

CONCRETE NEWS

Volume 7, No. 1, 2004

Published by



Kuwait Chapter

american concrete institute

www.acikuwait.com

from **THE PRESIDENT**

We Can All Help



Dr. Khaldoun Rahal

Concrete construction is by far the most common type of construction in Kuwait. Knowledge about concrete behavior, design, and construction has developed over the years. Codes and specifications were put to regulate the construction industry.

Kuwait is one of the leading countries in the region with regard to education and development. However, construction practices in Kuwait can benefit from improvement in quality practices.

Durability is the most important property concrete in Kuwait should possess. Many construction practices and newly developed materials can be used to achieve this property. However, these tools were not part of the education and training of many practicing engineers, or at least not part of their personal development and continuing education subjects. Public agencies also did not adopt many of the new materials in their specifications, and this hinders the efforts of professional companies to achieve better concrete construction.

Professionals in the field need to educate themselves about concrete, the threats it faces and the tools for prevention and remedy. One of the ACI-KC objectives is to help achieve this. The chapter has accomplished a lot during the past years, and will continue its efforts. Let us all help achieve this goal!

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ACI INTERNATIONAL

The American Concrete Institute (ACI), is a nonprofit international organization that promotes improved technology, technical competence, design, and construction related to concrete for the benefit of society.

ACI KUWAIT CHAPTER

The purpose of the Chapter is to further the charter objective for which the American Concrete Institute was organized, i.e. to further education and technical practices, scientific investigation and research by organizing the efforts of its members for a nonprofit, public service in gathering, correlating, and disseminating information for the improvement of the design, construction, manufacture, use and maintenance of concrete products and structures.

How the Chapter FUNCTIONS

The ACI Kuwait Chapter is approved and authorized by the Board of Directors of ACI International to advance the objectives of the Institute in the State of Kuwait. The Chapter is managed by a local Board of Directors whose members constitute the Chapter officers. Chapter membership is open to all individuals and organizations with an interest in any aspect of concrete technology. The Chapter operates through its committees, which are made up of volunteers to meet the needs of the Chapter members. The Chapter may hold several meetings each year and engage in activities that include:

- Sponsoring educational seminars, short courses or work-shops.
- Holding or sponsoring certification training courses and examination.
- Publishing technical information and newsletters.
- Conducting awards programs to recognize quality, innovation and achievement.

Year 2004 Calendar of EVENTS

Publication Committee

"Newsletter"

- No. 1 March
- No. 2 August
- No. 3 November

Social Committee

"Dinner Banquet"

- Members' Dinner Party, May
- Annual Award Dinner Banquet, December

"Field Visit"

- April
- June
- September

Technical Committee

"Diwaniya"

- Problems with aggregates in Kuwait and their impact on concrete
- Late March and November

"Seminar"

- Watertight construction system, March
- Waterproofing Systems and Admixtures, April
- Admixtures For High Performance Concrete, April
- Flooring, May
- TBA, June

"Training"

- Repair of Concrete Structures, Late May

"Workshop"

- Self Compacted Concrete (with live demonstration), October

Who's WHO

BOARD OF DIRECTORS

1. Dr. Khaldoun Rahal (Kuwait University)	President
2. Dr. Naji Al Mutairi (KFAS)	Vice President
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7. Dr. Moetaz El Hawary (KISR)	Director
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5. Mr. Mohd. Harb Madbouly (M.A. Al-Kharafi Sons w.l.l.)	Social Committee
6. Dr. Moetaz El Hawary (KISR)	Technical Committee
7. Mr. Ahmed A. Al-Jihayem (Al Jazera Consultants)	Nomination Committee

CONCRETE NEWS

Mission

Concrete News is published periodically by ACI-Kuwait Chapter to share information between members, exchange technical knowledge and enhance the Chapter's position within the engineering community.

Editorial Board

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Annual General Assembly & Elections 2003

The General Assembly Meeting and Elections for the year 2004 was held on December 29, 2003. During the meeting, the president and treasurer presented their report for last year and the elections for next year's board of directors were held. A copy of the Annual Report is available.



