

## 10<sup>th</sup> International Conference on

September 25 - 27, 2024

## CONcrete under SEvere Conditions - Environment & Loading

### Two Pre-consec24 workshops

September 24, 2024

- 1) Corrosion and its Control in Concrete Structures (C3S)
- 2) Construction Technologies for Sustainable Infrastructure (CTSI)

## All at Radisson BLU Hotel GRT Chennai (near airport), Chennai, INDIA

CONSEC conferences focus on the advancements in the areas related to the design, construction, testing, and preservation of various construction materials and systems exposed to severe environmental and loading conditions. Earlier CONSECs were held in Japan (1995), Norway (1998), Canada (2001), South Korea (2004), France (2007), Mexico (2010), China (2013), Italy (2016), and Brazil (2019). Now, the *Centre of Excellence on Technologies for Low-Carbon and Lean Construction (TLC2)* at the Indian Institute of Technology Madras feels proud and privileged to organize the 10<sup>th</sup> CONSEC in Chennai, India (named as CONSEC24). We have also planned pre- and post-conference workshops on allied topics. CONSEC24 will provide a single platform for exchanging ideas in both focussed and holistic manner for the design, construction and conservation of reinforced concrete structures experiencing severe conditions. We invite students, researchers, faculty members, and practitioners working in the relevant areas of structural engineering and construction materials to attend CONSEC24 and make it a huge success.

### Bridging structural and materials technologies



### Conference themes and subthemes

#### T1: Advanced materials for severe conditions

- Cements and binders (SCMs)
- Chemical admixtures
- Hydration and microstructure
- Metallic and non-metallic reinforcement (fibres, mesh, bars, strands)
- Alternative aggregates

#### T2: Lab/field testing and characterisation

- Material characterisation tests
- Accelerated tests and long-term performance
- Non-destructive testing
- Forensics and condition assessment
- Naturally deteriorated systems

#### T3: Repair and strengthening materials and methods

- Preventive maintenance
- Electrochemical repair
- Waterproofing & coating
- Grouts and grouting methods
- Repair mortar and concrete
- Residual capacity assessment
- Strengthening techniques

#### T4: Damage, deterioration and transport properties

- ASR, sulphate or acid attack
- Chloride ingress
- Carbonation and leaching
- Corrosion of reinforcement
- Creep and shrinkage
- Fatigue and fracture

#### T5: Service life, reliability, sustainability and resilience

- Simulation of residual capacity
- Service life and durability
- Reliability and resilience
- Sustainability and life cycle assessment (LCA)
- Standardization and codes

#### T6: Special concretes and construction techniques

- FRC, TRC, HPC, UHPC, SHC
- Precast concrete
- 3D-concrete printing
- Underwater construction
- Cold-weather construction
- High-rise concrete pumping

# Plenary Speakers

|   |  |   |  |  |   |
|---|--|---|--|--|---|
|   | <b>Prof. Koji SAKAI</b><br>Founder, CONSEC series,<br>Japan Sustainability Institute<br><i>Inaugural address on</i><br><i>'What impacts did the CONSEC concept</i><br><i>give on concrete technologies until today?'</i> |   | <b>Prof. Paolo GARDONI</b><br>Univ. of Illinois Urbana-Champaign, US<br>An overview of regional risk (and<br>resilience) analysis                        |   | <b>Prof. Stefano PAMPANIN</b><br>Sapienza Univ. of Rome, Italy<br>Designing precast concrete structures<br>for earthquake resistance  |
|  | <b>Prof. Robert MELCHERS</b><br>Univ. of Newcastle, Australia<br>Resilience of reinforced concrete<br>structures in corrosive conditions   |  | <b>Prof. David TREJO</b><br>Oregon State Univ., USA<br>Service life of concrete structures<br>and standardization  |  | <b>Prof. Giovanni PLIZZARI</b><br>University of Brescia, Italy<br>Design Considerations, Experimental<br>Testing, and Field Applications of HPFR<br>Reinforcement in Bridge Piers |
|  | <b>Prof. Lisbeth M. OTTOSEN</b><br>Technical Univ. of Denmark, Denmark<br>Reuse of structural components -<br>documentation of properties  |  | <b>Prof. Ippei MARUYAMA</b><br>Univ. of Tokyo, Japan<br>Performance evaluation of concrete<br>under specific conditions for nuclear<br>reactor buildings |  | <b>Prof. Manu SANTHANAM</b><br>IIT Madras, India<br>Sulphate Attack: After 20 years of<br>'whither'ing  |
|  | <b>Prof. Koshy VARGHESE</b><br>IIT Madras, India<br>Digital technologies for accelerating<br>and improving quality in construction   |  | <b>Prof. Alexandra BERTRON</b><br>INSA Toulouse, France<br>Behaviour of SCM and low-CO <sub>2</sub><br>binders and systems in sewer networks             |  | <b>Prof. Jose Ivan ESCALANTE-GARCIA</b><br>CINVESTAV Saltillo, Mexico<br>Alkali activated binders based on<br>precursors of limestone and recycled<br>pulverized concrete         |
|  | <b>Prof. Surendra P. SHAH</b><br>Northwestern Univ., USA & IIT Madras, India<br>Future of Science and Technology of Construction Materials   |   |  |  |   |

