October - December 2023 Vol. 7, No. 4

e-STRUCT

e-Newsletter of CSIR-Structural Engineering Research Centre

In this issue

e-STRUCT, the quarterly newsletter showcases the scientific activities and myriad events that are part of day-to-day life on the CSIR-SERC campus. I am very happy to present Vol. 7, No. 4, 2023 issue of e-STRUCT. This edition of newsletter showcases the varied skills of the CSIR-SERC community, highlighting our R&D pursuits, achievements, skill development initiatives and other significant events & endeavors during October - December 2023.

This issue's research highlights the studies, carried out at CSIR-SERC, on large wind turbines, viz., 5 MW, 10 MW Reference Wind Turbines (RWT) using tools of varying fidelity towards assessment of aerodynamic loads/responses.

In this quarter major projects undertaken include condition Assessment of 11.1 km viaduct of Metro Line-1, condition assessment of fire affected TG deck and Pedestals of Unit-1, NTECL, field and numerical investigations to examine the load dispersal in the ROB foundation (BR 268A), condition assessment of circulating water pump house and crusher house foundation of stage II & III and recommendation for repair measures, condition assessment of Track hopper and Wagon Tippler foundation and recommendation for repair, condition assessment of TG Columns of stage II, III and IV and recommendation for repair measures, static load testing of GFRP telescopic gangway for submarines, performance evaluation of balanced draft gear and, wind tunnel investigation on aeroelastic models of 150 m tall RC Chimney. The handing over of technology for Modular textile reinforced concrete wastewater treatment units was done.

Four MoUs – between CSIR-SERC and (i) M/s Tata Steel Limited for the purpose of sharing confidential information relating to by-products generated from steel manufacturing and their use as raw materials in 3-D construction of buildings (ii) M/s. Amity University, Noida for Intellectual Cooperation, Scholarly Exchange, and Development of National Partnership (iii) M/s. Roschcrete Technologies Pvt. Ltd., for developing advanced protective structures/ components for ballistic/bullet proof/baffle range products for Advance Protection of Personnel and Property in India and, (iv) M/s. Kavi Thendrall, for development of low-cost medium range ultrasonic pulse velocity (UPV) technology for concrete integrity assessment.

Under capacity development initiative, one advanced course, two on-site workshops for government school children and eight schools were covered. One online webinar was organized.

Other major events during this quarter included organizing the Vigilance Awareness Week, Rashtriya Ekta Diwas, Fit India Swachhata Freedom Run 4.0, Shramdhan Day, Ayurveda Day,and, Constitution Day. As we continue the journey towards excellence in research and knowledge development, I hope you will support us in all our future endeavours.

With best wishes

4.4.2024 Dr N. Anandavalli

Modular lightweight wastewater treatment units made with TRC for rural and periurban dwellings (CleanWater)

Research highlights

Aerodynamics of large wind turbines

Power generation from renewable energy sources has increased recently as a part of global energy awareness and a step towards the sustainable energy goals. Among the various sources of renewable energy, power generation from wind has been observed to have tremendous potential. Horizontal Axis Wind turbines (HAWT) of increasing sizes are being envisaged and have become industry standard to harness wind energy, both from onshore and offshore installations. In the global scenario, the size of HAWTs has increased markedly, with rated capacity of commercially-available wind turbines of the order of 5 MW for onshore installations and 15 MW for offshore installations.

Majority of the utility scale wind turbines have three bladed configuration, with the rotor located upwind of the nacelle. The blades that are adopted have higher twist at the root section, which gradually reduces towards the tip in the span wise direction. Aerodynamic behaviour around the rotor geometry by itself is highly complex. Numerous studies are carried out in the literature with the objective of improving the understanding of the aerodynamic phenomenon around the wind turbine rotor, through numerical simulations and experiments on scaled models, with the overall objective of achieving safe and sustainable design of the wind turbines. The aerodynamic loading and their interaction effects are considered using the methods like Blade element momentum (BEM) theory, Free Vortex Wake (FVW) method and Computational Fluid Dynamics (CFD) as shown in Fig. 1. At CSIR-SERC, studies on such large wind turbines, viz, 5 MW, 10 MW and 15 MW Reference Wind Turbines (RWT) have been carried out using tools of varying fidelity towards assessment of aerodynamic loads/responses.