Please contact the chapter's administrator. Election results are shown on page 2 of this issue.

Corporate News

Al-Babtain Library Under Construction

Owned by M/s Abdulaziz Saud Al Babtain Award Organization for Poetry Innovation, the Central Library for Arabic Poetry is under Construction. The project Contractor is **Alamiah Building Co.**, the designer is **Engineering Group**, the project manager is **Engineering Systems Group**. The Contract value is over KD 2.5 million with 510 days duration.



Az-zour North Offshore Soil Investigation and Culvert Assessment is Completed

Gulf Inspection completed 14 offshore boreholes of depth 10 to 25m below sea bed using jack-up barge with associated laboratory tests and prepared factual report. In addition, they completed assessment of existing culverts to be used for AZN powerstation including concrete coring, corrosion mapping, concrete resistivity tests, rebound hammer tests and associated lab tests.



KBRC Expands Fleet

Kuwaiti British Readymix, concrete supplier, announced that it has expanded its truck mixers by 30 vehicles and added two new concrete pumps. They also are currently taking delivery of a mobile batching plant which will be located at sites far from existing KBRC operations.

KBRC anticipates that this year they will exceed last years production record of over half a million cubic meters.

If you would like to contribute to this section, please send your corporate news to info@acik Kuwait.com. All relevant news will be published based on availability of space on a first-come-first-serve basis.

3.5-METER DEEP RAFT FOUNDATION FOR A 31-FLOOR TOWER

Contributed by: Emad Obaid, Resident Engineer - KEO

The project is located at Fahad Al Salem street, opposite Al Muthanna Complex and is a total of 31 floors including the basement, ground and mezzanine floors. The Tower is founded on a raft 3.3 meters thick, solid concrete, heavily reinforced, particularly at the top part which is reinforced with 3 to 7 layers of 32mm diameter bars. This situation imposed several challenges

Technical Challenge

Heat Generation: A 3.3m thick massive raft generates tremendous heat due to the exothermic hydration reaction, this was controlled by using chilled water and pouring the concrete in layers to enable maximum dissipation of heat, but without causing cold joints. The moderate climate in January played a positive role in facing this challenge.

Top Steel: With a raft top steel which ranges from 3 to 7 layers of 32mm bars, at about 3 meters height, the conventional bent bars spacers / chairs could not be sufficient. An auxiliary structural steel supporting system had to be designed to take the loads of the top steel in addition to other handling, working, concrete pouring imposed loads, with a safety margin. This auxiliary steel system was also utilized to support the in-raft services and utilities.

This auxiliary system was made in the form of steel tube towers, one square meter gross area, with a tube of 50mm x 2mm thick at each corner, laterally braced. These towers were installed on a grid 3m x 3m on centers with a steel hollow section 100 x 50 x 2.5mm fixed on top to support the top reinforcement.

Setting Time: Special admixtures were used to provide setting retardation up to about 4 hours to enable safe transportation as well as controlling the heat generation by pouring in layers, without cold joints.

Cold joints: The risk of cold joints was controlled by placing concrete in layers before setting occurred in any previous layer. This was possible by using the aforementioned concrete mix and utilizing sufficient equipment and resources.



Quality Challenges

Concrete Quality : Consistency, workability, setting time and strength were controlled, as mentioned earlier, by the special mix design which was tested and yielded satisfactory results. A special mix, having $\frac{1}{2}$ ", as a maximum size of aggregate, was used for the highly congested top steel zone, and special 1" vibrators were used to eliminate the risk of nesting or voids within the body of the raft top part.

Pouring and Compaction: Pouring the bottom part was done by inserting the pumps flexible hoses down to the bottom steel through special voids within the top steel, introduced for this purpose, and closed later. Pouring manpower with tools were working within the raft body space between top and bottom steel to control placing, spreading and compacting concrete for the first 50cm, before moving them above the top steel, to resume pouring upper successive layers.

