

CONCRETE NEWS

Volume 8 - No. 1 April 2005



Kuwait Chapter



From The President

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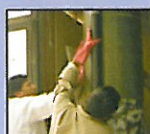


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ACI-KC has evolved throughout the years to become distinguished among the international chapters. In 2005, we look forward to continue this success with the support of our members.

The ACI-KC Board and its working committees are planning an extensive program during 2005 that includes 4 seminars, 3 certification programs, 2 diwanahs, new technical documents, and 5 social activities, in addition to many other activities. To make these events a success, we need all of our members' assistance and participation.

One of our new endeavors that will have an impact on the nation, is a certification program that we are developing for utilization by Kuwait Engineers Society to certify engineers in the state of Kuwait. This will be a significant contribution to our profession where ACI-KC will influence the quality of engineers practicing in Kuwait. This certification program includes Civil Engineering Certification, Structural Engineering Certification, and Site Engineer Certification. We will keep our members informed of new developments in this regard.

Our first social activity for the year was a new experience for our members – our social committee organized ACI-KC's first spring camp which took place in Equate Camp in the south of Kuwait. This was a unique activity because it included all age groups in an informal setting. I must say here that it was pleasant for me and my children who had a great time playing and making friends. On behalf of all ACI-KC members, I extend our appreciation to all the social committee members, especially Mr. Amgad Saad and Ms. Ebtisam Al-Kazami, who made all possible efforts to ensure that everyone had a good time. We also thank Equate for allowing us to enjoy their camp.

On a final note, we hope that the new look of "Concrete News" and new sections enhance our newsletter and add value to it. We look forward to our members' participation by way of ideas, suggestions, or articles. The Board of Directors welcomes your comments on any matter related to ACI-KC affairs to enhance our organization. Please be generous with your ideas, suggestions and prayers.

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.

ACI 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.



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Who's Who

BOARD OF DIRECTORS 2005

1. Dr. Naji Al Mutairi (KFAS)	President
2. Dr. Moetaz El-Hawary (KISR)	Vice President
3. Dr. Khaldoun Rahal (Kuwait University)	Past President
4. Eng. Ubedur R. Arain (Gulf Consult)	Director/Secretary
5. Mr. Abdulwahab Rumani (KBRC)	Director/Treasurer
6. Eng. Amgad Saad (FOSROC)	Director
7. Eng. Anas Kassem (Parsons Brinkerhoff)	Director
8. Eng. Ebtisam Al-Kazemi (NCCAL)	Director
9. Dr. Hasan Kamal (KISR)	Director

CHAIRPERSONS OF THE COMMITTEES 2005

1. Dr. Naji Al Mutairi (KFAS)	Exhibition Committee
2. Eng. Mohammed Harb (Al Ghanim Specialities Co.)	Membership Committee
3. Dr. Mohammed J. Terro (Kuwait University)	Publication Committee
4. Dr. Naji Al Mutairi (KFAS)	Public Relation Committee
5. Eng. Amgad Saad (FOSROC)	Social Committee
6. Dr. Hasan Kamal (KISR)	Technical Committee
7. Dr. Khaldoun Rahal (Kuwait University)	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

Mohammed J. Terro	Anas A. Kassem
Abdulwahab Rumani	Amanullah Ukai
Keith Horsfield	Saeed S. Sulaimani

Chapter NEWS

The General Assembly Meeting and Election of the Chapter for the year 2005 were held on December 29, 2004. The highlights of the meeting were the election of vice President, Board Members and Nomination Committee for the year 2005, and receiving the annual accounts for the year ended 30th December 2004. The Assembly was opened by Chapter secretary Mr. Ubed Arain's opening speech. Then treasurer Mr. Abdul Wahab Rumani put the account report for the year ended. After that president Dr. Khaldoun Rahal addressed the meeting. The president pointed out the goal of the Chapter is "to develop and share technical information of the concrete construction in Kuwait". He also highlighted how the name of the Chapter has been established in the engineering community by means of professionalism in its activities and by the selfless efforts of dedicated members. Dr. Khaldoun praised Dr. Naji in particular for his efforts and contribution for the Chapter. Finally, he invited all members to become active members to keep the goal of the chapter alive.



