dymaxion car's aerodynamic bodywork was designed for increased fuel efficiency and top speed, and featured a lightweight hinged chassis, rear-mounted V8 engine, front-wheel drive (a rare RF layout), and three wheels. With steering via its third wheel at the rear (capable of 90° steering lock), the vehicle could steer itself in a tight circle, often causing a sensation.

While DDUs never became popular for civilian housing, they were used during World War II to shelter radar crews in remote locations with severe climates, and they led to additional round housing designs by Fuller.

The Geodesic Dome

The Montréal Biosphère, formerly the American Pavilion of Expo 67, by R. Buckminster Fuller, on Île Sainte-Hélène, Montreal, Quebec

After 1947, one invention dominated Fuller's life and his career: the geodesic dome. Although Fuller was not the original inventor, he is credited with the popularization of this idea for which he received the U.S. patent No. 2,682,235 on 29 June 1954 (The first dome that could be called "geodesic" was designed by Walther Bauersfeld, chief engineer of the Carl Zeiss optical company, and constructed by the firm of Dykerhoff and Wydmann, on the roof of the Zeiss plant in Jena, Germany around 1926. But only after 20 years, R. Buckminster Fuller named the dome "geodesic"-a lattice of interlocking

icosahedrons that could be covered with a protective cover). Lightweight, cost-effective, and easy to assemble, geodesic domes enclose more space without intrusive supporting columns than any other structure; they efficiently distribute stress; and they can withstand extremely harsh conditions. Based on Fuller's "synergetic geometry," his lifelong exploration of nature's principles of design, the geodesic dome was the result of his revolutionary discoveries about balancing compression and tension forces in building.

Fuller applied for a patent for the geodesic dome in 1951 and received it in 1954. In 1953 he designed his first commercial dome for the Ford Motor Company headquarters in Dearborn, Michigan. The U.S. military became one of his biggest clients, using lightweight domes to cover radar stations at installations around the Arctic Circle. According to the Buckminster Fuller Institute, today there are more than 300,000 geodesic domes around the world, ranging from shelters in California and Africa to radar stations in remote locations, as well as geodesic structures on countless children's playgrounds.

Spaceship Earth, EPCOT Center in Walt Disney World (Bay Lake, Florida), opened in 1982, is actually a geodesic sphere, as a dome is only part of a sphere.

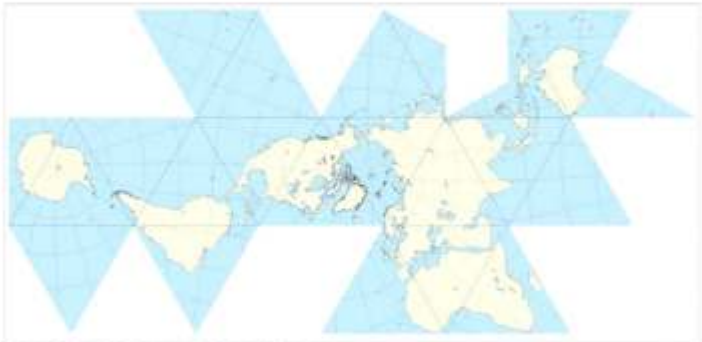
The Climatron greenhouse at Missouri Botanical Gardens, built in 1960 and designed by Thomas C. Howard of Synergetics, Inc., inspired the domes in the science fiction movie Silent Running

Fuller's own home, Carbondale, Illinois, built in the 1960s by him and his wife, Lady Anne, in just 7 hours using 60 wooden triangle panels. The pair lived in the house until 1971. It was recognized as a historic land mark by USA's National Register of Historic Places in 2006 (Photo: http://inhabitat.com)

Global Thinker

Fuller was a pioneering global thinker. In 1927, at the beginning of his career, he made a now-prophetic sketch of the total earth which depicted his concept for transporting cargo by air "over the pole" to Europe. He entitled the sketch "a one-town world." In 1946, Fuller received a patent for another breakthrough invention: the Dymaxion Map, which depicted the entire planet Earth on a single flat map without visible distortion of the relative shapes and sizes of the continents. The map, which can be

reconfigured to put different regions at the center, was intended to help humanity better address the world's problems by prompting people to think comprehensively about the planet. It is a projection of a world map onto the surface of an icosahedron, which can be unfolded and flattened to two dimensions.



Public Domain R. Buckminster Fuller/ Wikipedia

The Dymaxion Map, developed in 1946

In the early 1950's he coined the now familiar phrase "spaceship earth" to describe the integral nature of Earth's "living system." Beginning in the late 1960s, Fuller was involved in creating World Game®, a large-scale simulation and series of workshops he designed that used a large-scale Dymaxion Map to help humanity better understand, benefit from, and more efficiently utilize the world's resources.

Recognition & Awards

Throughout his life, Fuller found numerous outlets for his innovative ideas. During the early 1930s he published the Shelter magazine, and from 1938 until 1940 he was science and technology consultant for Fortune magazine. During the 1940s, he began to teach and lecture at universities, including Harvard and MIT, and in the late 1950s he became a professor at Southern Illinois University (SIU), where he and his wife lived in a geodesic dome when he was in residence. In 1972 he was named World Fellow in Residence to a consortium of universities in Philadelphia, including the University of Pennsylvania. He retained his connection with both SIU and the University of Pennsylvania until his death. He spent much of his life traveling the world, lecturing and discussing his ideas with thousands of audiences.

Some of Fuller's many honors highlight his eclectic reputation: For example, because he sometimes expressed complex ideas in verse to make them more understandable, in 1961 he received a one-year appointment to the prestigious Charles Eliot Norton Professorship of Poetry at Harvard. After being spurned early in his career by the architecture and construction establishments, Fuller was later recognized with many major architectural, scientific, industrial, and design awards, both in the United States and abroad, and he received 47 honorary doctorate degrees. In 1983, shortly before his death, he received the Presidential Medal of Freedom, USA's highest civilian honor, with a citation acknowledging that "his contributions as a geometrician, educator, and architect-designer are benchmarks of accomplishment in their fields."

