



Message from ACF President



Prof. Tamon Ueda
ACF President
Hokkaido University

Have you had time to read our latest Newsletter in early November? Did you find it interesting?

Newsletter is a typical mean to share useful information in a community as a benefit and to make people connected in the community they belong to. When you receive a newsletter you feel that you are a part of the community. In the latest issue, a new type of article is included. It is a PhD thesis abstract of a recently graduated doctoral student who is also a member of ACF. Readers benefit from this type of articles because they can know about hot topics and/or latest research advancement in the region. At the same time authors of the articles can feel that they are a part of ACF, the first step of their professional career. We plan to continue including the PhD abstracts in the coming Newsletters.

Prof Han, Vice President, showed the plan of our new publications, ACF Magazine and ACF Journal in the latest ACF Newsletter. ACF Magazine will replace the present ACF Newsletter in 2015. ACF Magazine will be the extended version of the present Newsletter in terms of the volume of each article and number of articles in each issue. ACF Magazine will include interesting technical articles, such as big projects and innovative technologies, which are translated from articles in domestic journals in member countries/regions.

The contents of those articles are well known in the respective countries/regions, but not in other countries/regions. Truly international magazines, such as TIME and The Economist, show international articles. An international magazine in construction field, ENR (Engineering News-Record) also includes international articles but much more domestic articles (news in USA). ACF Magazine could be more international.

There are two concepts for newsletter as Prof Han indicated in his article. The first concept is that newsletter compiles quick news and short articles. The second concept is that newsletter (or magazine) compiles long articles with detailed information. The former is good in providing hot and latest news. Thus, the frequency of publication should be more. The latter is good in providing news as detailed and precise information. Thus, the volume of articles should be more. Either way requires a good editorial team with certain manpower.

The contents and type of the newsletter would be of various options. Your comment on the planned change in the ACF Newsletter is welcome. Together we can make our publication better.

[from President Report, November 2013]

YRGS 2013

The 5th Asia and Pacific Young Researchers and Graduates Symposium on Current Challenges in Structural Engineering

October 15-16, 2013

MNIT Jaipur, India

by
Dr. Sandeep Chaudhary
MNIT Jaipur
India



The 5th Asia- Pacific Young Researchers and Graduates Symposium: Current Challenges in Structural Engineering (YRGS - 2013) was held at MNIT Jaipur on October 15-16, 2013.

The series of the Asia and Pacific Young Researchers and Graduates Symposium (YRGS) was initiated in 2009 to promote the young professionals from academics, research, and field practice and to facilitate knowledge sharing between Asia and Pacific countries.

A tremendous development of infrastructure is expected in the Asia-Pacific Region in the coming years. The young structural engineers have a crucial role to play in this development in terms of new ideas. These engineers need to interact more often for exchange of idea, understanding the problems faced in different countries and help each other by coming out with the suggestions and collaborative research.

It was found that the research community of European Countries and American Countries has many platforms for the young engineers to discuss their ideas. However, there was no such formal platform in the Asia and Pacific region for the young structural engineers. Considering this need, the series of the Asia and Pacific Young Researchers and Graduates Symposium (YRGS) was initiated to promote the young structural engineering professionals of this region from academics, research, and field practice and to facilitate knowledge sharing between Asia and Pacific countries. The first YRGS was held in 2009 at Kunsan National University, Korea; second in 2010 at Zhejiang University, China; the third in 2011 at National Taiwan University, Taiwan and the fourth in 2012 at Hong Kong Polytechnic University, Hong Kong.



Release of Proceedings of the Symposium by (L to R): (a) Dr. Bhavna Tripathi, Organising Secretary; (b) Prof. R. Nagar, Director In-charge; (iii) Prof. Dev Swarup, Hon'ble Vice Chancellor, University of Rajasthan; (iv) Prof. Sudhir Kumar, Head, Department of Civil Engineering; and (v) Dr. Sandeep Chaudhary, Symposium Chair

YRGS 2013 accepted forty two papers from countries including Australia, China, Egypt, Hong Kong, India, Japan, Korea, Malaysia and Thailand. The symposium consisted of a two day technical program: the first day program was organized in five technical sessions; and the second day program was organized in three technical sessions with one session jointly organized with the Asian Concrete Federation. The papers presented at YRGS 2013 discussed the current challenges being faced in structural engineering in the Asia and Pacific region and the efforts carried out by young researchers to overcome these challenges.

