




36th Conference on
Our World in Concrete & Structures
 14 – 16 August 2011, Singapore

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 <p>Ready-Mixed Concrete Association Of Singapore</p> <p>3 International Business Park Nordic European Centre #01-14, Singapore 609927</p> <p>Telephone: +(65) 64254660 E-mail Address: yeopenghow@rmcas.org.sg</p>	 <p>CNCAS CEMENT AND CONCRETE ASSOCIATION OF SINGAPORE</p> <p>Cement And Concrete Association Of Singapore</p> <p>3 International Business Park Nordic European Centre #01-14, Singapore 609927</p> <p>Telephone: +(65) 64254660 E-mail Address: info@cncas.org.sg</p>
 <p>Japan Concrete Institute Sogo Hanzomon Buid. 12th floor No.7,Kojimachi 1-chome,Chiyoda-ku, Tokyo 102-0083, JAPAN</p> <p>Telephone: +(81) 3-3263-1571 E-mail Address: inuoe@jci-net.or.jp Website: www.jci-net.or.jp</p>	<p>"CALL FOR PAPERS" 37th Conference on OUR WORLD IN CONCRETE & STRUCTURES 29-31 August 2012, Singapore Dedicated to: Mr Willie M Kay</p> <p>Please send your abstracts to: The Conference Director (OW12) CI-Premier Pte Ltd, 150 Orchard Road #07-14, Orchard Plaza, Singapore 238841</p> <p>Telephone: +(65) 67332922 E-mail Address: ci-p@cipremier.com Website: www.cipremier.com</p>

36th Conference on
**OUR WORLD
 IN CONCRETE
 & STRUCTURES**
 14 – 16 August 2011, Singapore

Conference Theme:
"Recent Advances in the Technology of Fresh Concrete"

PROGRAMME & ABSTRACTS

Conference Co-sponsors:

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- Japan Concrete Institute

Organisers:

- CI-Premier Conference Organisation, Singapore

36th Conference on Our World in Concrete & Structures

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- Cement and Concrete Association of Singapore
- Japan Concrete Institute
- Indian Concrete Institute

36th Conference on OUR WORLD IN CONCRETE & STRUCTURES

14 – 16 August, 2011 – Goodwood Park Hotel, Singapore

Welcome Participants

Welcome to the 36th Conference on **OUR WORLD IN CONCRETE & STRUCTURES**, with the theme **"Recent Advances in the Technology of Fresh Concrete"**. This 36th OWICS Conference is dedicated to Professor Olafur H. Wallevik for his significant contribution to the conference series for more than 10 years.

We would like to thank and recognise the following for their sponsorships:

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Dinner Quiz Sponsor * ACI – Singapore Chapter

We wish to thank you for your participation; especially authors from more than 25 countries who have submitted interesting and important papers and most of you are here to share your valuable experience with fellow participants. We appreciate the contribution of the session chairmen, the conference advisors and all those who have helped in one way or another to make this annual conference of the OWICS Series a success.

The Secretariat Desk has been set up to service you so that you can participate actively in the deliberations. Do contact Ms Peggy Teo or any of the secretariat staff for any assistance that you may require during these two days.

Please wear your name badge at all times during the conference as it will create a friendlier atmosphere where fellow participants can address you by name. This will also serve as an identification for your admission to the conference activities.

Kindly identify all materials and documentation handed to you, with your name, so that we can return them to you if you have inadvertently forgotten to take them with you. Please check the NOTICE BOARD regularly for any changes in the programme and also for messages.

The Concrete Industry Dinner will be held at 7.30 pm on Monday, 15 August 2011 at the Singapore Recreation Club (Padang Palace Chinese Restaurant), B Connaught Drive.

On behalf of the conference organising committee, I invite you to stay on after the conference to enjoy the sights of Singapore.