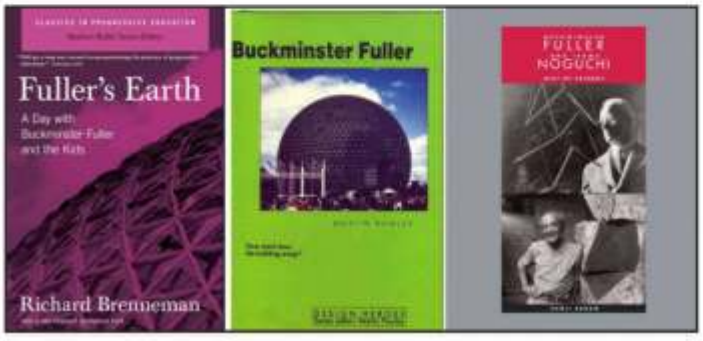
After Fullers death, when chemists discovered that the atoms of a recently discovered carbon molecule were arrayed in a structure similar to a geodesic dome, they named the molecule "buckminsterfullerene."

R. Buckminster Fuller died in Los Angeles on July 1, 1983.

BOOKS:

Fuller authored 30 books over the course of his career (see https://www.bfi.org/about-fuller/resources for a more comprehensive list). Several of these books, including Synergetics I and II are available online at bfi.org and other sites.

In addition, several books have been written about him; See the complete list at: https://www.bfi.org/about-fuller/bibliography/books-about-fuller



ACKNOWLEGEMENTS:

The photos used in this article have been extracted from the Web and Wikipedia sites.

Sources and further reading

1. https://www.bfi.org/
2. https://en.wikipedia.org/wiki/Geodesic_dome
3. https://en.wikipedia.org/wiki/Dymaxion_car

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(WITHOUT PREJUDICE)

SOME INTERPRETATION AS TO APPREHENDED RESPONSIBILITES ON STRUCTURAL ENGINEERS UNDER RERA (REAL ESTATE REGULATIONS ACT)

Satish Dhupelia

Some concerns are raised by some Consulting Structural Engineers, in interpretation of their apprehended Role, within the meaning of "Engineer" under RERA.

The clarification are amply available in RERA Act, itself, as to meaning and functions expected of "ENGINEER", (and not the Structural Engineer on Record.)

(A) In this matter, please Refer to FORM-2 {See Regulation3}, titled "ENGINEER'S CERTIFICATE", who , amongst other Details, vide Item 1, has to include, following information.

"Following technical professionals are appointed by Owner / Developer :—

(i) M/s/Shri/Smt as L.S. / Architect
(ii) M/s /Shri /Smt as Structural Consultant
(iii) M/s/Shri/Smt as MEP Consultant
(iv) M/s/Shri/Smt as Quantity Surveyor*

This very clearly implies that the Role of Consulting Structural Engineer, remains the same as it is now, and as limited as per current DC Regulations.

Further, on Page No. 3 of this **FORM-2 (See Regulation 3**), under *Note-

It goes to describe as under

*2. (*) Quantity Survey can be done by the office of **Engineer** or can be done by an independent Quantity Surveyor,whose certificate of quantity calculated can be relied upon by the **Engineer** in case of independent quantity surveyor being appointed by Developer, the name has to be mentioned at the place marked*

*(*) and in case quantity are being calculated by **office Engineer**, the name of the person in the office of **Engineer**, who is responsible for the quantity \ calculated, should be mentioned at the place marked (*)*

(NOTE: the bold letters as highlighted are for purpose of clarity,)

Cont. on Page No. 11

Seminar report on "Innovations in Structural Design and Construction" at WorldBuild-India, on Saturday 22nd April 2017, Bombay Exhibition Centre Mumbai

Dr. Deepali Hadker

This event was organized by **WorldBuild-India**, an initiative by ITE-ABEC, the owners of the world's largest portfolio of building and design shows. WorldBuild-India 2017 was a part of the WORLDBUILD365 series - a premier trade fair showcasing building materials, architectural and engineering innovations as well as technologies that appeal to the key influencers from within the engineering, architectural, building and construction industry. Needless to say, the Tradeshow was a great success and offered opportunities for partnership, collaboration, and technology transfer.

The 3rd day of the event was dedicated to Structural Engineers and their contribution to the built environment. The title of the conclave was "**Innovations in Structural Design and Construction".** It was well attended by over 300 participants and brought together structural designers, construction engineers, and project managers on a common platform to discuss important topics such as alternatives in concept design, the importance of design development and construction techniques.

The event was curated by Dr. Deepali Hadker, Director, Sterling Engineering Consultancy Services Pvt Ltd. There were lectures and presentations by experts in the field, who spoke passionately about the latest technology and up-to-date trends in design and construction.

The Key Note speaker of the day was Mr. Kamal Hadker who will set the tone of this conference. He showcased several projects from the early 70s to present day where innovative ideas were used for the structural design of landmark buildings. Some of the projects he presented were the Bombay Stock Exchange, The ICICI Building in BKC, the Public Utility Building in Bangalore, MRF Headquarters in Chennai, Reliance Antilia, The Sunshine Tower in Mumbai, the Indraprastha Indoor Stadium in New Delhi and the Dhirubhai Ambani Convention and Exhibition Centre, in BKC Mumbai.

This presentation was followed by a lecture by Dr. Nori - Chairman of Shirish Patel & Associates, who has spearheaded several innovative projects across India. He recounted his journey of structural engineering in the past 50 years where he has been at the apex of the consulting fraternity throughout his career. Dr. Nori also spoke about improving office procedures for analysis and design and guiding young engineers in the design process.

The next speaker was Mr. Umesh Joshi - partner at JWC. A Gold Medalist from Pune University and an IIT Bombay graduate, Mr. Joshi has 40 years of rich experience as a structural engineer and he delighted us with his presentation on "How to meet fast-track construction deadlines without compromising quality!"

This was followed by a presentation by Mr. Hemant Vadalkar, a brilliant student of engineering and an ME Gold medallist from VJTI, and a career spanning 25 years. Hemant is proficient with the use of several design software and he has conducted numerous seminars and technical training programs in STAAD pro for consulting engineers. As a member of the committee of the Indian Society of Structural Engineers, he has arranged many technical seminars on software tools, published papers and conducted lectures and workshops. Hemant's presentation addressed "Recent Advances in Software Tools" – where he showed the use of software – right from selection

of appropriate software tools, to understanding capabilities and limitations of the software and compatibility with hardware.

