Dear Readers,

We are pleased to share with you papers covering research on traditional and blended concrete, assessment technique and some systematic comparisons of code provisions for concrete characteristic.This edition is guest edited by Dr Sandip Kumar Saha. Dr Sandip Kumar Saha is an Associate Professor in the School of Civil and Environmental Engineering at the Indian Institute of Technology Mandi (IIT Mandi). His research interests include multi-hazard vulnerability assessment of reinforced concrete structures, resilient infrastructure in the hilly region, performance-based earthquake engineering and seismic vibration control. Dr Saha has published more than 60 research articles and edited two book volumes. He is member of several professional bodies, namely, Indian Society of Earthquake Technology (ISET), Indian Association of Computational Mechanics, The Institution of Engineers (India), Earthquake Engineering Research Institute (EERI) and American Society of Civil Engineers (ASCE). Dr Saha is currently serving as an associate editor for the Practice Periodical on Structural Design and Construction, ASCE and an editorial board member of the ISET Journal of Earthquake Technology. We hope you enjoy reading this edition and look forward to your feedback!

Production Editor
Indian Concrete Journal

Dear Readers,

Greetings! It's my great pleasure to bring out the May 2024 issue of the Indian Concrete Journal (ICJ). Today, concrete stands as one of the world's most widely utilized materials, owing to its versatile applications in the construction sector. Consequently, understanding its manufacturing processes, characterization of its properties with the use of new ingredients and for specialized applications, and exploration of novel techniques to assess the concrete structures present a plethora of complex challenges for researchers and industry professionals. This edition of the ICJ includes five high quality articles in line with the above-mentioned research challenges.

The advancement in concrete technology and construction management through sophisticated tools and processes in the recent past is noteworthy. However, a significant portion of the concrete production in India and many other countries still relies on manual labor and use of traditional equipment, even in sufficiently large and organized construction projects. As a result, time and resource estimation in such projects often becomes qualitative instead of quantitative, mostly based on rule of thumb. In this context, Singh *et al.*[1] have presented the development of a detailed and systematic method for accurate estimation of time and labor resources required for pouring concrete in traditional ways by meticulously analyzing the work cycles down to the minute and second level. This level of granularity in analyzing production rates and worker activities contributes to a more precise and reliable cost estimation process for concrete construction projects enhancing the overall project efficiency.

While the traditional method of concrete pouring is still practiced, it is often associated with problems like non-uniformity of mixing, poor surface finishing, difficulties with casting of elements having congested reinforcement etc. To overcome these shortcomings of regular concrete mixes, self-compacting concrete (SCC) has emerged as an attractive choice for modern construction leading to improved quality, pouring efficiency, and versatility in use. However, quantifying the flowability performance of SCC using standard tests is known to be inadequate when compared to the site observations. The study by Rao *et al.*[2] on the flow performance of SCC against multiple resistance from reinforcement has provided valuable insights into the challenges faced in congested structural elements. In this study, by simulating real-world conditions, the authors have demonstrated the significant impact of reinforcement spacing and diameter on the flowability of SCC. The constrained flow test (CFT) of SCC, proposed by the authors, offers a novel approach to evaluate the ability of the SSC to overcome resistance from the reinforcement. Further, a new parameter, i.e., flowability coefficient, has been proposed to quantify the effect of reinforcement characteristics on the slump flow of SCC, enhancing the understanding of optimum SCC mix designs.

It can be noted that modern day concrete not only became more workable, enhancement of specific concrete properties also regularly practiced with blending of supplementary cementitious materials. Moreover, conscious efforts are constantly made to make concrete more sustainable. In this regard, bottom ash blended concrete has gained serious attention in recent times. The study by Rahman *et al.*[3] has demonstrated that coal based bottom ash is a potential sustainable building material, with the ability to replace up to 40 % of natural sand in concrete mixes. By improving thermal insulation and structural viability in tropical climates, bottom ash blended concrete roofs offer energy-efficient solutions for buildings. This approach not only reduces environmental impact by repurposing industrial waste but also contributes to sustainable construction practices.

The recent development in concrete technology is not only focused on development of tailored concrete for faster, superior, and sustainable construction, it also emphases on the development of techniques for assessment of issues related with concrete construction. The corrosion induced degradation of prestressing strands in pretensioned concrete (PTC) is a prime concern regarding the safety and durability of such structures. Early detection of such corrosion is an open challenge for the researchers. Joseline and Pillai[4] have presented a method to assess the early-stage corrosion in prestressed concrete structures exposed to chlorides. They have demonstrated that the use of electrochemical impedance spectroscopy (EIS) allows for the identification of passive and active corrosion stages, aiding in the timely intervention and maintenance of prestressed concrete bridges to ensure their long-term durability and safety.

With continuous innovation in the development and assessment of concrete, the use of appropriate expressions for modeling the concrete properties in the analysis and design of reinforced concrete structures becomes challenging. The modular ratio of reinforced concrete is one such important parameter that has been related to the properties of hardened concrete differently in different design codes across the world. Understanding the relationship between the modular ratio and the ever-changing ingredients of modern-day concrete is essential for accurate structural analysis and design in reinforced concrete applications. The last article of this issue by Subramanian[5] delves into the concept of the modular ratio in reinforced concrete, crucial for transforming composite sections into equivalent concrete sections. It compares the expressions from design codes, such as, IS: 456[6], Eurocode 2[7], and ACI 318-19[8] to determine their applicability and associated shortcomings. The article also highlights several changes proposed in the draft revision of IS: 456 standard and need for further research in this direction, especially concerning the higher grades of concrete.

In summary, this issue of the ICJ presents a unique set of articles addressing some crucial research needs, encompassing traditional concrete pouring, self-compacting concrete, evaluation of blended concrete for thermal performance, assessment of corrosion in prestressed concrete and some important insights into the modular ratio of reinforced concrete. On behalf of the ICJ, I wish to express heartfelt gratitude to the authors whose research findings have been entrusted to the ICJ for dissemination. The reviewers' dedication and commitment to maintaining the quality of the published articles within a stipulated timeline are deeply appreciated. I anticipate that the articles featured in this edition will prove advantageous to both researchers and practicing engineers alike.

Best Regards,

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