Er John S Y Tan
Conference Director
14th August 2011

36th Conference on
OUR WORLD IN CONCRETE & STRUCTURES
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List of Participants

Name of Participant	Company	Country
Minoru Aba	Hachinohe Institute Of Technology	Japan
Pierre-Claude Aitcin	Université de Sherbrooke	Canada
Yoshitada Akiyoshi	Oita University	Japan
Kristján Friðrik Alexandersson	Reykjavik University & Innovation Center	Iceland
C R Alimchandani	STUP Consultants Ltd	India
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György L Balázs	Budapest University	Hungary
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Chirag Baxi	GNFC Ltd., India	India
Phelip Bay	G & W Ready-mix Pte Ltd	Singapore
M H A Begyi	Babol Nooshirvani University of Technology	Iran
T Bhaskaran	The Singapore Engineer IES	Singapore
Vlastimil Bilek	ZPSV a.s.	Czech Republic
Peter Billberg	Swedish Cement & Concrete Research Inst.	Sweden
Kok-Kuan Chan	Premier Structures	Singapore
Jimmy Chandra	Nanyang Technological University	Singapore
Cheng-Ming Chen	Hicon	Singapore
Yogesh Chhabra	Novaars International (S) Pte Ltd	Singapore
Tiffany Chia	Sinmix Pte Ltd	Singapore
Geert de Schutter	Ghent University	Belgium
S K Deb	Indian Institute of Technology Guwahati	India
Frank Dehn	MFGA Leipzig GmbH	Germany
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Jon G Gudmundsson	Reykjavik University & Innovation center	Iceland
Yashpal P Gupta	COWI - DIPL Consortium	India
Mehdi Sadeghi e Habashi	Seraj Higher Education Institue	Iran
TorArne Martius-Hammer	SINTEF Building and Infrastructure	Norway
Issam Harik	University of Kentucky	USA
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Shoji Ikeda	Yokohama National University	Japan
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M G M U Ismail	Tokyo Cement Co. (Lanka) PLC	Sri Lanka

Name of Participant	Company	Country
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Yu Liu	Nanyang Technological University	Singapore
Desmond Low	BASF South East Asia Pte Ltd	Singapore
Jinping Lu	ACI-Singapore Chapter	Singapore
Kyuich Maruyama	Japan Concrete Institute	Japan
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Shinichi Miyazato	Kanazawa Institute of Technology	Japan
Franco Mola	Politecnico di Milano	Italy
Florian V Mueller	Cemex Research Group AG	Switzerland
Kenyu Muratani	Kanazawa Institute of Technology	Japan
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Isamu Natsuka	Shimane University	Japan
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K C Gary Ong	National University of Singapore	Singapore
Toshihiro Otani	Oita University	Japan
Nobuaki Otsuki	Tokyo Institute of Technology	Japan
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Petr Prochazka	Czech Technical University	Czech Republic
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Kommajosyula Ramesh	Varshitha Concrete Pvt Ltd	India

Name of Participant	Company	Country
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Shushi Sato	Kochi University	Japan
Takayasu Sato	Hachinohe Institute of Technology	Japan
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P Srinivasa Rao	J.N.T.U College of Engineering, Hyderabad	India
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Casey Teo	W R Grace (S) Pte Ltd	Singapore
Mahinda Thilakarathna	St Anthony's Hardware	Sri Lanka
Seshadri Sekhar Tirumala	Chirala Engineering College	India
Yuriko Tsuburaya	Tokyo Institute of Technology	Japan
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Jon Elvar Wallevik	Reykjavik University & Innovation Center	Iceland
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Joost Walraven	Delft Technical University	The Netherlands
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Kohei Watanabe	Hachinohe Institute of Technology	Japan
Shingo Watanabe	Kanazawa Institute of Technology	Japan
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Jianying Yang	BASF South East Asia Pte Ltd	Singapore
MinHong Zhang	National University of Singapore	Singapore