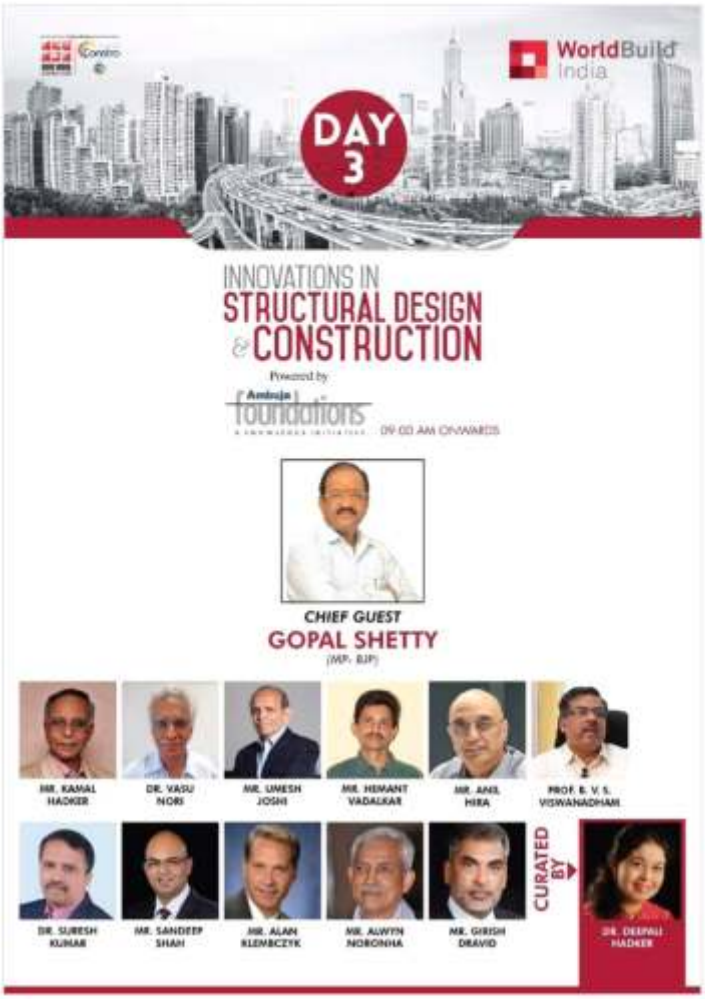
This was followed by a session from our sponsor Ambuja Cements and it was presented by Mr. Hitesh Barot, General Manager, Technical Services. He outlined their keen interest in sharing knowledge among the community and asked the audience to attend the lectures and workshops conducted at the Ambuja Knowledge centers located at Andheri, Thane, Belapur and Nalasopara. He also presented and explained in detail the tools and tests that Holcim has developed like the Holcim Cone, Holcim Blue, and Holcim Heat.

In the post lunch session, we had a delightful presentation by Mr. Anil Hira, who introduced the concept of "Digital Structural Engineering". With over 35 years of consulting experience, Mr. Anil Hira's is the Director and Partner at Buro Happold Engineering and heads its multidisciplinary operations based in Mumbai. He is a world-recognized expert on tall building design. Known for his energy, dedication and focus on producing high-quality delivery - on time and within the budget, he showed several cutting edge ideas in his presentation for use of digital engineering of high-rise structures.

We also had Prof Vishwanadham from the Indian Institute of Technology, Bombay. With a Masters degree from IIT Madras, Prof Vishwanadham completed his doctorate degree from Ruhr – University Bochum in Germany. He spoke about modern tools of foundation design and optimization techniques. Taking us down memory lane, Prof Vishwanadham started from primitive foundation designs when analytical tools were not available, to the latest innovations using software, precautions to be taken while using such programs and comparative studies – between designs carried out with conventional theories and with modern analytical tools.

The next speaker was Dr. Suresh Kumar who holds a Master's, Ph.D. and Post-doctorate degrees in Wind Engineering. As a senior wind engineering consultant, he is currently serving as Principal and managing director of RWDI's operations in India.

Event information



His presentation covered - "Appropriate Application of Wind Forces in Structural Analysis". Dr. Suresh Kumar worked as a wind engineering consultant on many iconic structures around the world including the current tallest building in the world the Burj Khalifa in Dubai. His case studies showed how shapes of the buildings affect the wind flows especially on high-rise buildings, stand-alone structures and dense clusters of tall buildings.

The audience was delighted with the next presentation on Seismic analysis and design. The special invitees were Mr. Sandeep Shah and Mr. Alan Klembczyk. Their presentations addressed – "Seismic Analysis and Design – Over and above the Code Prescription".

Mr. Shah who has an M.Sc. in Earthquake and Civil Engineering Dynamics from the University of Sheffield, and over 27 years of engineering experience, specializes in supplementary damping systems for tall buildings and structures that are

dynamically sensitive. He spoke about some challenging projects like the New ATC Tower at Delhi Airport which is amongst the tallest and most slender ATC tower in the world; the renovation of Terminal 1-C at Delhi Airport; the design of technical parameters for the Fluid Viscous Dampers installed at Terminal T2, Mumbai; the design of the supplementary damping system for the Palais Royale, Mumbai; the seismic upgrade of Apollo Hospital Delhi and many other group housing and commercial buildings.

Alan who is a Mechanical Engineering and has been with Taylor Devices Inc. for last 27 years, is the Vice President of Sales and Engineering and specializes in research, designing and developing shock and vibration mitigating products for a diverse customer base ranging from military applications to civil engineering industry. He spoke about seismic protection and wind effect mitigation with applications around the world to improve the performance of buildings and structures under the wind, seismic and shock vibrations.

The final speaker of the day was Mr. Alwyn Noronha, Executive Vice President – Projects of ITC Ltd – Hotels Division. As the Head of Projects, this is his 41st year with ITC. Mr. Noronha presented his ideas on how to have an Interdisciplinary Approach to Design Development. He cited examples which addressed the need for co-operation between several disciplines like a facade, services, F&B, landscape and interiors which need high levels of co-ordination in hotel buildings. He talked about the importance of interdisciplinary planning and coordination to achieve success in any project.