# Keynote Speakers

|   |  |   |  |
|---|--|---|--|
|    | <b>Dr. Asit BAXI</b><br>Baxi Engineering, Inc. Houston, USA<br>Post-tensioned concrete structures for excessive loading<br>conditions  |    | <b>Prof. Sze Dai PANG</b><br>National Univ. of Singapore, Singapore<br>Effect of Climate Change on Building Materials:<br>Predictions from Accelerated Testing and Machine Learning                        |
|    | <b>Prof. Shashank BISHNOI</b><br>IIT Delhi, India<br>Carbonation of low clinker concretes: when it is a<br>concern and when it is not  |    | <b>Prof. Suriya Prakash S.</b><br>Indian Institute of Technology Hyderabad, India<br>Use of GFRP rebars in construction: Recent research on<br>short and long term performance                             |
|   | <b>Prof. Pedro CASTRO BORGES</b><br>Avanzados del IPN Unidad Mérida, Mexico<br>Concrete durability in vulnerable coastal communities. Role of<br>participatory action research (PAR) for social appropriation. |   | <b>Prof. Enrico SASSONI</b><br>University of Bologna, Italy<br>Phosphate treatments to enhance the durability<br>of cementitious substrates  |
|  | <b>Dr. Gino EBELL</b><br>BAM - Berlin, Germany<br>Stress corrosion cracking in prestressed concrete bridge<br>- A case study   |  | <b>Prof. Marijana SERDAR</b><br>University of Zagreb, Croatia<br>Does carbon footprint reduction impair mechanical properties<br>and service life of concrete?   |
|  | <b>Prof. Yang EN-HUA</b><br>Nanyang Technological University, Singapore<br>Characterization & tailoring of mechanical properties of<br>engineered cementitious composites under dynamic loading<br>condition   |  | <b>Dr. Lok Pratap SINGH</b><br>National Council for Cement & Building Materials, India<br>Enhancing the performance and durability of cementitious<br>materials through nanotechnology                     |
|  | <b>Prof. Liberato FERRARA</b><br>Politecnico di Milano, Italy<br>Material and process design in 3D Concrete Printing via AI<br>driven experiments and modelling  |  | <b>Dr. Surender SINGH</b><br>IIT Madras, India<br>Technologies and Strategies to Meet Future Needs of<br>Aggregates  |
|  | <b>Prof. Burkan ISGOR</b><br>Oregon State University, USA<br>Dual Purpose Titanium Alloy Anodes for Near-surface Mounted<br>Retrofit and Impressed Current Cathodic Protection                                 |  | <b>Dr. Ali Akbar SOHANGHPURWALA</b><br>CONCORR, Inc., USA<br>Application of Service Life Modeling to Reinforced Concrete<br>Structures   |
|  | <b>Prof. Laurie LACARRIÈRE</b><br>INSA Toulouse, France<br>Modeling the durability of structures under multiphysical<br>loads  |  | <b>Mr. David TEPKE</b><br>SKA Consulting Engineers, USA<br>At the intersection of safety, environmental responsibility, &<br>durability: seeking a sustainable approach to existing concrete<br>structures |
|  | <b>Prof. Sriramya D. NAIR</b><br>Cornell University, USA<br>Viability of Utilizing Supplementary Cementitious Materials for<br>Subsurface Infrastructure   |  | <b>Prof. Bernardo TUTIKIAN</b><br>Univ. of Vale do Rio dos Sinos Campus São Leopoldo, Brazil<br>Accidents of concrete structures under fire  |
|  | <b>Prof. Sreejith NANUKUTTAN</b><br>Queen's University of Belfast, UK<br>Calcium focused design for longevity of concrete structures in<br>silage environment  |  | <b>Prof. Anya VOLLPRACHT</b><br>RWTH Aachen University, Germany<br>Carbonation in concretes with SCMs  |

