

## Future of cement and concrete

Cement is a binder, a material that can set, harden and bind other materials together. It is a basic ingredient of concrete. For several centuries, concrete have been one of the most popular construction materials around the world. But what is the future of concrete? Due to its affordability, wide availability, and surprisingly low environmental footprint, it is clear that concrete is the only viable construction material that can satisfy humanity's needs for the 21st century.

From this regard, cement and concrete are not only construction materials, but also solution for human society. When we look closely, cement and concrete have a very strong impact on human society more than being only construction materials. In cement factory, we cannot deny that making cement and concrete consumes energy. We cannot deny that making cement and concrete produces CO<sub>2</sub>. In construction site, there are more specific requests from construction engineers, architectures and construction promoters. There are so many examples such as how to reduce 30% the size of column to gain more usable surface, how to build 50-floor building in three months. During service life, there are more and more requests on how to improve energy efficiency in buildings and how to make concrete durable in water-related structures.

It is important to view cement and concrete from a materials point of view, as well as through the perspective of construction methods, design, function, and service life. In order to do this, innovation is the keyword. We have to simultaneously look for innovation from several perspectives (materials - construction/design - function/service life). The synergy of research from different fields is going to be more important than ever.

Dr Pipat Termkhajornkit  
Project Manager, Microstructure Design Group  
Lafarge Centre de Recherche, France



**i** Built in 1902, the Ingalls Building in Cincinnati was the first reinforced concrete skyscraper in America. Standing 210 feet high, the 16-story building is still in use today. It was not until after World War II, however, did concrete buildings exceed 20 stories. Higher buildings were uneconomic because then-current codes required large columns that took up too much rentable floor space. Not until the mid-1950s, when elastic design was replaced by ultimate strength design, did concrete building heights begin to rise.

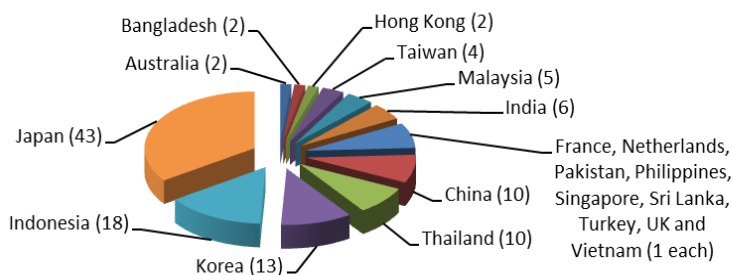
Source: <http://www.concreteconstruction.net>

## ACF Membership at present

### REPRESENTATIVE

India  
Indonesia  
Japan  
Korea  
Mongolia  
Singapore  
Taiwan  
Thailand  
Vietnam

**CORPORATE**  
Korea (13)  
Japan (7)



### INDIVIDUAL 124

## ACF Technical committees continue to devote to ISO/TC71 activities



19<sup>th</sup> Plenary Meeting of  
ISO/TC71  
19-22 June 2012  
San Jose, Costa Rica

The Asian Concrete Federation (ACF), which merged with the International Committee on Concrete Model Code for Asia (ICCMC) in 2010, continues to devote to the ISO code developing activities. Long before becoming the core of the current Technical Committees (TCs) of ACF, ICCMC has established a Task Force (TF) in liaison with the ISO/TC71 on “Concrete, Reinforced Concrete and Prestressed Concrete”. This move has significantly strengthened the presence of Asian countries in the ISO society and helped the ISO/TC71 to recognize the present situation and significance of Asian countries in the field of concrete technology. ISO/TC71 covers a broad discipline of concrete technology and at present consists of the following seven active sub-committees (SCs):

- SC1: Test methods for concrete
- SC3: Concrete production and execution of concrete structures
- SC4: Performance requirement for structural concrete
- SC5: Simplified design standard for concrete structures
- SC6: Non-traditional reinforcing materials for concrete structures
- SC7: Maintenance and repair of concrete structures
- SC8: Environmental management for concrete and concrete structures

ACF members/member countries have been very active in all the above SCs, and in particular, played a major role in SC6, SC7 and SC8, which are all related to the very important socio, economic and environmental sustainability issues of the concrete technology. **It deserves to be mentioned that the Asian Concrete Model Code (ACMC), first published by ICCMC in 2001 and then updated in 2006, was used for the purpose of identifying a performance-based design solution for the ISO’s umbrella code for the design of concrete structures (ISO 19338 “Performance and assessment requirements for design standards on structural concrete”).** In addition, the ICCMC members also initiated successfully the ISO TC71/SC7 on “Maintenance and Repair of Concrete Structures” to broaden the impact

of ACMC2001 that is one of the very few international codes with inclusion of the “Maintenance” chapter. To further strengthen its contribution to ISO/TC71, ACF also established two task groups (TGs) in 2007, to draft technical reports for the WG3 and WG4 of ISO/TC71/SC7. These two WGs were formed thanks to the concerted efforts of ICCMC members.