The seminar concluded with a very interesting "Climatic Session". This was moderated by Mr. Girish Dravid, Director – Sterling Engineering Consultancy Services Pvt Ltd. An IIT Bombay graduate, Girish has over 30 years of experience in planning and designing structures for a variety of buildings be they – high rise residential or commercial buildings, hotels, industrial projects, transportation facilities, townships, hospitals, or mixed use developments.

As a Director at Sterling, he is instrumental in leading design teams for many well known iconic buildings in India and abroad. All along, he has worked passionately to implement advanced design techniques and suggest newer construction methodologies conducive to large building construction projects which are today the symbols of growth of the Indian Economy. Girish has worked in association with international architects and consultants on many projects in India and abroad.

Some of the major projects which Girish has led at Sterling are – The ITC Grand Chola Hotel at Chennai, ITC Grand Central Hotel at Mumbai, Palais Royale in Mumbai, ICICI Regional Head Quarter at Hyderabad - the largest office building constructed with structural steel in India, TSI Bar Building at Hyderabad - the longest (200 m) monolithic building in India, Chepauk Cricket Stadium at Chennai, and the under construction 8 million sq.ft. world class convention and exhibition

Audience

complex at Mumbai. Since 2013, Girish has been actively involved with CTBUH (The Council on Tall Buildings and Urban Habitat which is an international body in the field of tall buildings and sustainable urban design) He is now the Chairman of CTBUH India.

It was a very enjoyable experience being the Curator of such a special event, organized for the first time in India and I am grateful to these incredible structural engineers who made the time and come forward to participate and share their knowledge at this event.

Authors
Dr. Deepali Hadker

Cont. from Page No. 7

In our view, it is implied, that, as per these provisions, the Term Engineer, intends to refer to "in-house Engineer " of Owner/Developer, and NOT "Structural Engineer"

(B) Also reproduced below is extract form "The Gazette of India", of March 26, 2016 under Ministry of Law of Justice, in respect of RERA, under Serial No.(u) of "Definitions", it has defined the meaning & intent of "Engineer" which reads as under.

(u) "engineer" means a person who possesses a bachelor's degree or equivalent from an institution recognised by the All India Council of Technical Education or any University or any institution recognised under a law or is registered as an engineer under any law for the time being in force;

Thus, this does not imply that the reference to "Engineer" under this RERA Act is meant to be "Structural Engineer", a different Entity.

(C) Reference is also invited to Circular issued by Maharashtra Regulatory Authority, being Circular No. 1/2017, MahaRera/Secy/File No. 27/ 53/2017, read as under.Subject:- Clarification regarding "License Number" of Engineer, With reference to MAHARERA-2017 it states, with reference to Regulation 3, Form 2 (Engineers' Certificate) which interalia states that,"The Engineer who signs and issue the "Engineers Certificate" in form 2 has to mention License Number along with his signature. In the process, it has however, been observed that the Engineer, who fulfill the criteria of qualification as defined in section 2 (4) of Real Estate (Regulation and Development) Act 2016, may not necessarily possess License Number, as there is no mandatory procedure of issuing Licenses to the Engineers, who prepare the plans & estimates & record the measurements of work done in the project.In view of the above, holding of or possessing of License in not mandatory. The License Number is not required to be mentioned, while signing & issuing the Engineer's Certificate. (Bold intend to highlight)

From all the above it is amply clear that the role of "Engineer" as required under RERA or MAHA-RERA, does NOT expect these functions of "Engineer", to be of "Structural Engineer".

However, if a concerned "Consulting Structural Engineer" so chooses, to also accept this additional function, distinct and different for that of "Structural Engineer", he may opt to do so, with full awareness as to various functions expected of "Engineer" as defined under RERA OR MAHA RERA, with resultant consequences upon his accepting the additional function.

RERA - 2017 - 1

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Use of "Ferron®" Wall and Slab Plates in Low Cost Light Gauge Section Steel Buildings.

Arun Purandare

Abstract:

A Method of construction of mid height buildings with "LGS" is described. The walling and decking on steel sections with Ferron® plates are explained. The combined system gives Large reduction in the cost of construction. The cost saving as well as the speed of construction makes this system a very attractive proposition for the massive Low Cost Housing projects proposed by Governments.

One constantly hears about Central and State Government announcing proposed construction of housing for low Income Groups. These are generally 2 room (1RK) with toilet or 1BHK units in ground plus two or three floor buildings. As the numbers are in thousands at each location, speed of construction and cost per unit are of paramount importance.

The conventional method of Reinforced Concrete Frame with brick infill walls plastered with mortar is greatly time consuming. The construction industry is also facing acute shortage of trained manpower. Every large project suffers due to this. It also causes slippage in project completion time. Being aware of this problem, the Ministry of Housing and Urban Poverty Alleviation studied various new technologies that can solve this problem of speed of construction and cost. Of the various system recommended by their expert committee, construction with "LGS" Light Gauge Steel Sections can be for structural frame work. This is useful for low rise and Medium rise Structures.

Light Gauge Steel sections are made from thin steel plates bent in the form of channels, box sections etc. The vertical channels are spaced at fixed centers suitably tied to each other. The slab and wall loads are transferred to these closely spaced vertical compression members. Due to its thin walls, sections are prone to early compression failure, needing reduction in load carrying capacity in design. However, for mid height structure up to G+3, large savings can be achieved (LGS frame fig.No.1&2)

Fig. No. 1: Light Gauge Steel Frame (G+2) 15,000Sq.ft. Internal & External Walling.

Fig. No. 2: Light Gauge Steel Frame (G+2) 18,000 Sq.ft. Internal & External Walling.

Major problem in using LGS frames was the construction of wall in the section. Several alternatives were tried. They were

a) Foam concrete filling between sections and plaster.

b) Cement board screwed to the LGS sections.

c) Boards with different light weight in fills.

All these have serious shortcomings. The cement board panels makes hollow sounds. It also cannot take any load is brackets are fixed. It has no load carrying strength. The joints between boards open up showing cracks. Cement board has no strength in bending and cannot be used where such a situation arises in its use. The board used externally deteriorates in rain, thus is not an option for exterior walls.

