Dear Readers,

ICJ team wishes each one of you a very happy New Year!

As newer materials with high-performance attributes get introduced to the construction industry, mechanics of structures built with such materials and construction technology involved thereof are subject matters of investigation leading to resilient infrastructure development. Such cutting-edge technological advancements in engineered construction materials and their applications in real-life civil infrastructure projects leading to resilient infrastructure development are addressed in this sequel.

Prof. Vasant Matsagar, our Guest Editor, delivers contemporary knowledge on this emerging topic in the concrete industry with this sequel edition. Prof. Matsagar, who is well-known in both academia and industry, specialises in Multi-Hazard Protective Structures, and is presently serving as Dogra Chair Professor in the Department of Civil Engineering at the Indian Institute of Technology (IIT) Delhi.

Production Editor
Indian Concrete Journal

Dear Readers,

Happy New Year 2021! The Indian Concrete Journal (ICJ) has been publishing scholarly articles on resilient infrastructure development with advanced engineered materials. In this sequel edition of the ICJ, five articles have been included, which address the developments in fiber-reinforced polymer (FRP) composites, fiber-reinforced concrete (FRC), and their applications in infrastructure development.

The first article has reported results of experimental investigation on the FRP stay-in-place formwork applied for box-beam bridge deck. The full-scale tests conducted have demonstrated the ease of construction achieved by using the stay-in-place formwork, while reducing the deflection and reinforcement requirement in the members. Some of the design practices followed contemporarily in the USA have been shown through this work. Currently, code/standard on the design of reinforced concrete (RC) and prestressed concrete (PSC) structural members with internal/external FRP reinforcing bars or prestressing tendons is inexistent in India. Across the world, the design philosophies for the FRP-reinforced/prestressed, RC/PSC members have greater diversity. The second article in this edition has presented analytical, numerical, and experimental results on flexural behavior of the PSC beams reinforced and prestressed using basalt fiber-reinforced polymer (BFRP), which were designed as under-reinforced sections. The ability of the BFRP-PSC beams in exhibiting ductility at ultimate failure has been shown through this investigation. The step-by-step flexural design approach shown in this article in a flowchart and along with a solved example given in Appendix will be directly useful for the practicing structural engineers. The next article has dealt with real-life construction project of highway bridge on an expressway in Japan. Epoxy-coated steel rebars have been used in the structural renewal project upon extensive testing under fatigue loading. In future, it would be interesting to see if introducing some new engineered composites will be able to further improve the durability and performance of structures, help assuring longevity, and address the problems of aging infrastructure. Externally wrapped concrete members using triaxially-braided hybrid FRP composites are studied experimentally and analytically and results are reported in the next article. Production of the composites and results from the laboratory tests conducted are shown for possible improvement in axial and flexural behaviors of concrete members. Material characterization tests have been conducted for the FRP fabric made with combination of carbon and glass fibers oriented in various braiding angles, and their effectiveness to enhance performance in axial and flexural behaviors of the members has been established. Extensive finite element (FE)-based numerical studies are required, calibrated/validated through experimental investigations, in order to develop the analysis schemes with confidence for the advanced engineered materials. The last article in this edition has addressed such a need through detailed FE analysis of prestressed concrete beams with steel and polyolefin-based hybrid fibers dispersed in concrete. The comparison of the experimental and FE simulation results has shown a promise to employ the numerical tool effectively for predicting structural response of the hybrid fiber-reinforced concrete (FRC) members.

Thus, in this edition of the ICJ, we are glad to bring together experiences from both, academia and construction industry, as well as practices followed in different countries on the use and application of the FRP composites in the civil infrastructure in various forms. From the extensive submissions made to us, we plan to publish yet another upcoming sequel edition of the ICJ on advanced engineered materials employed in resilient infrastructure development. Thank you.

Vasant Matsagar
Guest Editor, ICJ