## Important Dates

|   |                          |
|---|--------------------------|
| Last Date of Registration & Payment<br>(Spot registration & Payment are not allowed)        | <b>August 31, 2024</b>   |
| <del>Abstract submission (Closed)</del>   | <del>June 30, 2024</del> |
| <del>Submission of 4-page Extended Abstract (preferred) or 8-page Full Paper (Closed)</del> | <del>July 26, 2024</del> |

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| Registration Category                              | Conference Registration fee (including tax)   |               |
|--|---|---------------|
|  | <b>On or Before September 15, 2024</b><br><b>(Spot registration is not allowed)</b> |               |
|  | Indian (INR)  | Foreign (USD) |
| Student Author                                     | 18,000  | 550           |
| Student Author (subsidized**)                      | -   | 350           |
| Individual   | 30,000  | 900           |
| Individual (Discounted)<br>(RILEM/ACI/ICI members) | 27,000  | 800           |
| Individual (Subsidized**)                          | -   | 550           |
| Accompanying family<br>members***                  | 8000  | 150           |
| <b>Pre-conference workshop<br/>attendee only</b>   | <b>4000</b>   | <b>50</b>     |

Registration Fee entitles the delegates to attend all technical sessions of the conference, exhibition, lunch, welcome reception, banquet and receive the proceedings.

A maximum of one oral presentation is allowed for one registrant. Remaining accepted abstracts, if any, will be considered for poster presentation. Students without an abstract for oral/poster presentations will be considered under 'Individual' category.

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**\*\*Countries eligible for subsidized fee:** Albania; Algeria; Angola; Argentina; Bangladesh; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burkina Faso; Cambodia; Cameroon; Chile; Colombia; Congo; Costa Rica; Croatia; Cuba; Dominican Republic; Ecuador; Egypt; Estonia; Ethiopia; Federal Republic of Nigeria; Georgia; Ghana; Guatemala; Hungary; Indonesia; Iran; Iraq; Ivory Coast; Jordan; Kazakhstan; Kenya; Latvia; Lebanon; Lesotho; Libya; Lithuania; Macedonia; Malawi; Malaysia; Mauritius; Mexico; Montenegro; Morocco; Mozambique; Myanmar; Nepal; Pakistan; Paraguay; Peru; Poland; Philippines; Republic of Moldova; Romania; Russian Federation; Senegal; Serbia; South Africa; Sri Lanka; Syrian Arab Republic; Tanzania; Thailand; Togo; Tunisia; Turkey; Ukraine; United Republic of Tanzania; Uruguay; Venezuela; Vietnam; Yemen; Zimbabwe, and [other countries with similar or lower GDP](#).

