Editorial

Wei-Liang Jin*

College of Civil Engineering and Architecture,
Zhejiang University, Hangzhou, China
E-mail: jinwl@zju.edu.cn
*Corresponding author

Tamon Ueda

Laboratory of Engineering for Maintenance System,
Division of Built Environment,
Hokkaido University,
Sapporo, Japan
E-mail: ueda@eng.hokudai.ac.jp

P.A. Muhammed Basheer

Queen's University Belfast,
Northern Ireland, UK
E-mail: m.basheer@qub.ac.uk

Biographical notes: Wei-Liang Jin is a Professor of Structural Engineering at Zhejiang University where he served as the Head of Institute of Structural Engineering and Deputy Dean of College of Civil Engineering & Architecture. He commenced his academic career at the Zhejiang University, where he rose to the rank of Professor in Structural Engineering in 1996. He is the author of more than 200 research papers. He continues his active structural research and is on the board of several academic journals. He is also a member of editorial committee of several national structural technological standards.

Tamon Ueda is a Professor at Division of Built Environment of Hokkaido University. He obtained his Doctor of Engineering from University of Tokyo in 1982. His research interests are in numerical analysis of concrete and hybrid structures, prediction of chronological change in structural performance, upgrading of structures, seismic design and structural design methodology. He is currently the Chairman of International Committee on Concrete Model Code for Asia (ICCMC), Advisory Committee Member of International Institute of FRP in Construction (IIFC), Vice President of Asian Concrete Federation (ACF) and Secretary of ISO/TC71/SC7 (Maintenance and Repair of Concrete Structures).

P.A. Muhammed Basheer is a Professor of Structural Materials and the Director of the Centre for Built Environment Research at Queen's University Belfast, Northern Ireland, UK. He has extensive research experience in developing new test techniques for measuring transport properties of concrete, assessing the effect of new materials and methods for improving the durability of concrete, predicting service life of reinforced concrete structures by non-destructive testing and the use of industrial by-products and waste materials in concrete.

The second issue for 2009 is a special issue on durability of concrete structures. The special issue contains nine technical papers.

A synthetic view of the holistic approach for the deterioration of reinforced concrete structures was proposed through a ternary representation of the damage process by M. Collepardi in 'Damage of concrete by sulfate attack and alkali-silica reaction' This model was adopted to examine two specific examples of the concrete damage dealing with the cement matrix and the embedded aggregates: sulfate attack of the cement matrix and alkali-aggregate reaction.

V.M. Malhotra discussed some aspects of global-warming, and the role of supplementary cementing materials and superplasticisers in reducing greenhouse gas emissions to the atmosphere in 'Global warming, and role of supplementary cementing materials and superplasticisers in reducing greenhouse gas emissions from the manufacturing of portland cement.' The author also suggest that combined use of superplasticisers and supplementary cementing materials can lead to economical high-performance concrete with enhanced durability.

The influence of parametric values on the risk of steel corrosion in concrete was quantitatively calculated in terms of the sensitivity to service life of concrete structures subjected chloride attack by Ha-Won Song, Ki Yong Ann, Seung-Woo Pack and Chang-Hong Lee in 'Factors influencing chloride transport and chloride threshold level for the prediction of service life of concrete structures'. These results indicate that in predicting the corrosion-free life, the depth of cover concrete is the most influential to the time of corrosion, followed by surface chloride content, diffusion coefficient and chloride threshold level

Experimental investigation was conducted by Muhammad Nasir Amin, Jeong-Su Kim and Jin-Keun Kim in 'Assessment of cracking in concrete due to hydration heat and autogenous shrinkage' to simulate the generation of thermal stresses in concrete due to hydration heat. Experiments were also conducted to accurately measure the precise value of early-age autogenous shrinkage and to evaluate the basic creep model with respect to autogenous shrinkage. Recommendations were proposed based on the experimental results.

Material tests and analysis are presented by Peiyu Yan and Yaodong Jia in 'Carbonation of concrete containing mineral admixture in normal indoor environment'. The relationship among carbonation of concrete and several influencing factors, namely moistly curing ages before carbonation, water-binder ratio, kinds of mineral admixture, fly ash-slag mixing ratio and replacing proportions of mineral admixture were investigated.

The paper by Shilang Xu, Qinghua Li and Shide Song 'Durability performance of RUHTCC beam under flexural load' opens this special issue of the journal. Investigations on flexural behaviour of reinforced UHTCC (RUHTCC) members are carried out by virtue of excellent crack dispersion and strain energy absorption abilities of UHTCC. The results indicate that UHTCC can delay yielding of reinforcements and improve load bearing capacity and ductility of structures.

'Research on the application of random layered sampling theory to evaluating durability of existing concrete bridge structures' has been carried out by Ping-hua Zhu, Xia He and Wei-liang Jin. Based on the three-level-multi-index evaluating model for durability of existing concrete bridges structures, the application of random layered sampling theory to durability evaluation is studied. The result of application to actual

projects showed the proposed method is able to achieve coherence between evaluating cost and evaluating precision.

In 'Development of corrosion layer of steel bar in concrete and its mechanical and electrochemical effects' Yingshu Yuan and Yongsheng Ji describe the composition and distribution of the corrosion layer along the bar surface, present the distribution model of expansive force and reveal time-depended process of the variation of corrosion rate of the steel bar in concrete and discussed the mechanism of mechanical and electrochemical effects.

Jun Wei, Pei Li, Xiwu Zhou and Keqiang Zhang carried out 'Correlation analysis of durability and concrete cover thickness of concrete structures'. They developed a reliability method for concrete members under small eccentric loads with consideration of structure resistance change based on concrete structure damage deteriorating law. They also discussed the relevancies of concrete protective cover, reliability index and corrosive crack width.