The European countries and USA have had a strong presence in ISO activities. However, since Asia is at present the most prosperous region in terms of economic development and construction activities, it is expected that ACF would be able to provide an even better collaborative platform than ICCMC for Asian countries to bring their advancement in concrete technology into the ISO society, make substantial contributions to the international code harmonization, and further promote the worldwide recognition of Asian countries in concrete technology discipline.

Dr Jian-Guo Dai  
Department of Civil and Structural Engineering  
The Hong Kong Polytechnic University  
Member of ACF and ISO/TC71

## ACF new member - MCA

Mongolian Concrete Association (MCA) was inaugurated on 17 May 2002 thanks to the faculty members of School of Civil Engineering and Darkhan Technology School, Mongolian University of Science and Technology (MUST). MCA was first established as the Mongolian Chapter of the American Concrete Institute. Its founding members include Dr M.P. Hansen from South Dakota Technology and Mining University and Mr Luke M. Snell and Mr Billie Snell from Southern Illinois University at Edwardsville.

During 2002, its first year of establishment, MCI organized its first conference with participants from over twenty concrete related organizations and institutions. Since then MCA organizes a similar conference every year with the last, 11<sup>th</sup> Annual Concrete Conference held on 15 June 2012. The number of local and overseas participants has been increasing every year bringing new as well as more important topics into consideration. MCI is now well accepted among practical engineers and their counterparts.

MCA has been active in the MUST student activities which include organization of the 'Annual Reinforced Concrete Week' and 'Mini-Olympics of Construction Materials'. It also organizes training for engineers and technicians a few times a year. At present, it is embarking upon the certification system.

The current President of MCA is Mr A. Khashchuluu, Executive Director of Beton Armatur, Co., Ltd and the Vice President is Mr O. Batmunkh, Executive Director of Premium Concrete, Co., Ltd. We are delighted to become a member of the Asian Concrete Federation and look forward to sharing the knowledge and experiences and working closely with our Asian colleagues.



11<sup>th</sup> Annual Concrete Conference, Ulaanbaatar, Mongolia.

Professor Duinkherjav Yagaanbuyant  
Professor and Chairman of Department of Civil Engineering  
Head of Concrete and Steel Structure Testing Laboratory  
School of Civil Engineering and Architecture  
Mongolian University of Science and Technology

## KCI joins *fib* as national member

*fib* Technical Council meeting and the General Assembly were held on 9 and 10 June 2012 respectively. A symposium, "Concrete Structures for Sustainable Community" followed on 11-14 June with more than 270 participants from over 40 countries. These events took place KTH Royal Institute of Technology, Stockholm, Sweden.

Korea Concrete Institute (KCI) and South Africa become the two new members of *fib* organization in 2012. KCI President Jongsung Sim, Vice President Manyop Han, and Director Hongkun Park attended the *fib* symposium 2012 as delegates of KCI.



Prof Sim and Prof Park

On the first day during the Technical Council meeting, the new structure of *fib* COMs, TGs and SAGs was discussed. KCI President Sim then introduced KCI to the delegates. On the second day, during the General Assembly, the new *fib* President was elected. KCI Vice president Han made a short speech to the audiences introducing KCI.

In the near future, ACF is expected to be a major international organization in Asia.

Professor Manyop Han  
Ajou University, Suwon, Korea  
KCI Vice President and Representative Member of ACF

## 5<sup>th</sup> ACF Conference

The 5<sup>th</sup> International Conference of Asian Concrete Federation (ACF) will be held 24-26 October 2012 at Amari Orchid Pattaya Hotel, Thailand. This conference is hosted by Thailand Concrete Association (TCA) together with Faculty of Engineering, Chulalongkorn University (100<sup>th</sup> anniversary celebration) and the Sirindhorn International Institute of Technology (SIIT), Thammasat University (20<sup>th</sup> anniversary celebration). The main theme of the conference is “Novel Concrete Technology for Environmentalism-conscious Design” to support the expanding construction industry in Asia with the environmentally conscious design and sustainability.