The symposium was organized by Department of Civil Engineering, MNIT Jaipur in partnership with the Asian Concrete Federation (ACF), and was sponsored by Ambuja Cements Ltd. and Altair India. Prof. I. K. Bhat, Director MNIT was the Patron of the symposium; Prof. Sudhir Kumar, Head, Department of Civil Engineering MNIT was the Chairman of the Organizing Committee and Dr. Bhavna Tripathi was the organizing Secretary.



Prof. I. K. Bhat, Director MNIT, was the Patron of the symposium.

Dr. Sandeep Chaudhary, Associate Professor, Department of Civil Engineering, MNIT Jaipur was the Symposium Chair. He has been associated with YRGS since he was Research Professor in the Structural System Laboratory, South Korea in 2010-2011 and has been instrumental in extending the reach of YRGS to India. He also expressed his desire to host the Indian Chapter of ACF in MNIT Jaipur during the Symposium.

Renowned professors and scientists from India and abroad attended the symposium and enlightened the young participants with their thoughts. The keynote speeches were delivered by Prof. A.K. Nagpal (IIT Delhi), Prof. S. B. Singh (BITS Pilani), Prof. P.K. Gupta (IIT Roorkee), Prof. Saroj Mandal (Jadavpur University) and Prof. M.K. Banerjee (MNIT Jaipur). A special session was organized by the Asian Concrete Federation in which the speeches were delivered by Dr. Hwa-kian Chai (University of Malaya, Malaysia); Dr. Yew-Chin Koay (VicRoads, Australia); Dr. Raktipong Sahamitmongkol (Sirindhorn International Institute of Technology, Thammasat University, Thailand) and Prof. Y. Kobayashi (Nihon University, Japan).

Two awards were given by ACF for the best papers. The papers were selected by the International Steering Committee in pre symposium meeting. The awards were given to Mr. M. R. Kaloop & Mr. M. A. Syed and Mr. Kaustav Sarkar.



Mr. M. R. Kaloop was granted the best paper award.



Mr. Kaustav Sarkar was granted the best paper award.

During concluding session, Prof. I. K. Bhat, appreciated the efforts of the International Steering Committee of YRGS. He thanked ACF for supporting YRGS and assured his support for the Indian Chapter of ACF in MNIT Jaipur. He also stressed on the need of collaborative research projects among the countries of Asia and Pacific region.

YRGS 2014

The next YRGS symposium (YRGS 2014) will be held at Sirindhorn International Institute of Technology (SIIT), Thammasat University during 31 July 2014 to 1 August 2014. For more information, please contact Dr. Raktipong Sahamitmongkol (sahamit@siit.tu.ac.th).

VCA – ACF Joint International Seminar on Concrete Technologies and General Meeting of VCA 21 November 2013 IBST campus, Hanoi, Vietnam



by
Dr. Phan Huu Duy Quoc
VCA Executive Committee
Vietnam

Asian Concrete Federation (ACF) and Vietnam Concrete Association (VCA) had just jointly organized an international seminar on new technologies for production of precast products, construction and maintenance of concrete structures to celebrate the general meeting of VCA.

Approximately 150 people participated in the seminar held at Vietnam Institute for Building Science and Technology (IBST), Hanoi. The seminar was evaluated to be very informative, with 14 presentations on important issues of concrete technologies such as quality control, durability, maintenance, etc.

ACF sent two top experts from Japan and Thailand to deliver two important presentations on durability and maintenance of concrete structures.