Planning & Resourcing Challenge: It was anticipated that the raft of about 2100 cubic meters would require about 24 hours to be completed. Capacities of the batching plant, transit mixers, pumps and other resources were studied to surpass this limit (to shorten the pour duration). At site, three mobile pumps, 42m each, were in operation, and one stationary pump was connected ready to support whenever needed. Three standby pumps were also at site. Two fully fledged concreting manpower shifts complete with supervisors, each composed of three independent groups backed up by supervisors, safety men, engineers, a plumber and electrician, a carpenter and a steel fixer were utilized in the pour. Quality control team was performing quality checks, testing and sampling.

Safety Challenge

In order to ensure that safety requirements were met, all people associated with the pour, including the transit mixers drivers, received the necessary instructions and orientation prior to the pour. And Special attention was made during pouring to prevent accidents from happening. Manpower wore special fluorescent shirts to be seen below the top reinforcement while pouring the bottom part of the raft. Wireless communication devices were deployed with predetermined contact people.

At the end, it was a project everyone felt proud being part of. The pour was performed successfully without problems. The pour was completed in only 14 hours (against the maximum of 24 hours planned duration). The quality of concrete used or achieved after completion was acceptable. Visual inspection on the next day and the cubes tested after 7 days and 14 days were also acceptable.



Project Data

Owner: Mr. Bader Al-Salem

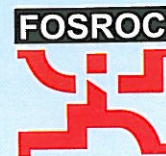
Consultant: KEO International Consultants

Construction Manager: Al-Ahlia Contracting Group (ACG)

Ready Mix Concrete: Kuwaiti British Ready Mix Concrete (KBRC)

Pioneering

EFFORTLESS CONCRETING in Kuwait



Introduction

The history of admixtures dates back to 7000BC when animal fat, milk and blood were used as the first admixtures to increase the properties of pozzolanic cement.

Admixtures play a vital role in production of quality concrete and mortars in all segments of the industry - Readymix, Precast and Site-batch. Admixtures add value and contribute to successful production of concrete for specialised applications, environmental and long-term durability.

Conventional concrete has limitations because they are difficult to place in highly congested reinforced structural sections and when using high dosages of admixtures, excessive retardation may occur.

Fosroc's latest contribution to the ever changing needs and requirements of the construction industry is the new generation of hyper-plasticiser based on Polycarboxylate Ether (PCE) technology.

This superior PCE Technology is steadily establishing a strong track record throughout the world with progress being made in the Middle East. FOSROC's "STRUCTURO" products, based on Polycarboxylate Ethers can produce Self Compacting Concrete which flows silently, with minimal friction and can be placed within the most intricate formwork and/or heavily congested reinforcement without the aid of any vibration or compaction with no bleed or segregation.

A comparative graphical representation between traditional and SCC mix designs is shown below.

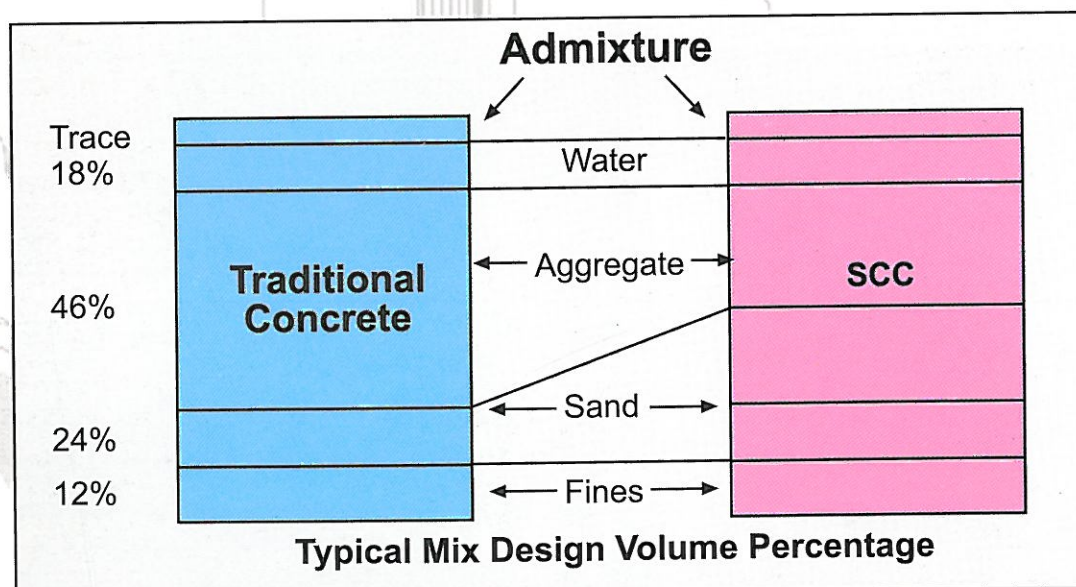
It indicates that the SCC incorporates a higher percentage of fines in the mix resulting in ultra cohesive concrete inspite of very high flowability.