COUPLED ANALYSIS OF FOWT

Floating Offshore Wind Turbines (FOWT) are highly complex multi-body aero-hydro-servo-elastic systems, and their design involves challenging task of understanding the nature, behaviour and order of various dynamic loads. Fully coupled analysis of a FOWT under the simultaneously acting wind and wave conditions have been carried out using a medium-fidelity aero-hydro-servo-elastic tool OpenFAST. The design conditions, as prescribed by IEC standard 61400-3 under operating and parked conditions of the turbine have been considered for the study. Different wind conditions (normal turbulence model (NTM), extreme turbulence model (ETM), extreme coherent gust with direction change (ECD) and extreme wind speed model (EWM)), wave conditions (normal sea state (NSS), severe sea state (SSS) and extreme sea state (ESS)) and current

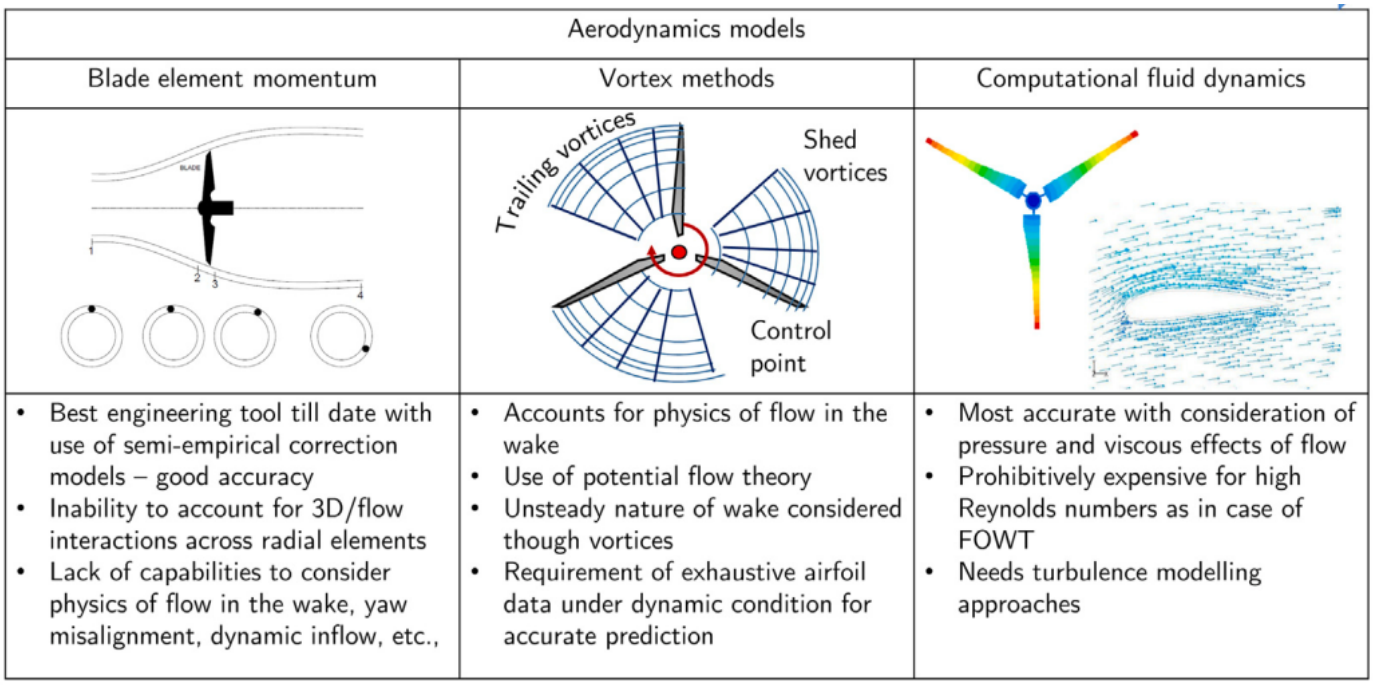


Fig 1: *Approaches for assessment of aerodynamic of wind turbines*

conditions have been appropriately considered. The principal parameters required for structural design of rotor and supporting structure of FOWT, viz, blade-root moments and tower fore-aft/overturning moments have been studied towards gaining renewed perspective on the key aspects of environment-structure interactions. As a typical result, the variation of blade root flapwise moment with wind speed for two Design Load Cases (DLC), 1.1 and 1.3, specified in the code shown in Fig. 2. Statistical extrapolation approach is adopted for the loads from DLC 1.1 to obtain characteristic loads for 50-year return period. The findings offer crucial insights that can guide future investigations and are essential for ensuring the structural integrity and safety of FOWT throughout their design life.