Dr. Hiroshi Watanabe represented Japan Concrete Institute (JCI) to give the first presentation on maintenance of existing concrete bridges deteriorated by corrosion of reinforcing steel.



Dr. Hiroshi Watanabe (representing JCI)

Prof. Dr. Somnuk Tangtermsirikul represented Thailand Concrete Association (TCA) to give the second presentation on Durability Problems and Service Life Design for Sustainable Construction in Thailand.

This is the third time that VCA and ACF jointly organized this kind of activity, following the first joint seminar dealing with cracked concrete (2010), and the second seminar on preventing thermal cracks in mass concrete (2011). It is a good example on the cooperation between ACF and its representative members in the region in organizing information-sharing events that serve the actual needs in each country.



Prof. Dr. Somnuk Tangtermsirikul (representing TCA)

On the same day, Vietnam Concrete Association held its general meeting to review its activities in the past 4 years, to discuss the direction for future activities and select new leaders for the period from 2014 to 2017.

The general meeting successfully ended by the election of a new presidential board and executive committee that is believed to lead VCA and concrete industry to a higher stage to meet the urgent need of infrastructure development in Vietnam.

Dr. Le Quang Hung, former Vice President of ACF, was re-elected as president of VCA for the second term from 2014 to 2017.



Dr. Le Quang Hung
Re-elected President of VCA

VCA highly recognizes the importance of international collaboration and the participation in the ACF community has been proved to be beneficial to its members.

New Presidential Board of VCA

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| 1. | Dr. Le Quang Hung | President |
| 2. | Mr. Nguyen The Hung | Vice president and Secretary General |
| 3. | Mr. Phan Khac Long | Vice president in charge of Southern Vietnam |
| 4. | Dr. Luong Duc Long | Vice president in charge of Science and Technology |
| 5. | Mr. Ngo Van Long | Vice president in charge of Central Vietnam |
| 6. | Mr. Nguyen Ngoc Dung | Vice president in charge of Consulting and Supervision of Construction Work |



Newly-elected executive committee of VCA for the 4-year term (2014 to 2017)

PhD Abstract on Repair Effect of Electrochemical Treatment to Chloride-Contaminated Concrete Structures



Dr. Hyun-Bo Shim
KCI Research
Korea

Dr. Hyun-Bo Shim is a PhD graduate of Yonsei University, Korea in 2013. He received his Bachelor of Engineering degree and his Master of Engineering degree from Yonsei University, Korea. His PhD topic was "Repair Effect of Electrochemical Treatment to Chloride-Contaminated Concrete Structures".

The service life of concrete structures exposed to a chloride environment can be extended by some repair/rehabilitations in terms of removing chlorides from concrete body. In particular, patch repair removes chloride-contaminated concrete from the surface concrete and replaces with sound repair material. Alternatively, electrochemical chloride extraction (ECE) forces chloride ions to move away from the reinforcements by using electric field.

It is necessary to quantitatively estimate a change in the service life (extended residual life) after maintenance to maximize the repair effect. However, there are difficulties, such as applications of phases with different diffusivity and redistribution of residual chlorides, in predicting the chloride ingress in repaired concrete structure with the conventional prediction models.

Furthermore, only limited information for ECE is available for predicting the service life, for example, changes in the chloride threshold level (CTL) and chloride profile.

In this study, the effect of the ECE in enhancing the corrosion resistance and chloride removal were investigated by experimental works, of which information was subsequently used to predict the service life. A formulation based on the Crank-Nicolson scheme in the finite difference methods was used to predict the chloride ingress in repaired concrete, using the experimental results for the ECE. The service life prolonged by the ECE was quantitatively estimated and compared to that prolonged by the patch repair.

The CTL in terms of corrosion resistance increased with the intensity of current density. The ECE lowered chloride ion concentrations throughout the whole depth, ranging from 63.2% to 72.8% of original concentrations. It was estimated that the residual service life after the first treatment of ECE (i.e. 49 years after the completion of construction) was prolonged up to more than further 100 years to meet the target life, whilst about 36 years was extended by the patch repair.