More than 150 abstracts from 12 countries or regions have been received. Participants from academic, research, public and industrial sectors are expected to reach 200. As many countries in Asia experienced disasters both of natural and man-made types during the past few years, the organizing committee plans to make ACF2012 a venue for sharing knowledge, experiences and information relating to disaster prevention, mitigation and management. Keynote lectures from 5 distinguished speakers from Indonesia, Japan, Korea, Taiwan and Thailand will focus on “Experiences, preventions and post-management of natural and man-made disasters”.

### Program

- 23 Oct: ACF Executive Council meeting and General Assembly
- 24 Oct: Conference, Keynote Lectures and Banquet
- 25 Oct: Conference, ACF Sustainability Forum
- 26 Oct: ACF Technical Board and Technical Committee meetings

Pattaya city, the conference venue, is the world famous holiday destination conveniently accessible from Bangkok. We would like to extend our invitation to all of you to participate in this meaningful conference and **to welcome all of you to the land of smile, Thailand, where ACF was officially inaugurated at the 1<sup>st</sup> ACF International Conference organized by Thailand Concrete Association in Chiang Mai in October 2004.**



For more information please visit <http://acf5.thaitca.or.th/pv1/> or contact the local organizing committee by email at [thaiacf@gmail.com](mailto:thaiacf@gmail.com).



Utility poles were first used in the mid-19<sup>th</sup> century with telegraph systems, starting with Samuel Morse who attempted to bury a line between Baltimore and Washington, D.C., but moved it aboveground when this system proved faulty.

[http://en.wikipedia.org/wiki/Utility\\_pole](http://en.wikipedia.org/wiki/Utility_pole)

The concrete pole in the photos above and below is in Hokodate, Japan. It was erected by Hokkaido Electric Power company in the Hakodate city in 1923 and is the oldest one in Japan. The pole, 10m high, 47 sq.cm at the base and 19.5 sq.cm at the top, is a pyramid style structure made of prestressed concrete. It was one of the fireproof structures introduced after an increase in the number of fires in Hakodate. (Reference: signboard next to the pole.)



Photos shown are from <http://tripwov.tripadvisor.com>  
<http://www.flickr.com>

Local Organizing Committee     
The 5<sup>th</sup> International Conference of Asian Concrete Federation (ACF2012)

## Sustainable Pre-fabricated Civil Structures


The Structural Engineering Laboratory of Gadjah Mada University where I have been working during the past two years is located in Yogyakarta Province, Indonesia. Most researchers and professors in my laboratory have been very active in research on concrete structures especially on its seismic performance and repair technologies. This is inspired by two facts of natural condition: Yogyakarta Province is frequently hit by earthquakes and the laboratory is very close to the Merapi Volcano that regularly releases high quality sand and coarse aggregate for concrete mixture. In addition to reinforced concrete structures, recently some researchers of the laboratory have conducted research intensively on other sustainable construction materials such as timber and bamboo that are abundant locally. These materials have gained interest especially of Ph.D students as they are more environmental friendly and their engineering properties are not fully discovered yet. Timber and bamboo are non-isotropic materials and their mechanical properties generally vary across species, growth age and locations.



Structural Engineering Laboratory of Gadjah Mada University where test preparation of an RC beam-column joint, light steel truss and timber panel is being conducted.

Since last year I and my students, under the AUN/SEED-Net JICA special research for alumni program, conducted a research work on sustainable pre-fabricated structures where one of the most challenging issues is to find an optimum combination of available building materials: concrete, steel, timber and bamboo. Reasons for utilization of a specific building material in certain structure elements are thoroughly assessed in term of environmental impacts, availability, strength requirement and durability aspects. While the experimental works emphasize more on lateral resisting force system of the structures such as connections and shear wall systems as it is essentially required to obtain a reliable pre-fabricated structure under lateral forces, wind or earthquake. A couple weeks ago we have completed the shear test of timber member to concrete block using mechanical fastener lag screws and this test basically describes possible connection between the two materials in flooring or anchorage systems. An analytical solution upon a simplified mechanical model is sought and compared to the experimental results. The research outcomes will be presented in the coming ASEAN Civil Engineering Conference in Ho Chi Minh in October 2012.

Dr Ali Awaludin  
 Assistant Professor  
 Structural Engineering Laboratory  
 Gadjah Mada University, Yogyakarta

 At the onset of the automobile industry in the early 1900s, the roadway was asphalt paved over wooden blocks in downtown Detroit. Northern portions remained covered with gravel or planked. The majority of the road was dirt, which became rutted with mud during the spring. In 1909, responding to demand for smoother roads by bicyclists and early auto owners, the **first mile of concrete highway in the world** was laid by Wayne County between Six and Seven Mile Roads in Green fields Township (present-day Northwest Detroit).