"Ferron®" Wall panels have been proposed as an economic and permanent construction solution to this problem. The wall panels are 20mm thick and are designed to withstand a horizontal wind pressure of 150Kg/Sqm. These are of 900mm x 600mm size. This dimension matches the Centre to Centre dimension between two vertical channel sections of the wall. The wall panels are fixed on two sides of the channel forming a double panel wall with air gap incorporated. The wall is a good thermal insulation for the use externally. See in fig. No. 3 & 4

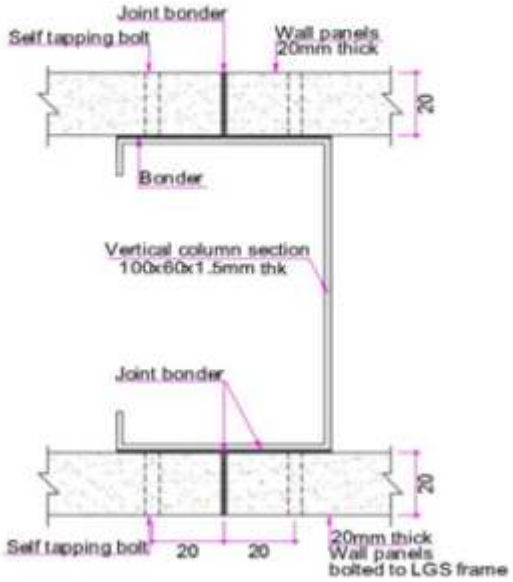

Fig.No.3 Section through wall.

Figure No. 4: Panel & Channel.

Panels can be made to be used as decking plates. The panels are laid on LGS floor beams to form a deck. Panels can be fixed to the floor beams by using epoxy. Together with the topping concrete of 50mm, it forms a composite section with the steel beam. This gives additional rigidity and moment carrying capacity to the section. See figure No. 5 & 6. The decking panels are designed to carry Dead load and Live load on the decking plate.

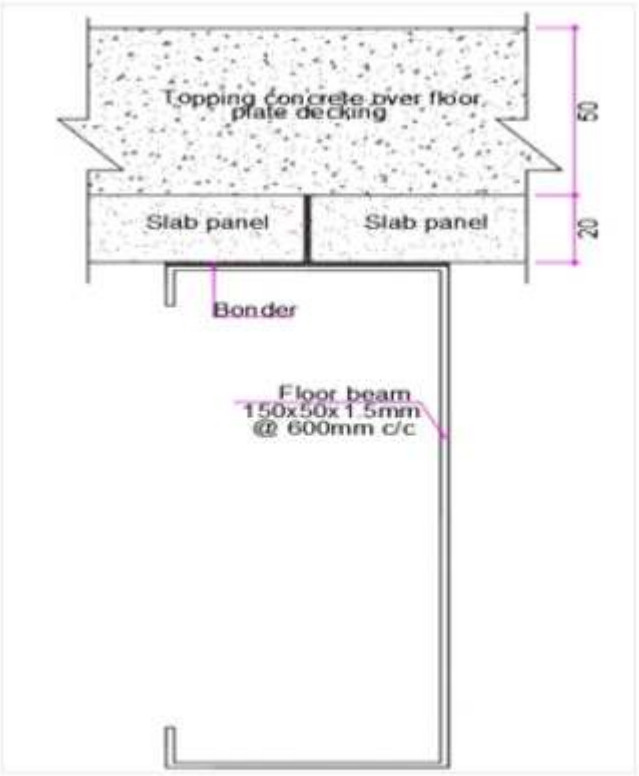

Figure No. 5: Section through Beam.

Fig.No.6: Slab Panel Over Bridge.

The plates can withstand a live load of 400Kg/Sqm. This method of construction gives substantial overall economy in construction. This comes from the total steel required for the building. The steel work has columns closely spaced which carry all the Dead loads and live Load. Thus it forms wall frame work together with floor beams at about 600mm centers. The floor is made with decking and topping of 50mm concrete. The total steel does not exceed a quantity of about 3.3Kg/Sq.ft. of built up area. Construction cost of completed frame with internal and external walls will be Rs. 6000/ 650Sq.ft. Adding the cost of finishing items, the completed cost of the building would be in the range of Rs. 1000 to Rs. 1100 Sq.ft. The system is workable only when walling is possible with steel section. This is made possible with "Ferron" walls. The installed cost is less than the cost of 150mm thick masonry wall with plaster.

The wall panels are cast in steel moulds in a continuous casting process giving a very smooth surface. No plastering is needed on this surface. The installation of the wall panels is also very easy and fast. The fixing is done with self tapping screw.

The weight of individual steel frames is less than 40kg each. The wall erection can be done by 2 persons without the use of crane. The wall panels also weigh 25 kg each. The structural frame in LGS together with the precast walls and decking have a substantially reduced Dead load compared to the normal construction. The normal dead load of the RCC building with 150mm thick brick walls is double compared to LGS frame with Ferron walls & Decking. Its advantage will manifest itself in the reduction in cost of foundation. The advantage of reduced dead load will give savings in provisions for Seismic design of the building.

As the wall panels are designed for a wind load of 1.5 KN/SqM and can be used for any exterior position. The System of wall fixing is shown in fig. 7 & 8

Fig. No. 7: Internal Walls

Fig. No. 8: Conducting in between panels

Fig.No. 8 : Fixing of panels with Self tapping screw

The system reduces the time of construction substantially. The completion time can be reduced to 30% of the normal R.C.C. building.

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INDIAN SOCIETY OF STRUCTURAL ENGINEERS

ISSE

With active support of

The Institution of Engineers (India)

MAHARASHTRA STATE CENTRE

Cordially invite you to

R. L. Nene Memorial Lecture

on

Friday, August 04,2017 at 6.00 pm

at

The Institution of Engineers (India)

15, Haji Ali Park, K. Khadye Marg, Mahalakshmi, Mumbai – 34.