**\*\*\*** Fee includes lunches, banquet and local sightseeing trips on conference days.

## Tentative Programme Schedule

| CONSEC24 - Tentative programme schedule  |  |   |  |  |
|--|--|---|--|--|
| 10 Plenary (P), 20 Session Keynote (K), and 96 Contributory (C) oral presentations and 100+ poster presentations |  |   |  |  |
| Time   | Day 0 (Tuesday)<br>Sep 24, 2024  | Day 1 (Wednesday)<br>Sep 25, 2024   | Day 2 (Thursday)<br>Sep 26, 2024                                 | Day 3 (Friday)<br>Sep 27, 2024   |
| 8:00 – 9:00  | All registrations & Tea/coffee in Hall E   | CONSEC Registration, Posters & Tea/coffee   | CONSEC Registration, Posters & Tea/coffee                        | CONSEC Registration, Posters & Tea/coffee  |
| 9:00 – 11:00   | <b>Two parallel pre-conference workshops</b><br>1) Corrosion Control of Concrete Structures (C3S)<br>2) Construction Technologies for Sustainable Infrastructure (CTSI)<br><br>Venue: Halls A and B in Royal Ball Room | Session 1 - Plenary (Inaugural & 3 Ps)  | Session 5 - Plenary (3 Ps)                                       | Session 9 - Plenary (4 Ps)   |
| 11:00 – 11:30  |  | Tea/coffee/snacks   | Tea/coffee/snacks  | Tea/coffee/snacks  |
| 11:30 – 13:00  |  | Sessions 2A, 2B, 2C, 2D (each with 1 K and 4 Cs)  | Sessions 6A, 6B, 6C, 6D (each with 1 K and 4 Cs)                 | Sessions 10A, 10B, 10C, 10D (each with 4 Cs)   |
| 13:00 – 14:00  |  | Lunch   | Lunch  | Lunch  |
| 14:00 – 15:30  |  | Sessions 3A, 3B, 3C, 3D (each with 1 K and 4 Cs)  | Sessions 7A, 7B, 7C, 7D (each with 1 K and 4 Cs)                 | Sessions 11A, 11B, 11C, 11D (each with 1 K and 4 Cs)   |
| 15:30 – 16:00  |  | Tea/coffee/snacks   | Tea/coffee/snacks  | Tea/coffee/snacks  |
| 16:00 – 17:00  | Tea/coffee/snacks  | Session 4E - Posters (1-50 posters)   | Session 8E - Posters (50 onwards)                                | Session 12 - Closing and Awards  |
| 17:00 – 18:00  | Launch of TLC2 Consortium<br>Radisson BLU Hotel (Conference Venue)   | Buses will leave to IIT Madras by 5 pm  | Relax  | To respect even the last presenter, please consider booking your return flight <b>after 7 pm</b> . Airport is just about 10 minutes away from the venue. |
| 18:00 – 20:30  |  | Welcome Reception & Dinner at IIT Madras Research Park (Shuttle buses will be provided) | Banquet and Gala Dinner at Radisson BLU Hotel (Conference Venue) |  |

# Pre-CONSEC24 Workshop

9 to 5 pm, September 24, 2024 (Tuesday)

Hotel Radisson BLU GRT Chennai (near airport), India

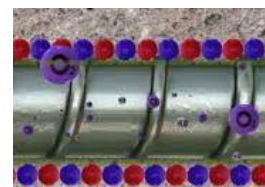
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7<sup>th</sup> One-day workshop on

## Corrosion and its Control in Concrete Structures (C3S)



### About the C3S workshop series

Nowadays, many major concrete structures are designed for a service life of 100+ years. However, many are corroding prematurely and not able to meet the design/service life requirements due to chloride-attack and carbonation. These can be avoided by appropriate use of material systems. Moreover, most repairs are excessively focused on structural strengthening aspects and neglect the durability of repairs. This leads to short-lived and frequent repairs, creating huge economic burden (about 2 % or more of GDP in managing the corrosion in concrete infrastructure). If we do not take adequate measures in this regard, then we will have to face expensive repair works on the large number of concrete structures that are being built now. To create awareness about this, the Dept. of Civil Engg. at IIT Madras has been organizing the C3S workshops since 2016. This is the 7<sup>th</sup> C3S workshop, which is formulated to educate engineers about corrosion mechanisms and how to design for durability or service life and combat corrosion of steel in concrete structures with a blend of both theoretical and practical aspects.