STRUCTURO technology packs a wide range of benefits; including faster placement in adverse conditions, non-segregated flow within the most congested reinforcement, eliminates vibrations, reduced labour, enhanced concrete surface; which directly relates to cost benefits to concrete specifiers, producers, users and ultimately the Client

Fosroc's STRUCTURO PC Technology can help you design Self Compacting Concrete and combine high workable concrete with large water reduction.

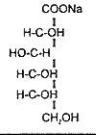
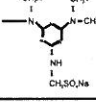
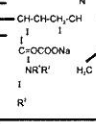
Self Compacting Concrete has spread across the Middle East around five years ago. It is seen by the contractor as a material which permits and demand different placing and working practices.

Self Compacting Concrete has lots of benefits for the contractor when compared to conventional concrete materials and practices. As a result that in many form of construction, Self Compacting Concrete offers improvements in ease and speed of placement, Quality of surface, and reduced over all cost in addition to the technical benefits of complete and assured compaction and elimination of voids.



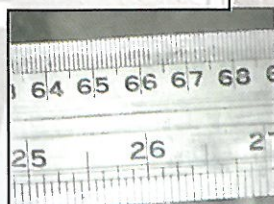
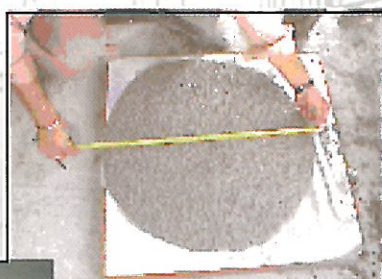
SCC : Definition

SCC is taken to mean a very fluid, homogeneous, cohesive and Stable concrete, which is capable of compaction, and moves through intricate form work, without segregation and bleed, while still maintaining the proper air void distribution.

Year	Type	Chemical structure
1930	MLS (Modified Lignin-sulphonate)	
1940	GN (Gluconate)	
1970	NS (Naphthalene sulphonate)	
1980	MS (Melamine sulphonate)	
1990	VC (Poly Vinyl copolymer)	
2000	PC (Poly Carboxylic copolymer)	

SCC: Main Advantages

- Easily placed in thin-walled elements or elements with limited access.
- Can flow considerable distance horizontally and upwards to fill vertical elements from the bottom.
- Ease of placement can result in cost saving, through reduced equipment and labour requirements.



Al Gurg Fosroc LLC proudly flaunts its involvement with the following projects in Kuwait, where STRUCTURO 335, Fosroc's PCE based hyperplasticiser has been used extensively.

1. Water Treatment and Reclamation Plant at Sulaibiya, Kuwait

The project is the first BOT project executed in Kuwait and consists of over 30 tanks with multiple pipe penetrations throughout the tanks. As seen in photograph the outlet boxes are heavily reinforced and access is limited. It is very difficult to vibrate the conventional concrete in such a restricted area. The requirements for the surroundings is to have a good quality concrete to avoid any leakage around the opening. Benefits of SCC was discussed in detail with the consultant and contractor, and finally it was decided to use Self Compacting Concrete as a viable solution to the problem at hand. To date approximately 600 cubic meters of concrete has been poured successfully this project.