CHIEF GUEST : Dr. S.K.GUPTA, Director Project MRVCL

SPEAKER : Dr.C.M.JAIN Chief Project Manager MMRCL

TOPIC : CHALLENGES FACED IN UNDERGROUND METRO RAIL DESIGN AND CONSTRUCTION

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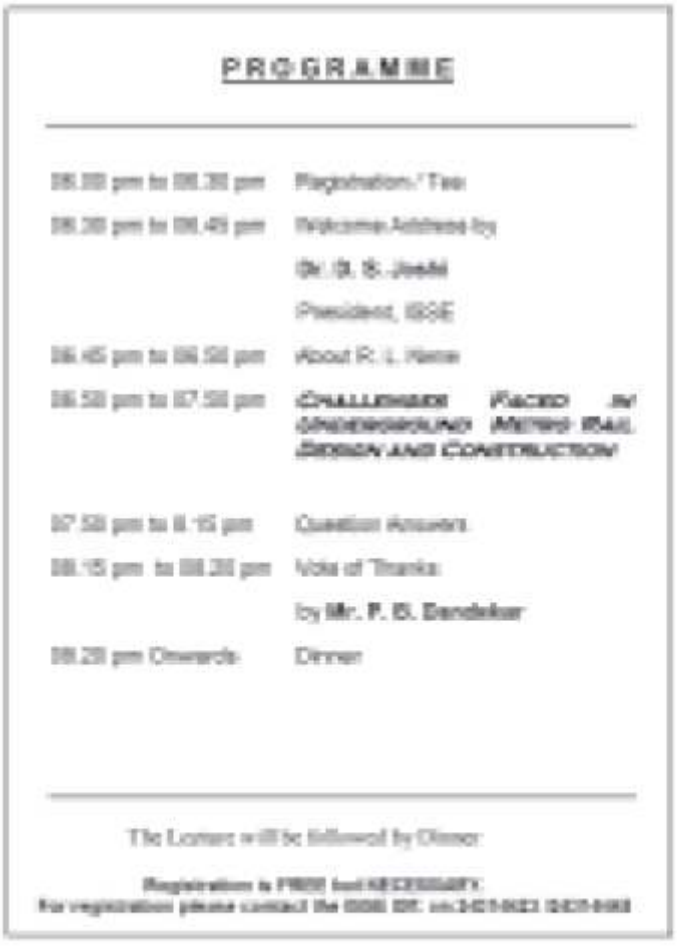

PROGRAMME

05.00 pm to 05.30 pm	Registration / Tea
05.30 pm to 05.45 pm	Welcome Address by Dr. D. S. Joshi President, ISSE
05.45 pm to 05.55 pm	About R. L. Nene
05.55 pm to 07.55 pm	CHALLENGES FACED IN UNDERGROUND METRO RAIL DESIGN AND CONSTRUCTION
07.55 pm to 8.15 pm	Question Answers
08.15 pm to 08.20 pm	Vote of Thanks by Mr. P. B. Dandekar
08.20 pm Onwards	Dinner

The Lecture will be followed by Dinner

Registration is FREE but NECESSARY.
For registration please contact the ISSE Off. on 24019823 24018483

INDIAN SOCIETY OF STRUCTURAL ENGINEERS

ISSE

[illegible]

[illegible]

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Ref: TPS-2115/3116/CR-41/16/CEDCR/UD-12
Date : 28 March 2017

To,
The Office of Joint Director of Town Planning,
Konkan division,
Konkan Bhavan, CBD, Navi Mumbai.

Subject: DCR for MMR region suggestion and objections from ISSE on **Mumbai Metropolitan Region Circular No: TPS-2115/3116/CR-41/16/CEDCR/UD-12 Dt. [illegible]**.

Respected Sir,

Indian Society of Structural Engineers is a body of about 1600+ Structural engineers connected with the building industry. We have been making earnest efforts to have healthier structures by frequent seminars, publication of books like "Seismic Design of R.C.C. structures", and also quarterly journal on structural engineering subjects.

We would like to draw your attention to role and responsibility of a structural engineer as given below :-

1. A structural engineer is responsible for accuracy of structural design, structural drawings and specifying the structural material from the point of strength and stability of the structure as per National Building Code 2016 Part -6 guidelines.
2. It is the responsibility of the owner / Developer to appoint different agencies for successful execution of the project such as architects for planning and municipal approval, structural engineer for structural design, geotechnical consultant for suggesting appropriate founding system and certifying founding strata, contractor for execution of the work, Construction Engineer / Quality Auditor / supervisor for day to day supervision ,quality control, material testing and workmanship at construction site. These agencies are responsible for their respective role. However, the entire construction activity is under total control of the owner / developer.
3. Structural engineer / his representative visits the construction site only when requested by the representative of the owner to check the work done

INDIAN SOCIETY OF STRUCTURAL ENGINEERS

Thanking you,

Yours truly,

Subject: DCR for MMR region suggestion and objections from ISSE on **Mumbai Metropolitan Region Circular No:** TPS-0215/3119/CR-41/15/CIDCR/UD-12 **Dt. 28/02/2017.**

5.4 HEIGHT OF BUILDING-
5.4.1. High Rise Committee –

Sr. No.	Item No.	Description	Comments/Objection/Recommendations
1	5.4.1. a)	It is mandatory for the Municipal Corporation that, for the buildings having height 58m and more, the building approval proposal shall be cleared from the High Rise Committee.	As per MCGM norms, Building of height 70m or above should be cleared from High Rise Committee. Same norm can be followed in MMR. For Proof checking requirements of Structural design, Table 6.1 page 94 of Model building Bye-laws2016 may be followed.

30 STRUCTURAL DESIGN, STABILITY AND STRUCTURAL AUDIT:

30.1 General :-

A) Structural Design & Stability for New Building.