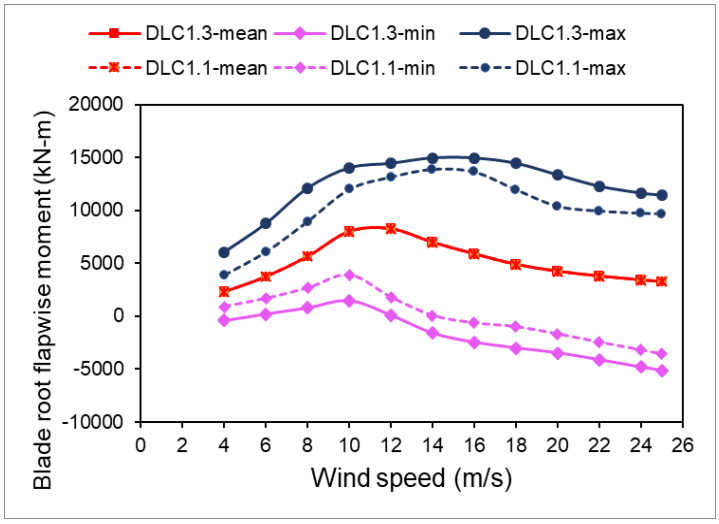


Fig 2: *Variation of blade root flapwise moment with wind speed for 2 DLCs*

AERODYNAMICS OF WIND TURBINES UNDER YAWED FLOW

Yawed flow in modern day wind turbines still continues to be a simulation challenge due to the complex nature of flow around the rotor. Yawed flow occurs in wind turbines due to various reasons, namely, turbulent fluctuations in the oncoming flow, defective yaw mechanism, etc. Yawed flow is of interest also from viewpoint of wake steering to improve power production in wind farms. In this study, numerical simulations have been carried out on the RWTs for two wind speeds, one below and at rated wind speed and various yaw angles in the range of 0° and 40°, at an interval of 5° using BEM and FVW approaches. The evolution of discretised vortex elements in the wake of the turbine from FVW simulations has been shown in Fig. 3.

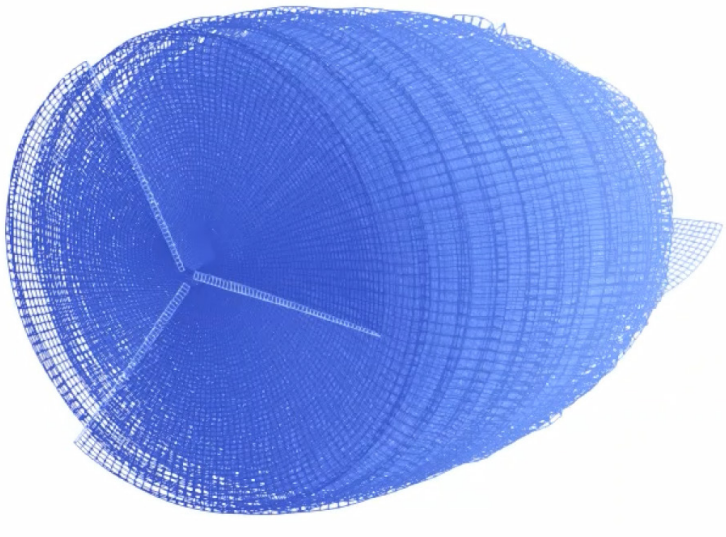


Fig 3: *Evolution of discretised vortex elements in the wake of the turbine from FVW simulations*

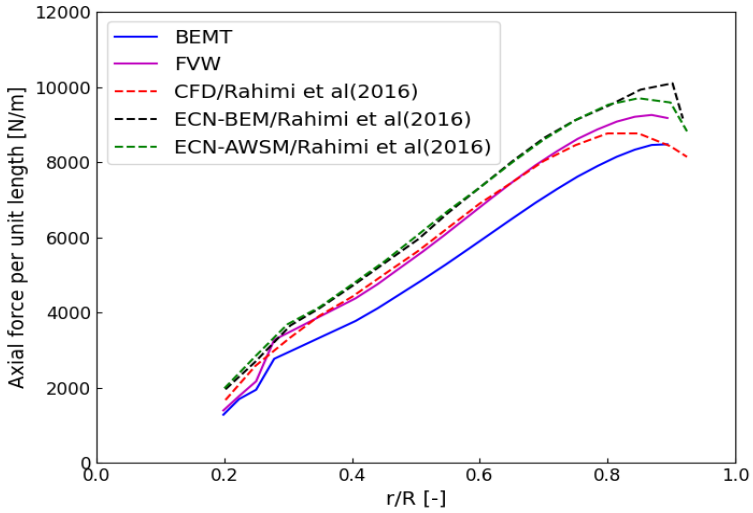


Fig 4: *Comparison of axial force per unit length of blade with literature for 30° yaw simulations*

Fig. 4 shows the radially-averaged axial force per unit length of the blade for 10 MW RWT under yawed condition with yaw angle of 30°. Under axial flow condition (0° yaw), the axial forces obtained from the present study using BEM and FVW approaches are comparable. They also show better comparison with the literature. Under yawed flow, BEMT significantly underestimates the axial forces. The difference is attributed to the overestimation of axial inductions. This observation from the study warrants improvements in engineering models used in conjunction with BEM under yawed flow for modern day higher capacity wind turbines.