2. Az Zour Gas Turbine project, Kuwait

On this project, it was specified to use precast concrete piles. The concrete mix design contained OPC and GGBFS 40% and 60% respectively, along with the use of Calcium Nitrite @ 15 litres per cubic meter. It was difficult to maintain the concrete workability for 30 minutes by using a superplasticiser

with calcium nitrite. Based on Fosroc's extensive experience with concrete mixes using calcium nitrate additives, it was recommended to use hyperplasticiser, Structuro 335. Trials were conducted which proved that the use of the hyperplasticiser could meet all design parameters.

3. Kuwait Oil Sector Project - Shuwaikh, Kuwait

Due to the heavy reinforcement and the geometrical configuration of the required element, the use of traditional concrete mixes along with vibration technique, was assessed and ruled out as inappropriate. SCC was chosen for this pour and the job was executed to the highest required standard and to the satisfaction of the designer and the client. Approximately 25 sections of 13 cubic meters were poured using this technology.

As seen from the photographs the opening at the top was only 20cm wide and the total concrete was poured in from this opening.



4. New Fahaheel English School, Kuwait

In this project it was decided to enlarge the concrete column sections with limited access to place the conventional concrete and vibrated it. Instead, plenty of free flowing pre packed factory micro concrete could have been used for jacketing those columns, but was found costly.

The usage of Self Compacting Concrete was the ultimate solution and was translated in substantial savings with an improved production time, allowing early completion.



Boodai Trading Company, Tel. 4817618-4817848



www.fosroc.com

This article is contributed by FOSROC who generously sponsored this issue of Concrete News

Articles & Specifications Wanted for Next Issue of Concrete News

WATERPROOFING OF BURIED STRUCTURES

The next issue of Concrete News will be focused on Waterproofing of Buried Structures. If you would like to publish a technical article, list your products or give details of a recently completed project; please send information to info@aciKuwait.com. The goal is to shed a light on local practices and locally available waterproofing techniques and products.

Dr. Moetaz Maher El-Hawary

Every organization has few members who are at the core of its success. Dr. Moetaz El-Hawary contributions to the chapter have been key to our successes.

He has been an active member of ACI-KC since its initiation. He joined the technical committee which in 1998 and he has been the Chairperson since 2000. He participated in arranging many activities and personally presented many seminars and training courses. He participated in all the technical guides published by our chapter and was a member in both the organizing and the scientific committees of the 1st International ACI-KC conference. Dr. El-Hawary is currently a board member, in addition to being the Chairperson of the Technical committee.

Currently Dr. El-Hawary is a Research Scientist at Kuwait Institute for Scientific Research, Building and Energy Technologies Department. He is also a Professor of Properties and Strength of Materials at Cairo University, Fayoum Branch.

He has been involved in the structural engineering field, in general, and concrete technology in particular for a long time, both as researcher, educator and consultant. He taught many undergraduate and graduate courses both in Kuwait and Egypt, supervised Master theses and graduation projects, presented a large number of public seminars and specialized training courses. He offered consultation to many agencies and participated in many funded research projects. Dr. El-Hawary has published more than 60 papers in international journals and conferences. He is a member in many international associations. His areas of interest include concrete technology, building materials, polymers, blended cements, composites and mathematical modeling.



Education: Ph.D. "Structural Engineering" Univ. of California Davis, California USA 1987.
M.Sc. "Structural Engineering" Univ. of California Davis, California USA 1982.
B.Sc "Civil Eng." King Saud Univ. Riyadh, Saudi Arabia 1980.

Family: Married with two children, Mohanad and Leena. Mohanad is 12, attending an Kuwait English School - year 7. Leena is 8 and she is in year 2 at the same school. They both like music and Mohanad has passed grade 2 piano at the Royal Academy of Music.