Sr. No.	Item	Description	Comments/Ordinary/Recommendation
1	Applicability Regn 30(1)	Structural design and stability report shall be compulsory for all new buildings.	" Structural Design Basis report as per G.D.C.R of Mixed building Bye laws 2015 and Certificate of Structural design sufficiency as per Annex C of SP: 20(S&I) Part-2 shall be compulsory for all new buildings."
2	Scope of Work and Methodology Regn 30(2)	(i) Planning and Structural design :- To perform well in earthquake a building should possess four main attributes namely simple and regular configuration and adequate lateral strength, stiffness and ductility.	Comment :- Since architect has the control over building shape and configuration, a certificate from architect should be included stating that " building shape and configuration is complying with earthquake code requirements."
		Methodology: The structural designer shall acquire and record the requirement of the project as a whole, prepare the "structural design data" sheet, get the same confirmed in writing and store it as a permanent record.	Methodology:- The structural designer shall acquire and record the requirements of the project as a whole, prepare the 'Structural design data" sheet, Get the same confirmed in writing from architect and client and store it as a permanent record.
		Advise/initiate at the client's expenses soil investigation, if considered necessary to decide upon the type of foundation to be adopted.	Make Soil investigation and geotechnical report from a Geotechnical Consultant mandatory.
		Wherever applicable, the drawings may contain bar bending schedule and bill of quantities.	It depends on agreed scope of work and need not be made compulsory.
		The important stages for inspection may be:- Approval of foundation areas and founding level	During execution of foundation, Soil consultant should visit the site and give certificate to Municipal Corporation confirming founding strata , safe bearing capacity , suggestion for foundation type.
	(ii) Quality assurance	Structural engineer may undertake the following :- (specify type of tests and frequency for materials	Comment :- Structural engineer is not directly involved in quality assurance. Construction engineer and

		etc. ..... Check shampoos periodically ..... Hold the structural workshops at site for contractors and other agencies	Quality matters will take care of this part.
	(iv) Quantity control page 303	Whenever quantity estimate and cost estimate is included in the scope of work	Generally , it is not in scope of Structural engineer unless agreed upon in scope of work with client.
3	Responsibility page 304	Delivery for said Technical person shall in every case in which he ne be professionally consulted or engaged ..... or inspector of works is constantly employed and present on the work to supervise the execution of all works and to prevent the use of any defective material therein and the improper execution of any such work.	Suggestion - Make it mandatory to appoint Construction management agency / construction engineer to supervise the work on day to day basis and check the quality of material and workmanship at site .
	(vi) page 305	(vi) The liability of Structural Engineer shall expire on thirty years from date of issue of liability certificate.	This should be substituted by " The liability of structural engineer is to provide correct structural design as per IMC part II and parameters provided by Architect / Client " . Please follow the guidelines provided in IMC2016 Part 2

(E. STRUCTURAL DESIGN, STABILITY AND STRUCTURAL AUDIT-
(E) i General -

B) Structural Audit of Old Buildings:

Suggestion - As suggested in Model building bylaws 2016 Clause 8.2.4 Structural engineer should prepare " Structural inspection report " . So the words structural audit should be replaced by " Structural inspection report "

Sr. No.	Item	Description	Comments/Objections/Suggestions/ modifications
8	Scope of Work and Methodology page 308	(i) the loading on the structure of the building in which he has to identify any deviation from intended use, misuse and abuse which can result in overloading of any addition or alteration works affecting the structure of the building in which he has to identify any addition of alteration works which can result in overloading or adverse effects on the	If Design Basis Report of the structure, Soil Investigation Report, RCC Drawings, approved Architectural drawings and elevation drawings are not available with the Client, then it is very difficult for a structural engineer to comment on these

		structure. Methodology- b) Structural System of the building - Description of structural forms, systems and materials used in different parts of buildings e.g. reinforced concrete, pre-stressed concrete, steel etc. Description of the soil condition and foundation system, if known.	aspect). Suggestion for text to be added – " Based on the available data about the structure, Structural engineer can record his observations and comments"
2	Responsibility page 3(ii)	c) The structural engineer shall be responsible for not following code of practice ..... safety & stability of the structure for the stipulations which may be mandatory when the structure was design.	In the absence of design parameters and as built structural drawings, it is not possible to comment on this aspect. It is not clear what is the procedure to check the design & drawings of the structure originally designed by some other structural engineer? Who will check/certify the original design & drawings? Therefore , this clause should be omitted.
		Every licensed Technical person shall in every case in which he or he professionally consulted or engaged ..... or inspector of works is constantly employed and present on the work to supervise the execution of all works and to prevent the use of any defective material therein and the improper erection of any such work.	Suggestion – it should mandatory to appoint Construction engineer / Site Supervisor by owner and his duty is to check the quality of material and workmanship at site. Structural engineer is not responsible for this.

News and Events during Apr – June 2017

by Vedang Vadalkar

May 12-13 2017

A two-day Workshop for seismic design of RCC high-rise Buildings

by Dr. Yogendra Singh, Professor & Head Department of Earthquake Engineering, IIT Roorkee

The workshop was organized by 'Epicons Friends of Concrete' at the Mechanical Seminar hall VJTI, Matunga east, Mumbai.

The aim of this workshop was to discuss the use of the new Criteria set for earthquake resistant design of structures i.e. IS 1893 (Part I) and also to discuss in detail the implementation of the ductile design and detailing of RCC structures as outlined by the new IS 13920: 2016.

Buildings all over India are reaching new heights. All the Mega cities like Mumbai, Kolkatta, Delhi, Chennai are talking about super tall structures with 100 storied and more. Whereas, 50 to 60 storied buildings are becoming more than common. Design of such buildings requires good understanding of Earthquake Engineering as well as Proper Design and Detailing of various Structural elements. We need to revisit the codal provisions set in latest revisions of IS 1893 & IS 13920 on this background. It is very much essential to know the background of the revisions made/ proposed for safe and economical design of high-rise buildings.

The workshop was divided in two parts, On the first day of the workshop Dr. Singh discussed in depth about the changes made in the new IS 1893 and how to implement the same in the design of RCC structures. On the second day Dr. Singh had a special focus for the design and detailing of shear walls, shear wall cores, Flat slab-column system and infills (Partitions). Hands-on training was provided on ETABS/SAP 2000 Nonlinear. There were also questions and debates on the provisions of the new codes from the audience.

Friday, 2nd June 2017

Interactive lecture on Salient Features of the new seismic codes IS 13920 & IS 1893 Part I

by Dr. C. V. R. Murty, Director, IIT Jodhpur.

The event was organized by "Epicons Frineds of Concrete" at the Circot Auditorim, Adenwala Road, Opposite VJTI, Matunga east, Mumbai.

The new seismic codes bring in major changes the way the building have to be designed, some of which are the less practical though quite essential for structural safety. The new design requirements can be best understood from the key personnel behind the development of these codes. The presentation was an opportunity for us structural engineers to not only learn the application of the new provisions in the code but also to appreciate the intentions behind the modifications of the same.