The prediction of the residual service life for repaired concrete structures will provide the quantitative, rational estimation in the maintenance design and options to make for a repair method.

Conferences

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| July 16-20, 2014 | The 1st International Conference on Infrastructure Failures and Consequences
Melbourne, Australia
http://www.rmit.edu.au/icifc2014/ |
| July 31-August 1, 2014 | The 6th Asia and Pacific Young Researchers and Graduates Symposium (YRGS 2014)
Sirindhorn International Institute of Technology, Thailand |
| September 21-24, 2014 | The 6th ACF International Conference (ACF 2014)
Seoul, Korea
http://www.acf2014.kr |
| September 23-25, 2014 | The 2nd International Conference on Sustainable Civil Engineering Structures and Construction Materials (SCESCM)
Yogyakarta, Indonesia
http://conference.tsipil.ugm.ac.id/scescm/ |
| October 12-14, 2014 | RILEM International Symposium on Concrete Modelling
Beijing, China
http://conmod2014.tsinghua.edu.cn |
| December 4-6, 2014 | The International Conference & Exhibition on Durability of Concrete
India |

PhD Abstract on Potential-Based Fracture Mechanics using Cohesive Zone and Virtual Internal Bond Modeling



Dr. Kyoungsoo Park
Yonsei University
Korea

Dr. Park is an assistant professor at the Department of Civil & Environmental Engineering at Yonsei University in Korea. He obtained his B.E. from Hanyang University in 2003, and M.S. and Ph.D. degrees from the University of Illinois at Urbana-Champaign in 2005 and 2009, respectively. His research focuses on computational and experimental mechanics to investigate nonlinear concrete structural behaviors at various time and length scales. Thus, his Ph.D. thesis is titled as "Potential-Based Fracture Mechanics using Cohesive Zone and Virtual Internal Bond Modeling".

The collapse and failure of infrastructure, for example bridges, aircraft, oil tankers and nuclear power plants, result in significant casualties and property damage, and adversely influence the local economy. In order to prevent such disasters, it is necessary to understand and predict deformation and failure mechanisms of structures. To this end, not only are appropriate physical theories and robust computational techniques needed, but they should also be verified and validated. Thus, his thesis focuses on the characterization of cohesive fracture behavior derived from a potential-based model and on the computational simulation of failure phenomenon including quasistatic fracture, dynamic fracture, microbranching and fragmentation.

The characterization of nonlinear constitutive relationships along fracture surfaces is a fundamental issue in mixed-mode cohesive fracture simulations. A generalized potential-based constitutive

theory of mixed-mode fracture is proposed in conjunction with physical quantities such as fracture energy, cohesive strength and shape of cohesive interactions. The potential-based model is verified and validated by investigating quasi-static fracture, dynamic fracture, branching and fragmentation.

For quasi-static fracture problems, intrinsic cohesive surface element approaches are utilized to investigate microstructural particle/debonding process within a multiscale approach. Macroscopic constitutive relationship of materials with microstructure is estimated by means of an integrated approach involving micromechanics and the computational model. For dynamic fracture, branching and fragmentation problems, extrinsic cohesive surface element approaches are employed, which allow adaptive insertion of cohesive surface elements whenever and wherever they are needed. Nodal perturbation and edge-swap operators are used to reduce mesh bias and to improve crack path geometry represented by a finite element mesh. Adaptive mesh refinement and coarsening schemes are systematically developed in conjunction with edge-split and vertex-removal operators to reduce computational cost. Computational results demonstrate that the potential-based constitutive model with such adaptive operators leads to an effective and efficient computational framework to simulate physical phenomena associated with fracture. In addition, the virtual internal bond model is utilized for the investigation of quasi-brittle material fracture behavior. All the computational models have been developed in conjunction with verification and/or validation procedures.

Membership fee

Members are kindly reminded to pay their membership fee. Please contact the secretariat in case you have any query about your membership status.

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Newsletter

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