Major Publications

- Renewable and Sustainable Energy Reviews, Vol. 164, 2022
- Journal of Wind and Engineering, Vol. 9 (2), 2012
- Proceedings of International Conference of Numerical Analysis and Applied Mathematics (ICNAM), 2022
- Proceedings of the Wind Energy Science Conference, 2023
- Proceedings of the Wind Turbine Noise Conference, 2023
- OpenFOAM Workshop, 2023

Major Projects Undertaken

- Condition Assessment of 11.1 km Viaduct of Navi Mumbai Metro Line-1 through NDT&E Method - Maharashtra Metro Rail Corporation Ltd, Maharashtra
- Condition assessment of fire affected TG deck and Pedestals of Unit-1, NTECL Vallur- NTPC Tamil Nadu Energy Company Ltd, Tamil Nadu
- Field and numerical investigations to examine the load dispersal in the ROB foundation (BR 268A) due to the additional load from railway line in RVNL, Ranchi- Rail Vikas Nigam Limited (RVNL), Jharkhand
- Condition assessment of circulating water pump house and crusher house foundation of stage II & III and recommendation for repair measures- NTPC Limited, Vindhyachal, Madhya Pradesh
- Condition assessment of Track hopper and Wagon Tippler Foundation and recommendation for repair - NTPC Limited, Vindhyachal, Madhya Pradesh
- Condition assessment of TG Columns of stage II (2 units) and recommendation for repair measures- NTPC Limited, Vindhyachal, Madhya Pradesh
- Condition assessment of TG Columns of stage III (2units) and recommendation for repair measures- NTPC Limited, Vindhyachal, Madhya Pradesh
- Condition assessment of TG Columns and deck of Stage IV (2 units) and recommendation for repair measures- NTPC Limited, Vindhyachal, Madhya Pradesh
- Static Load testing of GFRP Telescopic Gangway for Submarines- M/s. Navnirmiti Composites Innovative Solutions LLP, Maharashtra
- Performance evaluation of Balanced Draft Gear- M/s. Escorts Kubota Limited, Haryana
- Wind tunnel investigation on aeroelastic models of 150 m tall RC Chimney -for 7x210 MW and 1x250 MW Raichur Thermal Power Station - WAT -RTPS Raichur Thermal Power Station KPCL, Karnataka

Societal Deployment/Commercialisation of Technology

Modular Lightweight Wastewater Treatment Units made with TRC for Rural and Peri-urban dwellings (Clean water)

Modular textile reinforced concrete wastewater treatment units of 2.4m3 capacity developed in the Indo-German Collaborative Project, CLP-007, titled "Modular Lightweight Wastewater Treatment Units made with TRC for Rural and Peri-urban dwellings (Clean water)" was implemented in Samata Vidyalaya, Pune, Maharashtra, on 06 October 2023, through which 1000 students will be benefited. The handover

MoUs

- A Non-Disclosure Agreement was signed between CSIR-SERC and M/s Tata Steel Limited on 01 November 2023, for the purpose of sharing confidential information relating to by-products generated from steel manufacturing and their use as raw materials in 3-D construction of buildings.
- Umbrella Memorandum of Understanding (MoU) between CSIR-SERC and M/s. Amity University, Noida for "Intellectual Cooperation, Scholarly Exchange, and Development of National Partnership" was signed on 11 December 2023
- Memorandum of Understanding (MoU) between CSIR-SERC and M/s. Roschcrete Technologies Pvt. Ltd., Punjab for "Intellectual Cooperation for the Development of Partnership for "Developing Advanced Protective Structures/Components for Ballistic/Bullet Proof/Baffle Range Products for Advance Protection of Personnel and Property in India in a Phased Manner" was signed on 18 December 2023
- Memorandum of Understanding (MoU) between CSIR-SERC and M/s. Kavi Thendrall, Cuddalore, Tamil Nadu, for "Development of low-cost medium range ultrasonic pulse velocity (UPV) technology for concrete integrity assessment" was signed on 28 December 2023

Advanced Course on "Recent Advances in Concrete Technology & Durability of Concrete Structures 2023 (RACT&DCS 2023)"

An Advanced Course on Recent Advances in Concrete Technology and Durability of Concrete Structures was organized under CSIR integrated skill development initiative by CSIR-SERC during 22-24 November 2023. Dr. P.S. Ambily, Principal Scientist, and Dr. S. Bhaskar, Chief Scientist, were the course coordinators. The program was inaugurated by Dr. N. Anandavalli, Director, CSIR-SERC and Co-ordinating Director CMC, on 22 November 2023. About 9 participants from academia and professionals from government sector, private sector, public sector undertakings, educational institutions, and industry attended the course. The lecture topics included concrete durability, fly ash- towards improvement in strength and durability of Portland cement concrete, condition assessment of structures, field experience and issues during concrete construction, nanoengineered smart/electrically conductive composite, pre-cast lightweight concrete sandwich panels for mass housing, microstructural characterization techniques, advanced NDT techniques, recycled concrete, textile reinforced concrete, electrically conductive cement mortar utilizing industrial by-products, 3D concrete printing, geopolymer concrete, health monitoring and performance evaluation of structures, durability based service life design, and ultra-high performance concrete.