Hobbies: Reading, Music, and Swimming.
My work as an academic involves a lot of reading. That is why I usually like reading non-academic texts. The last book I read was "A journey to the center of the earth" by Jules Verne, which is a classic since fiction novel.

Languages: English and Arabic

Work Experience:

September 2000 – Present: Employer, Kuwait Institute for Scientific Research, Kuwait.

Position: Research Scientist, Building and Energy Technologies Dept.

September 1992 – August 2000: Employer, Kuwait University, Kuwait.

Position: Associate Professor of Civil Engineering.

January 1988 - September 1992: Employer, Cairo University, Fayoum Branch, Egypt.

Position: Professor of Civil Engineering (Since Feb.2000)

Associate Professor (Jan. 95 to Feb.2000)

Assistant Professor (Jan. 88 to Jan. 95)

March 1987 - July 1987: Employer, University of California at Davis, USA.

Position: Post-Doctoral Research Engineer.

JABER ALAHMED CENTRAL LIBRARY- Kuwait University A Modern Concrete Educational Building with Artistic Form



ACI – Kuwait Chapter presents the *Award of Excellence* to a Project in recognition of outstanding work in Concrete Construction and Practices within Kuwait.

The Jaber Al Ahmad Central Library of Kuwait University Shuwaikh Campus is the recipient of this year's Award.

The Building is intended to be a living symbol of Arabian Gulf Culture. It is Educational in nature, designed to be the center of life on Campus and Provides for the needs of 10,000 students

The Building resembles a desert fortress decorated with Islamic motifs and incorporating the most modern facilities and technologies.

The building, stepped up to the central dome, is metaphorically guarded along the front by 10 watch-towers that are linked to the main building by space frames creating a public colonnade with a mosaic tiled fountain and seating

The building is a beautiful, functional and cost effective structure constructed almost entirely of concrete.

The Award was presented to Kuwait Chamber of Commerce for being the owner and visionary behind the project. Also, certificates were presented to:

General Contractor:

Real Estate Construction and Fabrication Co. RECAFCO.

Architect & Engineer:

The Associated Engineering Partnership (TAEP)

in association with

F&S Partners Associates



RECAFCO

المكتب
المهندسين
المشاركين

FS

Ali A. Al-Abdullah

Over 30 Years of Contribution and Leadership

ACI – Kuwait Chapter presents the *Award of Achievement* to an individual in recognition of outstanding contribution in the field of concrete in the State of Kuwait.

This year, Mr. Ali Al-Abdullah was selected as the Award's recipient because of his valuable contribution towards establishing the Motorway System in Kuwait and his contribution to the engineering community and Kuwait's society.

After receiving his Bachelor of Science in Civil Engineering from the University of London in 1970, Mr. Al-Abdullah assumed several leadership positions:

- **Ministry of Public Works:** Chief Engineer of Roads (1983)
- **Ministry of Public Works:** Chief Engineer of Roads and Acting Chief Engineer of Sanitary Engineering (1986-1992)

After completing his MPW tenure, he moved to the private sector where he became a partner and managing Director for SSH until 2002, when he relinquished his shares, and he is now a freelance consultant.

Throughout his career, he always earned the respect of his colleagues because he is a competent engineer with practical solutions and affinity to quality, he was fair, and he made the right decisions at the right time.

He was a visionary who was directly responsible for implementing Kuwait's Motorway System. He pioneered many research projects and established many of the standards which are still being used today.

Furthermore, Mr. Abdullah has a passion for poetry and music which he both writes and plays.





KUWAIT CHAPTER THANKS OUR ORGANIZATIONAL MEMBERS.

Their support and willingness to share knowledge is appreciated.

Your Organization Logo could be here!



KUWAIT CEMENT COMPANY



شركة اسمنت الكويت

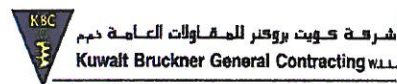


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لمواد البناء ذ.م.م.