The hall was full to its capacity even before the session began for the evening and the organizers had also arranged for a few extra chairs for people in the aisle for maximum participation of the people. As the session began the inflow of attendees did not stop and so as Dr Murty suggested they had to be accommodated on the dais!

It was an interactive session wherein the audience participated actively and asked questions about the

implementation of the codes in their projects. Dr. Murty also encouraged the active part of the audience and skimmed through the new codes page by page pointing out the changes made in this revision from the last code. He also pointed out the misprints in the codes due to printing errors. The practising structural engineers in the audience also had few suggestions and recommendations for the BIS committee that they found to be necessary to be included in the codes and to be implemented in the next version. Dr. Murty noted down the suggestions and recommendations and promised to convey them to the committee.

21 June 2017

BUREAU OF INDIAN STANDARDS (BIS)

Twenty-sixth Meeting of Cement and Concrete Sectional Committee, CED 2

in Joint Session with:

Twenty-fifth Meeting of Cement, Pozzolana and Cement Additives

Subcommittee, CED 2:1,

Twenty-fourth Meeting of Concrete Subcommittee, CED 2:2, and

Twelfth meeting of the Panel for Work Relating to ISO/TC 71 & 74, CED 2/P1

Mr. Shantilal Jain and ISSE President Mr. D S Joshi, attended the BIS meeting at New Delhi on behalf of ISSE and put forward their views in the meeting.

Mr. Shantilal Jain

Mr. D S Joshi

21 June 2017

Hearing at office of Joint Director Town Planning , Kokan Division, CBD, Belapur on DCR for MMR region based on Mumbai Metropolitan Region Circular no : TPS-I 215/ 3116/ CR-41/16/CIDCR/UD-12 dated 28-feb-2017.

Mr. Damle conducted the hearing. On behalf of ISSE, Past President Mr. S G Dharmadhikari along with Manasi Nandgaonkar and Hemant Vadalkar attended the hearing.

Mr. Dharmadhikari explained the role and responsibility of various professionals involved in the building construction. Responsibility of structural engineer is limited to correctness of structural design only. New National Building Code (NBC) 2016 Part -2 provides guidelines for certification and insists on obtaining " Design Sufficiency Certificate " from Structural Engineer. Therefore, stability certificate should not be insisted from Structural Engineer. These NBC guidelines should be followed in new DCR for MMR region.

Structural audit of old buildings : Mr. Dharmadhikari and Hemant pointed out that in most of the cases, data like building construction history, material test reports, architectural and structural plans are not available. A structural engineer is carrying out visual inspection of the building, may conduct some tests if required . There are many limitations during inspection as structural members are not visible / accessible due to false ceiling or interior work, due to modifications by the occupants etc.. With the available data and based on his experience, structural engineer provides his observations and suggestions for repair or demolition. The report should be termed as "Structural inspection report" and not " Structural audit report". It is wrong on part of the authority to ask for " Stability Certificate " from a person inspecting the structure and who is not involved in the original design and has no data about the structure.

A copy of ISSE Quarterly Journal and copy of ISSE publication " Manual of Practice – Professional Services for Structural Design Consultant" was handed over to Mr Damle for reference.

Manasi Nandgaonkar

Hemant Vadalkar

S G Dharmadhikari

29 June 2017

Hearing at Deputy Director (Town Planning) Azad Maidan, Mumbai on the Govt. Circular TPB/4317/123/CR-32/2017/UD-11 dated 8 Mar 2017 regarding 10 year defect liability period for Structural Engineers and other professionals.

On behalf of Indian Society of Structural Engineers , Mr. Hemant Vadalkar attended the hearing at the Deputy Director office, Azad Maidan, Mumbai. Other senior structural engineer Mr. Satish Dhupelia and other committee members from PEATA were also present. Mr. Sanjay Banait , Dy.Dir TP conducted the hearing in his office.

It was argued by all that the circular is very vague and does not point out responsibility and liability of each individual connected with the building project. There is no mention of Owner / Developer (who is the ultimate beneficiary in the project) for any liability and only professionals are made scape goats by the said circular. It was stressed by all the professionals that Owner / Developer is the only entity who controls all the construction activity by employing various agencies and consultants for the project. Therefore, he is only liable for any defects and for any warranty / Guarantee. Therefore, names of all professionals must be removed from the 10 year defect liability clause.

Mr. Hemant Vadalkar pointed out that ISSE letter indicates this fact that "Overall responsibility during defect liability period is of the Owner / Developer of the project" and name of Structural Engineer should be removed from the circular. Since, New National Building Code 2016 has been published and is available, reference should be made to the certification formats provided in Part -2 of the code. This part describes roles , responsibilities, competence criteria and certification formats to be provided by various professionals involved in the building project. These guidelines should be followed.

Professional liability insurance cover : It was pointed out that our Indian consultancy system is not yet matured enough and streamlined to adopt this system due to many grey areas. It is not a correct step to put unlimited liability on professionals and forcing them to opt for professional liability insurance to cover such liability. Mr. Satish Dhupelia stressed that financial liability of a consultant should be limited to 20% of fees received by him as practiced in other countries.

Mr. Hemant Vadalkar presented a copy of ISSE Quarterly Journal to Mr. Sanjay Banait.

Hemant Vadalkar

Edited and published by Hemant Vadalkar for ISSE, C/o S. G. Dharmadhikari, 24, Pandit Niwas, 3rd floor S. K. Bole Road, Dadar(W.), Mumbai 400 028. Tel. +91-22-24314423. e-mail issemubai@gmail.com Web : www.isse.org.in for private circulation and printed by Sudarshan Arts, 10 Wadala Udyog Bhavan, Naigaon Cross Road, Wadala, Mumbai - 400 031.

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Alkali Silica Reactivity Test	Harmless
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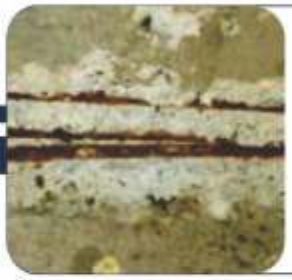

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