JIGYASA

Student-Scientist Connect Programme: "Exploring Science" Event Exclusively Organised for The Chennai Corporation School Students

CSIR-SERC in collaboration with M.S. Swaminathan Research Foundation, Chennai, organized an event "Exploring Science" exclusively for the Chennai Corporation School students on 31st October 2023 at CSIR Campus, Taramani, Chennai. The event was organized to connect with the school students and also to provide a platform for them to know about the research activities at CSIR-SERC. About 50 students and 5 teachers participated in this event. Dr. N. Anandavalli, Director, CSIR-SERC & Coordinating Director, CMC, delivered the presidential address. In her motivational talk she spoke on the great scientists of India, Engineer's day, engineering designs inspired by nature, bio-inspired inventions and evolution of building structures. She encouraged the students to be creative, innovative, and to achieve success by way of dreaming big, fixing definite goals, preparing definite plans, working hard and to act with persistence. She also spoke on significance of preserving the environment and consequences of plastic pollution, urgent need to reduce plastic usage, and practicing zero waste. Followed by the formal inauguration function, the students & teachers visited various laboratories of CSIR-SERC, and the scientist of various laboratories demonstrated different experiments to the students. Hands-on session (coin-battery, smart buildings & smart bridges) were given. Students witnessed the demonstrations and participated actively in all the events and interacted with the scientists with a lot of questions.

JIGYASA ATL Workshop

i. A two-day CSIR JIGYASA ATL workshop was organized during 1-3 November 2023, exclusively for the students of the adopted schools in Nilgiris district of Tamil Nadu. Schools which participated were from Masinagudi, Nanjanad, and Kothagiri. Eight scientists of CSIR-SERC and CSIR-CMC visited the schools and delivered lectures on topics related to basic science, the latest scientific advancements and Hands on/demonstration to battery experiment, smart building and bridges, etc. and also witnessed the facility created under the ATL program. About 900 students and 50 teachers participated in the workshop.

JIGYASA ATL Workshop

ii. A two-day CSIR JIGYASA ATL workshop was organized during 28-30 November 2023, exclusively for the students of the adopted schools in Thanjavur districts of Tamil Nadu. Schools which participated were from Mariamman Kovil, Nachiarkoil, etc.. Eight scientists of CSIR- SERC and CSIR-CMC visited the schools and delivered lectures on topics related to basic science, the latest scientific advancements and Hands on/demonstration to battery experiment, smart building and bridges, etc. and also witnessed the facility created under the ATL program. About 900 students and 50 teachers participated in the workshop.

St. Jude's Public School & Junior College-Kothagiri (03-11-2023)

GRG Memorial Higher Secondary School-Vazhaithottam (02-11-2023)

Webinar (through online mode)

The following online webinar was conducted.

Webinar Title	Date of the webinar	No. of Participants	Name of the Webinar Presenter
Fire-Resistant Design of Steel Structures	27 November 2023	36	Dr. A. Cinitha

Events

i. 82nd CSIR Foundation Day Function

The Foundation Day function and the birth centenary celebrations of Prof. G.S. Ramaswamy were held on 3 October 2023 and was presided over by Dr. N. Anandavalli, Director, CSIR-SERC and Coordinating Director, CMC. Shri Ashwin B. Pandya, Secretary General, International Commission on Irrigation & Drainage (ICID) & Ex CWC Chairman, ICID, New Delhi, was the chief guest of the function. Dr. P. Srinivasulu and Dr. C.V. Vaidyanathan, Former Director Grade Scientists, CSIR-SERC were the guests of honour. In her Foundation Day address, Dr. Anandavalli, in brief, talked about the genesis, history, and transformation of CSIR in the eight decades of its existence. She also highlighted the contributions and significant achievements of CSIR and its pivotal role in nation-building and in shaping the growth of science and technology in the country since its inception on 26 September 1942. Paying tributes to the dynamic leadership of Prof. G.S. Ramaswamy, the Founder Director of CSIR-SERC, on his birth centenary, Dr. Anandavalli spoke in brief on the vision, works, and significant contributions of Prof. Ramaswamy for CSIR-SERC and the structural engineering fraternity.

