Dear Readers,

We are proud to present to you the ICJ September Edition 2024 that has been curated by Prof. Dr B. B. Das.

Dr B. B. Das is a Professor of Civil Engineering at NITK Surathkal. After completing his PhD from IIT Bombay in 2007, he worked for two years as a Post-Doctoral Research Associate at the Centre for Innovative Materials Research (CIMR), Lawrence Technological University, Southfield, Michigan, USA. Before joining NITK, he was the centre head for NICMAR at Goa and Indore. In an era when environmental concerns were at the forefront of global discussions, Prof. Das recognized the urgent need to revolutionize the construction sector and developed Sustainable Construction and Building Materials Laboratory (SCBM Lab) in 2018 at NITK Surathkal. He has co-authored around 100 scientific and technical publications (SCI/SCOPUS) in the areas of concrete technology.

We hope our readers enjoy reading this edition. We are excited to hear your valuable feedback, please write to us at : icj@adani.com

Production Editor
Indian Concrete Journal

Dear Readers,

In this edition of ICJ September 2024, I am pleased to share with our community 5 enriching research papers oriented to sustainability as their common narrative.

In the first paper, Manu Santhanam and co-authors[1] highlight the adsorption mechanism of polycarboxylate ether (PCE) based superplasticizer (SP) to improve the workability of limestone calcined clay (LC3) cement. Further, the possibility of using sodium hexametaphosphate-based dispersing agent to improve the workability retention of LC3 based concrete is also evaluated. The addition of dispersing agent is observed to increase the workability retention without affecting the 7 days and 28 days strength significantly. It is concluded that the workability retention can be increased by blocking the active adsorption sites of the calcined clay either using higher SP dosage or by using dispersing agents.

Second paper highlights the research work conducted by P K Acharya and co-authors[2] is about the performance of concrete prepared using ferrochrome slag as coarse aggregate replacing natural coarse aggregates (NCA) of 0-100 % at an interval of 10 %. The compressive, flexural and split tensile strength of concrete improved up to 14, 42 and 35 % on the 100 % application of ferrochrome slag in place of natural coarse aggregates. The acid, sulphate and chloride resistance of concrete containing ferrochrome slag up to 100 % improved by 15, 17 and 16 % respectively when compared to normal concrete. The results of the study would encourage the concrete industry to replace natural aggregates with ferrochrome slag aggregates which may be a step towards strengthening the economy and ecology.

Third paper[3] presents the the effect of nano SiO_2 silicon dioxide on some properties of concrete as investigated by A A Moosa & co-authors. was studied. The nano SiO_2 has been added to the concrete mixtures at ratios of (0.2, 0.3, 0.4, 0.5) % by weight of cement respectively. Then, the compressive strength, density and absorbency were measured at ages (7, 14 and 28) days. SEM and EDX were used to characterize the samples. The results showed that the highest compressive strength, density, and lowest water absorption were in the mixture with nano SiO_2 added at 0.3 % of the weight of cement. SEM examination of the samples with 0.3 % nano SiO_2 by weight of cement showed that the microstructure is solid from the formation of C-S-H and there are no pores.

The next paper[4] investigates the strength properties of Composite Fiber Reinforced High-Performance Concrete (CFRHPC) developed by A S Sayyad & co-authors. Experimental results revealed that 3.0 % NS in combination with 15 % UFFA is optimal to achieve augmented mechanical strength. Additionally, SF and PPF have also contributed towards improving the tensile, flexural, shear and impact performance of CFRHPC. However, their contribution towards improving compressive strength was found only marginal.

The final paper by T S Sekhar and co-authors[5] of this special issue examines the impact of Metakaolin, Fly ash, and Nano silica in quaternary blends and the durability properties such as Acid resistance with 5 % HCl and H_2SO_4, Acid durability factor, Sulphate attack exposed to 5 % $MgSO_4$, Water permeability, and Rapid chloride permeability test are made at 28, 90 and 180 days. The findings shows that, due to the use of mineral admixtures quaternary blended concrete has shown improved performance than control concrete because of the improved pore refinement and dense structure.

In this ICJ themed edition, I have strived to build further awareness and promote sustainable construction in India. We will together continue to share and advance rich knowledge generated in the realm of concrete industry. Please do continue to share the findings and application knowledge in your community groups to make a positive impact in the construction sector.

With Best Regards,
Prof. Bibhuti Bhusan Das
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