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1605	<p>Special Papers in honour of Prof O H Wallevik continues Chairpersons: Er Yogesh Chhabra and Dr P Billberg</p> <p>8-Surendra Shah, Northwestern University, USA "Application of nanotechnology in concrete" by Surendra P. Shah 9-P-C Aitcin, Université de Sherbrooke, Canada "High performance concrete (HPC) (revisited in 2011)" by P.-C. Aitcin 10-Knut Ose Kjellsen, Norcem AS, Norway "The development of microstructure of portland cement mortars – from the fresh to the hardened state" by Knut O. Kjellsen and Sidney Diamond 11-Robert J Flatt, Institut für Baustoffe (IFB), ETH Switzerland "Chemical 'Spices' for sustainable building materials" by Robert J. Flatt 12-Geert de Schutter, Ghent University, Belgium "Effect of limestone filler as mineral addition in self-compacting concrete" by G. De Schutter 13-Florian V Mueller, Cemex Research Group AG, Switzerland "Particle packing by gyratory intensive compaction as tool to optimize the aggregate gradation of low binder scc, eco-scc" by Florian V. Mueller and Olafur H. Wallevik</p>
	1805
1900	Assemble at Hotel Lobby for transport transfer to dinner venue
1930	Concrete Industry Dinner at the Singapore Recreation Club (Padang Palace Chinese Restaurant", B Connaught Drive, Level 2 (enter by Stamford Road)
2230	Bus transport returns to Goodwood Park Hotel

Tuesday		16 August, 2011	
0900	Keynote Session 2	Chairperson: EmProf. S Ikeda	
	<p>1-Mr David Ball, David Ball Group Plc and President of UK Concrete Society "Highly sustainable, high durability concrete for the 21st century" by David M J Ball 2-Prof György L Balázs, Budapest University, Hungary and President 'fib' "Present and Future Potentials in Concrete Engineering" by G L Balázs 3-Dr Kyuich Maruyama, Nagaoka University of Technology and Vice President Japan Concrete Institute, Japan "Damaged concrete structures by East Japan Natural Disaster" by K. Maruyama</p>		
1015	Morning Refreshments		
1030	Technical Session 1 (Parallel)		
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	Chairperson: Dr Teng-Hooi Tan	Chairperson: Mr Jinping Lu	
	<p>1-Ryoji Sakurada, Akita National College of Technology, Japan "Effect of doping position of Sr Atom on crystal stability of beta-form belite" by R. Sakurada, A. K. Singh and Y. Kawazoe 2-KiatHuat Seow, BASF South East Asia Pte Ltd, Singapore "The Asian experience in low fines self consolidating concrete (scc) in everyday applications" by Seow Kiat Huat, Nilotpol Kar and Feng Qiuling 3-Macharia M M, Hiroshima University, Japan "Study of fracture energy properties of portland blast furnace cement Type-B concrete with partial replacement of aggregate with porous ceramic course aggregate" by M.M. Macharia, R. Sato, A. Shigematsu and H. Onishi 4-Norio Koide, Kawasaki Heavy Industrial Ltd, Japan "Study of the hybrid structures changed from the steel bridges for railroad which considered construction" by Nozomu Taniguchi, Masanori Hansaka, Norio Koide, Kazuo Ohgaki, Fujikazu Okubo and Toshiyuki Saeki 5-Andina Sprinca, Riga Technical University of Latvia, Latvia "Creep deformations on high strength concrete made of montmorillonite mineral nano particles" by Sprinca, L. Pakrastinsh and A. Korjakins 6-Chirag Baxi, GNFC Ltd., India "Formwork – a concrete quality tool" by Chirag Baxi</p>	<p>1-Sabet Divsholi Bahador, Nanyang Technological University, Singapore "Evaluation of high performance concrete using electrical resistivity technique" by Darren T.Y. Lim, B. Sabet Divsholi, Da Xu and Susanto Teng 2-P Srinivasa Rao, JNTU, India "Studies on thermal cycles of glass fibre concrete mixes" by P. Srinivasa Rao, Mouli Chandra, T. Seshadri Sekhar, N. Pannirselvam, P.Sravana and P.Sarika 3-Ramana Rao, JNTU, India "Behaviour of high strength metakaolin concrete at elevated temperatures" by N.V. Ramana Rao, Z. Abdul Rahim, P. Srinivasa Rao and T. Seshadri Sekhar 4-P Sravana, JNTU, India "Some studies on flexural behaviour of glass fibre reinforced concrete members" by P. Sravana, P.Srinivasa Rao, K. Chandramouli, T. Seshadri Sekhar and P. Sarika 5-Balakrishnan Kondraivendhan, Nanyang Technological University, Singapore "Assessment of strength, permeability and hydraulic diffusivity of concrete through mercury intrusion porosimetry" by B. Kondraivendhan, B. Sabet Divsholi and Susanto Teng</p>	