Dr. Srinivasulu, delivered the Prof. G.S. Ramaswamy Birth Centenary Lecture. In his lecture, he spoke in brief about Prof. G.S. Ramaswamy's life and education, his exemplary qualities, various positions held by Prof. Ramaswamy, his strategies and first recruitment of scientists for CSIR-SERC, his notable contributions, and his flair for multi-disciplinary research.

Dr. Vaidyanathan, delivered the second Prof. G.S. Ramaswamy Birth Centenary Lecture. In his address, he remembered Prof. G.S. Ramaswamy as the doyen of structural engineering and a true seeker of knowledge who introduced the master's program in structural engineering for the first time in the country at Annamalai University. He also spoke in brief on the contributions and passion of Prof. Ramaswamy for shell structures and his contributions towards prestressed structures.

Shri Pandya delivered CSIR Foundation Day Address on Dam Safety – Role of Engineering Analysis. In his address, he said that he is a great admirer of CSIR-SERC and had used its handbooks in many instances. Further, he spoke in detail on the significance of dams and dam safety management in India, highlights of the Dam Safety Act 2021 - the administrative mechanism under the act, owner level implementation requirements, regular reporting requirements, offences and penalties, etc.

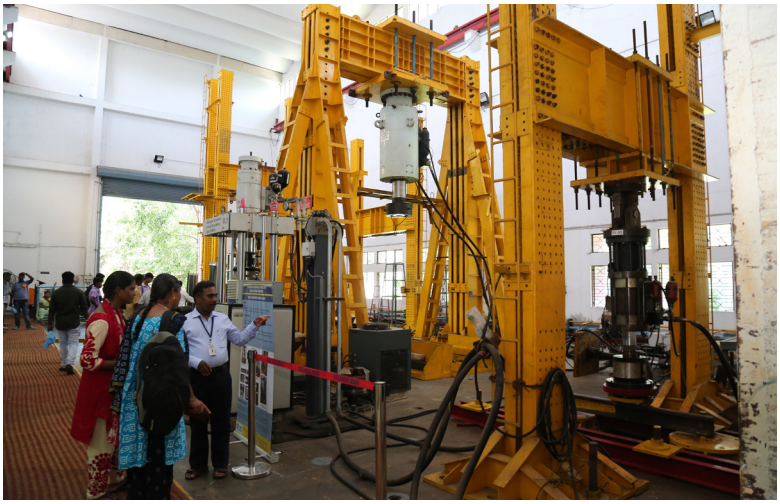
On the eve of the birth centenary of Prof. G.S. Ramaswamy, a special issue of the Journal of Structural Engineering (a publication of CSIR-SERC) was published. Prof. G.S. Ramaswamy was the first editor of the journal. The chief guest of the function Dr. Pandya released the special issue of the journal. As a part of the Foundation Day function, the renovated building of the Advanced Concrete Testing and Evaluation Laboratory was inaugurated by Shri Zacharia George, Former Scientist, CSIR-SERC and Principal Structural Consultant, M/s. Pithavadian and Partners.

Every year, during the foundation day function, Dr. M. Ramaiah Prize is presented for the best technical papers published by the scientists of CSIR-SERC. For the year 2022-2023, two papers were selected by the Committee as best papers and two papers were chosen for certificate of merit. The Director congratulated all the authors of the papers selected.

As a part of the function, Director, CSIR-SERC and Coordinating Director, CMC, honoured the employees of CSIR-SERC and CMC, who have superannuated during the past years. The employees who have completed 25 years of service in CSIR were also felicitated.

82nd CSIR Foundation Day

Open Day



Other Notable Events

i. **Vigilance Awareness Week 2023**

Vigilance Awareness Week 2023 was celebrated jointly by CSIR-SERC and CSIR Madras Complex during 16th August to 15th November, 2023 at CSIR-SERC Campus. This year theme of observing Vigilance Awareness Week is "Say No to Corruption; Commit to the Nation". Pledge was taken on 30 October 2023. Staff took active participation in various programmes which were organised during this period. A Debate Competition was held wherein Dr. Soma Valliappan, Motivational Speaker was the Judge. A Quiz Competition was organized for the staff of CSIR-SERC & CMC. Nukkad Natak (Street Show) was organized at Chennai Middle School, Mootaikaran Chavadi, Chennai. Administering of Vigilance Awareness Pledge was also undertaken.

