

Dear Readers,

We are pleased to share with you this edition that covers App development of concrete mixture, comparative design assessment of reinforced concrete bridge pier cap, high strain rate effects of concrete and concrete made of special aggregates and more.

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We hope you enjoy reading this edition. Please do share your comments and feedback with us.

Production Editor  
Indian Concrete Journal



Dear Readers,

The Indian Concrete Journal (ICJ) in its current edition is pleased to highlight some of the emerging topics to the readers such as Android Application development of concrete mixture as per the latest Indian standard, comparative design methodology of Reinforced Concrete (RC) bridge pier caps, dynamic material behavior of concrete, and the hardened properties of concrete made of granite and calc-granulite aggregate. In this edition, four articles have been published encompassing material to structural level characteristics of concrete.

The first article has proposed the development of Android Application using Android studio for concrete mixture as per the latest Indian Standard IS: 10262 (2019). Considering all the guidelines stipulated in IS: 10262 (2019), the developed Application can be used for obtaining mix design for various concrete types such as normal strength concrete (NSC) grade up to 60 MPa, high strength concrete (HSC) grade from 60 to 100 MPa, self-compacted concrete (SCC) and mass concrete of grade 15 and 20 MPa etc. Various laboratory tests (i.e., compressive strength and slump cone) have also been carried out on various types of concrete to validate the mix proportioning results obtained from the developed Android Application.

The second article has reported the design of RC bridge pier caps, particularly the amount of reinforcement requirements, by comparing sectional (as per IRC 112:2020), semi-empirical and strut-and-tie methods (as per AASTHO 2017). RC bridge pier caps are usually considered as 'disturbed' (D-region) region due to the action of heavy concentrated loading and abrupt change

in geometry. Four different pier caps of 'a/d' ratios (where 'a' is the distance between the vertical face of the pier and the load centre and 'd' is the effective depth) varying from 0.5 to 2 are considered for comparative assessment. For pier cap with 'a/d' ratio greater than 1, both strut-and-tie and sectional method provide almost identical main tension reinforcements whereas for 'a/d' ratio lesser than 1, strut-and-tie method gives higher amount of reinforcement as compared to sectional method. Overall, strut-and-tie method has been recommended for design of pier cap with 'a/d' ratio lesser than 1.

The third article has addressed the high strain rate (varying from 241-635/s) effects of concrete of various grades ranging from M20 to M40 using Split Hopkinson Pressure Bar (SPHB) test set-up. Numerous parameters such as striker bar length, gas gun pressure, grade of concrete, and specimen slenderness ratio are varied to evaluate the influence of strain rate. It was observed that slenderness ratio of samples plays an important on dynamic increase factor (DIF) values. DIF is on the lower side for higher grade of concrete as compared to lower grades. Successively, empirical equations are suggested for M40 grade of concrete to compute DIF for various strain rates.

The fourth article has suggested the empirical equations for predicting the flexural and split-tensile strength of NSC and HSC made of granite and calc-granulite aggregate in terms of cube compressive strength. Various concrete mixes were considered with 'w/c' ratio varies from 0.2 to 0.6 for which the 28-days compressive strength ranging from 20 to 110 MPa. Experimental values of flexural and split-tensile strength of NSC and HSC were compared with various international codes (e.g., ACI 318, NZS 3101) and the Indian code [IS 456: (2000)].

We would like to convey our sincere thanks to authors, reviewers and all other stakeholders involved in preparing this edition of the ICJ. Thus, we are delighted to issue this edition of the ICJ with firm belief that it would be of great benefit to the researchers and the practicing engineers involve in design and construction of concrete structures.

Best regards

Satadru Das Adhikary