Constructed in less than three months at a cost of \$13,493, the new roadway construction technique attracted international attention, as its advocates claimed concrete more durable, cleaner and easier to maintain than former methods.

In 1916, the entire 27-mile length of Woodward Avenue to Pontiac was paved and, in 1919, the first three-color traffic light appeared on the thoroughfare.



<http://www.waymaking.com>

# Cement consumption growth in Indonesia



Signature Tower (artist impression)

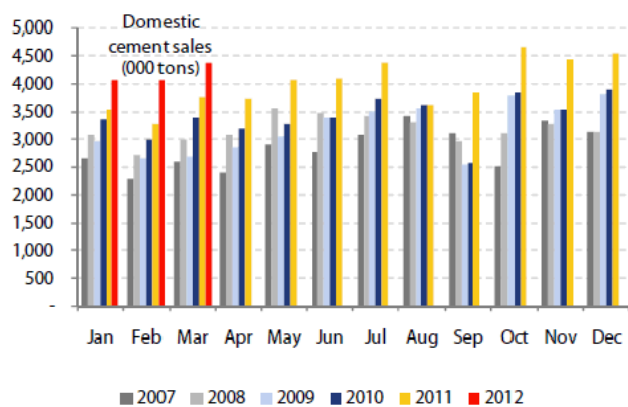


Central Park Jakarta (photo byTotal)

In the past ten years, the Indonesian economy has been increasing considerably. As a result, many new construction works have been realized such as high rise buildings, long span bridges, roads, etc. This fast growing activity of construction works, especially concerning the concrete construction, can be easily observed by the significant growth of cement consumption in Indonesia these recent years. Figure below shows the domestic cement consumption growth during 2007 – 2012.

The exact value of cement consumption growth in Indonesia during the past ten years is shown below.

**EXHIBIT 3. DOMESTIC CEMENT CONSUMPTION ('000 TONS)**



Source: Indonesia Cement Association

The cement sales in March 2012 (the latest consumption data that we obtained at this moment) booked at 4.4 million tons or the year-on-year increased by 16.7% than the same month last year, on which the year-on-year consumption growth outside Java is significant, e.g. Kalimantan (Borneo) 32.4% and Sulawesi 32.5%, compared with East Java 29.6%.

*Year Cement Consumption*

2002	27,172,796 tons
2003	27,529,886 tons
2004	30,208,479 tons
2005	31,488,048 tons
2006	31,953,196 tons
2007	34,168,667 tons
2008	38,073,358 tons
2009	38,416,200 tons
2010	40,781,433 tons
2011	48,000,346 tons

In recent years, many high rise buildings, mostly in concrete or composite concrete structures, were built or planned to be built in Jakarta. Some of them are really extraordinary, e.g. the Signature Tower (111 storeys above ground) that is now in the design stage (*Structural Engineers: Thomson Tomasetti & Gistama Intisemesta*), and the Central Park that was completed in 2011.

Dr FX Supartono  
 Associate Professor  
 Civil Engineering Department  
 University of Indonesia and  
 University of Tarumanagara, Jakarta  
 Member of ACF



## Message from ACF President

Dear colleagues,

Starting this year, I have implemented some changes regarding the operation of ACF.

We registered for the new domain name, [www.asianconcretefederation.org](http://www.asianconcretefederation.org) to replace the former [www.acf-org.net](http://www.acf-org.net). I would like to take this opportunity to express my gratitude to the Korean group for their efforts in managing this former website.

The new domain name comes with the new webmaster. Dr Werawan Manakul of Hokkaido University who was the first ICCMC administrative manager has agreed to take care of the new website.

Last month, I appointed Ms Naoko Masaki as ACF Secretary General. Ms Masaki had been working as ICCMC administrative manager until it merged with ACF in 2010. Needless to say that the experience these former administrative managers have is a great asset to the ACF operation.

Ms Masaki and Dr Werawan have joined Dr Phan Huu Duy Quoc, the editor-in-chief of the previous issue of the ACF newsletter to transform not only the look but the content of our newsletter to what you are reading now. I hope you enjoy reading it.

Tamon Ueda  
25 July 2012

## 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.

## Secretariat

Ms Naoko Masaki [secretary@asianconcretefederation.org](mailto:secretary@asianconcretefederation.org)

## Newsletter

Editorial team [newsletter@asianconcretefederation.org](mailto:newsletter@asianconcretefederation.org)

## Conferences