Awareness on Public Interest Disclosure and Protection of Informers Resolution (PIDPI), 2004, was also organized. Key-note Lecture for Administrative Staff of CSIR-SERC & CMC was delivered by Dr. A. Muthukrishnan, Ex-Sr. CoA, CLRI, under the theme "Say no to corruption: commit to the nation". Housekeeping activities was held. Many Staff members of CSIR-SERC & CMC have participated in the online Programme on CCS (Conduct) Rules, 1964 conducted by HDRC, Ghaziabad . Valedictory Function was held as part of Vigilance Awareness Week 2023, wherein Shri Senthil Avoodai Krishna Raj, S., IPS, Deputy Inspector General, Uttarakhand was the Chief Guest and delivered the Special Lecture on Vigilance Awareness.

ii. Rashtriya Ekta Diwas

As a part of Azadi Ki Amrit Mahotsav / 75 Years of Indian Independence, Rashtriya Ekta Diwas 2023 (National Unity Day) was observed and the pledge was taken on 31 October 2023

iii. Fit India Swachhata Freedom Run 4.0

As a part of Azadi Ki Amrit Mahotsav / 75 Years of Indian Independence CSIR-SERC & CMC successfully organised the Fit India Swachhata Freedom Run 4.0 with the theme 2023 "Swachh Bharat, Swasth Bharat" during 02 - 31 October 2023

iv. Shramdhan Day

Gandhi Jayanthi was observed as Shramdhan Day on 02 October 2023. As a part of Cleanliness Programme, the "Swachhata Shapath" (Pledge) was taken on 02 October 2023.

v. Ayurveda Day

Auspicious day of "Dhanwantari Jayanti - Dahanteras" officially celebrated as Ayurveda Day every year. Accordingly, CSIR-SERC and CMC celebrated Ayurveda Day by organizing "Awareness Lecture" and "Ayurveda Camp 2023" with the theme "Ayurveda for One Health" with Tag line "Ayurveda for Every One on Every Day" on 09 November 2023.

vi. Constitution Day 2023

CSIR-SERC and CMC jointly celebrated Constitution Day to Commemorate the adoption of the Constitution of India on 24 November 2023. Preamble of the Indian Constitution was taken on the same day.

Invited talk/lecture

i. Dr. P. Kamatchi, Senior Principal Scientist, delivered an Invited Lecture titled on "Seismic Resilience and Risk Evaluation of Buildings" in "Capacity Building Program on Seismic Hazard and Microzonation" organised by Centre for Climate Change and Disaster Management, held on 19 October 2023 at Anna University, Guindy, Chennai.

ii. Dr. B. Arun Sundaram, Principal Scientist, delivered an Invited Lecture titled on "Application of Artificial Intelligence in Structural Health Monitoring" in CSIR Sponsored Faculty Development Program on "Artificial Intelligence for Societal Applications" organised by KCG College of Technology, Kancheepuram District, Chennai, held on 20 October 2023

iii. Dr. G.S. Palani, Chief Scientist, delivered a Keynote Presentation titled "Challenges in Prototype Testing, Failure Investigations and Retrofitting of Transmission Line Towers" in "Industry-Academia Conclave" organised by PSG Institute of Technology and Applied Research (PSG ITech), Coimbatore, held on 27 October 2023 at PSG ITech, Coimbatore.

iv. Dr. N. Anandavalli, Director, CSIR-SERC, delivered "Ramasamy Reddy Memorial Endowment Lecture" at Highway Research Station, Guindy, Chennai, held on 14 November 2023.

v. Dr. J. Prawin, Senior Scientist, delivered an Invited Lecture (online) titled "Keeping Structures Safe: Structural Inspection and Health Monitoring" in Faculty Development Programme (FDP), organised by Government College of Engineering, Srirangam, Trichy, Tamil Nadu, held on 20 November 2023.

vi. Dr. N. Anandavalli, Director, CSIR-SERC, delivered an Educational Talk titled "Inspire from Nature: Protect it for Future" in Gyan Samvardhan Program, organised by Atomic Energy Central School, Kalpakkam, held on 21 November 2023.

vii. Dr. Rajendra Pitambar Rokade, Senior Principal Scientist, delivered a Keynote Lecture titled "R&D Contributions of CSIR-SERC in Achieving: Safe and Reliable Power Transmission Infrastructure" in International Conference on Structural Engineering Convention 2023 (SEC-2023), organised by Sri Visveswaraya National Institute of Technology, Nagpur, during 07-09 December, 2023.

viii. Dr. G.S. Palani, Chief Scientist, delivered an Invited Lecture titled "Structural Integrity Assessment of Steel Structures through NDT&E and Retrofitting/Strengthening Measures" in INSDAG - Seminar on "Steel Structures: Health Check-up and Cure (Inspection, Assessment, Rehabilitation, Retrofitting), organised by Institute for Steel Development and Growth (INSDAG), Kolkata held on 09 December 2023 at New Delhi.