### Tentative Programme Schedule

|                  |   |  |
|------------------|---|--|
| 09:00 – 09:30 am | Welcome address & Corrosion in concrete structures  | Dr. Deepak Kamde, INSA Toulouse, France                                    |
| 09:30 – 10:00 am | Duracrete model & parameters for service life design  | Prof. Carmen Andrade, CIMNE/UPC, Spain                                     |
| 10:00 – 10:30 am | Performance specifications for concrete structures  | Prof. Piyush Chaunsali, IIT Madras, India                                  |
| 10:30 – 11:00 am | Importance of concrete quality and placement on minimizing corrosion of steel                             | Prof. Robert Melchers, Univ. of Newcastle, Australia                       |
| 11:00 – 11:30 pm | <b>Tea/coffee break</b>   |  |
| 11:30 – 12:00 pm | Practical corrosion control: Influence of exposure conditions, material selection, and surface treatments | Prof. Mark Alexander, Univ. of Cape Town, South Africa & IIT Madras, India |
| 12:00 – 12:20 pm | Evolution & performance of corrosion inhibitors   | Prof. Shwetha Goyal, Thapar Inst., India                                   |
| 12:20 – 12:40 pm | Corrosion resistant steel bars for concrete structures  | Mr. Biswajit Ghosh, Tata Steel, India                                      |
| 12:40 – 01:00 pm | Ferritic stainless steel bars for concrete structures   | Mr. Vishal Seth, Jindal Stainless Limited, India                           |
| 01:00 – 02:00 pm | <b>Lunch break</b>  |  |
| 02:00 – 02:30 pm | Field corrosion measurements without connection to steel  | Prof. Burkan Isgor, Oregon State Univ., USA                                |
| 02:30 – 03:00 pm | Performance & failure mechanisms of galvanic anodes   | Dr. Gino Ebell, BAM, Berlin, Germany                                       |
| 03:00 – 03:20 pm | Optimized condition assessment and durable repairs  | Mr. Dhruvesh Shah, Vector Corrosion, India                                 |
| 03:20 – 03:40 pm | <b>Discussion &amp; Closing</b>   | Prof. Radhakrishna G. Pillai, IIT Madras, India                            |

### Registration Fee (including taxes)

|   |                 |                  |
|---|-----------------|------------------|
| <b>On or before September 15, 2024</b><br><b>Spot registration is not allowed</b> | <b>Indian</b>   | <b>Foreigner</b> |
|   | <b>INR 4000</b> | <b>USD 50</b>    |

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or scan this QR code →



### Coordinators

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**TCM**  
Building Technology,  
Construction Materials & Management

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Centre of Excellence on  
Technologies for  
Low-Carbon & Lean  
Construction

# Pre-CONSEC24 Workshop

9 to 5 pm, September 24, 2024 (Tuesday)

Hotel Radisson BLU GRT Chennai (near airport), India

Organized by

**IIT  
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## One-day workshop on Construction Technologies for Sustainable Infrastructure (CTSI)

**About the workshop:** While the construction industry contributes significantly to economic growth, it faces some of the greatest challenges. Here, academic research can contribute to overcoming those challenges through innovative solutions incorporating modern technology. For this to happen, the industry must be convinced of the practicality and the cost-effectiveness of deploying academic contributions; in other words, translating research outcomes to project site applications. In this workshop, we intend to focus on the practical applications of certain technologies and processes and how they can improve project performance.

We will have **interactive/game sessions** on the following three topics.



### **Topic 1 (9 to 10:30 am): Systems Thinking Approach for Technology**

**Implementation; Dr. Nikhil Bugalia, IIT Madras**

Given the complex nature of construction projects, translating technology into practice is challenging. A system-thinking approach would help stakeholders implement innovation in intricate and interconnected activities such as design, safety, and quality management. The instructor will take you through interesting games and activities to keep you engaged in translating research to implementation.



### **Topic 2 (11 to 12:30 pm): Contract Specifications to Implement Technological Innovations in Project Sites; Dr. Murali Jagannathan, IIT Madras**

Construction specifications are crucial in making technology implementable in construction project sites. Specifications are techno-legal documents that must be carefully drafted, balancing legal compliance and technological requirements. The key elements of a good specification will be discussed, and subsequently, the participants will be asked to develop their custom specifications for an item of their choice, the only caveat being that the technology should be new and contractual specifications should not be readily available in the public domain.



### **Topic 3 (2 to 3:30 pm): Implementing Lean Construction in Project Sites – Demonstration through Games; Prof. Ashwin Mahalingam, IIT Madras**

Lean construction refers to using processes, tools, and techniques that aim to reduce non-value-adding activities (like waiting, unnecessary motion, excess inventory, etc.) and thereby help improve overall project productivity. While it appears simple and straightforward, actual implementation at the site is challenging as lean implementation requires a tectonic shift in mindset – from a traditional silo working style to collaborative working involving all stakeholders. To help understand the practical benefits, the instructor will introduce team activities to appreciate the benefits of lean implementation.

### **Registration Fee (including taxes)**

| On or before September 15, 2024<br>Spot registration is<br>not allowed | Indian   | Foreigner |
|--|----------|-----------|
|  | INR 4000 | USD 50    |

**Register at**

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### **Coordinators**

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### Organized by

**IIT MADRAS**



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## Conference Venue and Event Manager

### Event Held at

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