CREEP DEFORMATIONS ON HIGH STRENGTH CONCRETE MADE OF MONTMORILLONITE MINERAL NANO PARTICLES

A. Sprince*, L. Pakrastinsh† and A. Korjakins‡

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Keywords: creep, creep coefficient, recoverable and irrecoverable creep, montmorillonite mineral nano particles, compression strength, modulus of elasticity

ABSTRACT

This paper introduces the recent state of research on creep of new concrete made by montmorillonite mineral nano particles (MNP) and then comparing them with control specimens made from reference concrete. Concrete compositions with unconventional additives were designed and prepared. Standard sample cubes 100x100x100 mm and prisms 40x40x160 mm were produced in order to investigate the mechanical characteristics of the material. Experimental studies review new concrete compositions on long – term deformations (creep). The samples were put into a creep lever test stand and loaded (see Figure 1). The constant compressive load was equal to 30% of the maximum strength of the concrete. Stress levels were calculated from compression strength results. At the beginning of the test, the samples were 51 and 63 days old and they were kept under constant load for 90 days and for recoverable creep they were kept without load for 40 days. Specimens were tested in two extreme environments: in one case there was 100% humidity provided by protecting the specimens from desiccation and in the other case specimens were air-dried and protected from any moisture. Concrete specimens were subject to load in a constant room temperature and with a constant level of moisture. The investigated properties include compression strength, modulus of elasticity and creep.

A number of experimental results are presented in Figure 2. This experimental study proves that montmorillonite nano particles in small dosage (8 kg in m³) don't have negative influence on mechanical and deformation characteristics of concrete. Some positive effects are established. Concrete mix containing montmorillonite nano particles perform long-term hardening effect. MNP concrete specimens cured in dry conditions showed larger increase of basic creep deformations than reference concrete specimens, but for samples hardened in moist conditions the values of basic creep deformation were similar. In the future, the physical and mechanical properties of

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new high-strength concrete containing montmorillonite nano particles as an alternative admixture should be investigated in a more detailed way.



Figure 1: Creep lever test stand

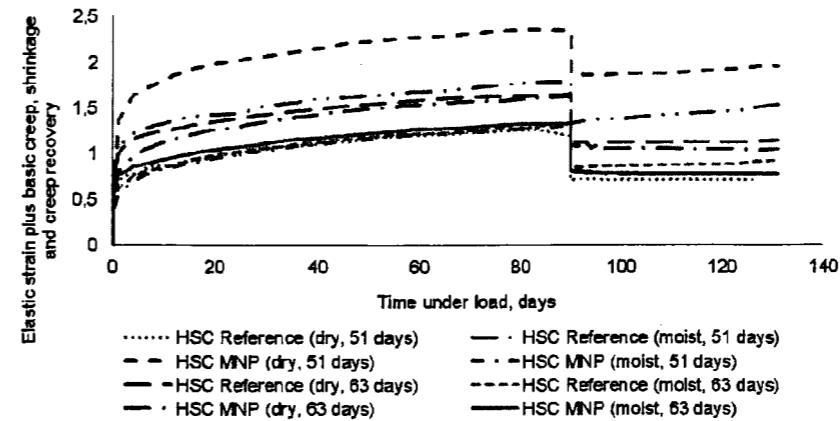


Figure 2: Elastic strain, creep and recoverable, irrecoverable creep deformations of high strength concrete samples