ix. Dr. B. Arun Sundaram, Principal Scientist, delivered an invited lecture on the title "Role of Structural Health Monitoring for Sustainable Infrastructure" in the AICTE (ATAL Academy) sponsored Faculty Development Program on "Construction Automation and Robotics towards sustainable Infrastructure" organized by Sri Venkateswara College of Engineering, Sriperumbudur, Tamil Nadu, held on 11 December 2023.

x. Dr. (Mrs.) N. Anandavalli, Director, CSIR-SERC, delivered a Keynote Lecture titled "SHM-Future and Challenges" in IITM Symposium, at IIT - Madras, Chennai, held on 11 December 2023

xi. Dr. Voggu Srinivas, Chief Scientist, delivered Invited Lecture titled "Application of AI in Structural Engineering" in AICTE (ATAL Academy) sponsored FDP on "Construction Automation and Robotics towards sustainable Infrastructure", organized by Sri Venkateswara College of Engineering, Sriperumbudur, Tamil Nadu, held on 13 December 2023.

Honours/Awards/Recognitions/Nominations/

- Dr. (Ing.) Saptarshi Sasmal, Chief Scientist, appointed as the **Associated Editor**, *ASME Journal of Nondestructive Evaluation (JNDE)* for the period 2023 – 2026
- Dr. Smitha Gopinath, Senior Principal Scientist, received **ISAMPE award** for Outstanding Design and Process Development for contribution towards the "*Design and Pre-Fabrication Process Development of Form-Finding and Non-Corrosive Concrete Products*" on 10 November 2023
- Dr. C. Bharathi Priya, Principal Scientist, received **ISAMPE award** for "Smart Materials and Systems, Technology Development (General Category)-2023" for contribution towards the "*Magneto-Rheological Smart Materials & Devices for Seismic Disaster Mitigation*" on 10 November 2023

- Dr. B. Arun Sundaram, Principal Scientist, received "**Outstanding Structural Engineer of the Year Award 2022**", given by Indian Association of Structural Engineers on 17 November 2023
- Dr. P.S. Ambily, Principal Scientist, has been awarded " **CSIR Raman Research Fellowship for the year 2023-2024"** for undergoing research titled "*Investigations on 3D Printing of Geopolymer Concrete*" at Institute of Textile Technology, RWTH Aachen University, Germany.
- Dr. P.S. Ambily, Principal Scientist, received "I**CI-Ultratech Outstanding Woman Concrete Engineer Award 2023**" given by Indian Concrete Institute, Chennai Centre
- Dr. Prabhat Ranjan Prem, Principal Scientist, received "**ICI-Ultratech Outstanding Young Concrete Engineer Award 2023**" given by Indian Concrete Institute, Chennai Centre
- Dr. K. Lakshmi, Principal Scientist, received "**Seermigu Poriyalar Award 2023**" conferred by The Hindu Tamil Thisai and Ramco Supercrete on 07 December 2023
- Dr. B. Arun Sundaram, Principal Scientist, received "**Proficient Engineer Award 2023**" conferred by The Hindu Tamil Thisai and Ramco Supercrete on 07 December 2023.
- Dr. T. Hemalatha, Principal Scientist, received "**Seermigu Poriyalar Award 2023**" conferred by The Hindu Tamil Thisai and Ramco Supercrete on 07 December 2023
- CSIR-SERC received First Prize on "Large Office Category" given by Town Official Language Implementation Committee (TOLIC), Southern Railway, Chennai, on 22 December 2023.

Dr. Smitha Gopinath receiving the ISAMPE award

Dr. C. Bharathi Priya received the ISAMPE award

Dr. B. Arun Sundaram receiving the outstanding structural engineer of the year award 2022

Dr. B. Arun Sundaram receiving the proficient engineer award

Dr. K. Lakshmi receiving the Seermigu Poriyalar Award 2023

Dr. T. Hemalatha receiving the Seermigu Poriyalar Award 2023

CSIR-SERC received first Prize on "Large Office Category" given by Town Official Language Implementation Committee (TOLIC)

Patents Granted

- Smitha Gopinath, A. Ramachandra Murthy, Nagesh R. Iyer - "Method and Apparatus for Producing Textile/Fabric Reinforced Composite Sheets and Products - Indian Patent No: 477667, 06 December 2023
- Smitha Gopinath, Amar Prakash, A.K. Farvaze Ahmed, J. Rajasankar – "An Apparatus and Method for Production of Precast Textile Reinforced Concrete Crash Barriers" - Indian Patent No: 480834, 12 December 2023

Paper Publications

- **SCI Journals - 11**
- **Reputed Indian Journals - 1**

CSIR–SERC
ENGINEERING SUSTAINABLE STRUCTURES

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