The attending members voted and elected Dr. Moetaz El-Hawary to the position of Vice president, and Eng. Anas Kassem and Mr. Abdul Wahab Rumani to the Board of Directors. Dr. Husain Al-Khayyat, Mrs. Suad Al-Bahar, Dr. Bader Al-Hoti and Mr. Ahmed Al-Jihayem were elected Members of the Nomination Committee and the Assembly was concluded with refreshments.

The social committee organized ACI-KC's first spring camp which took place in Equate Camp in the south of Kuwait. This was a unique activity because it included all age groups. Each family was provided with separate tent. Various entertainment activities were arranged: DJ with variety of competitions and games, children's slide, baby foot games, horse and pony riding and many more things which all families enjoyed. Food was provided to all attendees. Drinks sponsored by "Coca-Cola" and an ambulance was provided by Red Crescent for the safety of attendees. Surprise gifts were arranged for adult's entrance tickets. Lucky draws and competitions took place in a large tent which created a joyful atmosphere Which will be remembered for a long time. There were also special prizes for ladies, for the best home-made sweet dish. Finally the joyful day ended with drizzling rain.

Corrosion Inhibitors – The way forward

The event was sponsored by Degussa MBT Construction Chemicals., and the seminar was offered by Mr. John Halsall, Repair and Protection Systems Manager for the Gulf Region of Degussa MBT Construction Chemicals., on February 15th, 2005. Focusing on the refurbishment of concrete structures, Mr. Halsall presented the latest innovation in reinforced concrete protection and enhancement. Utilizing a surface applied treatment, corrosion within reinforced concrete can be measured, controlled and the life of a structure enhanced.



The Membership Committee installed ACI-KC Booth in the Exhibition Held at Hotel Crown Plaza for 4 days from 13-16 Feb. 2005. The Exhibition facility was provided during "The Second Conference of Insight of Successful Engineering Practice" Organized by Kuwait University College of Engineering & Petroleum in Collaboration with the Save international value Engineering Society Arabian Gulf Chapter. Large no. of participants from Kuwait and Gulf Countries visited ACI-KC Booth.

Concrete Reinforcement Carpet

Industrial prefabrication replaces manual installation on the construction site

by Cornelia Haeussler

Modern methods for installing steel reinforcement in concrete structure involves interpreting steel positions from plans and installing of individual bars by site workers. Frustration on the job site can frequently be attributed to confusion in determining steel layout and/or too many individual, awkward steel placements. But who ever thought of an automated manufacturing process to lay out steel reinforcement for concrete structures? No one, until now. Reinforcement can be installed up to 10 times faster using BAMTEC® reinforcement technology.

CONSTRUCTION AND SPEED

The two main factors affecting the speed with which reinforcement can be installed are: placement of individual bars and how well the bars fit together (how congested, for example). If ease of installation were considered during the design phase of the structure, more prefabricated reinforcement elements could be included.

This separation between design and construction, which is typical throughout the world, often leads to reinforcement that is cumbersome to install, requiring more time. Because time is valuable, the only solution thus far for shortening reinforcement installation time has been hiring a larger construction crew, which increases crew oversight and inspection costs.

BAMTEC reinforcement technology significantly shortens construction time and time-dependent general costs. Further, costly and time-consuming inspections of the installed reinforcement and on-site waste of reinforcement are almost completely eliminated.

BAMTEC AND ENGINEERING

Deposite the drastic increase in productivity seen in all market areas due to computers, only a limited amount of productivity increase has been observed in the construction industry regarding reinforced concrete. There are new opportunities for reinforced concrete industry using process-optimized, static work preparation. To use this process, the structural engineer must first consider the implementation of his or her design before attempting that design. One must first consider how the reinforcement can be efficiently installed on site, then the reinforcement layout is optimized for the manufacturing process, and



Fig. 1: At the job site, cranes are used to transport the reinforcement elements (carpets) manufactured using bamtec reinforcement technology

finally, drawings and calculations are begun. Using this basic principal, Haussler-Planung GmbH in Kempten, Germany, developed BAMTEC in 1994 - a new method for manufacturing and incorporating reinforcement into formwork. There are currently 14 software companies offering BAMTEC software modules for reinforcement programs. These programs use FEM results to automatically calculate the individual bar diameters and lengths, as well as the distances between individual bars for each mat. For each direction of reinforcement, the BAMTEC system uses large industrial reinforcement elements (carpets), which are produced fully automatically, and which need only to be rolled out at the construction site.

The software determines all the manufacturing data for the reinforcement plans. The BAMTEC element files are transferred to the straightening machine via disk or online communication services, where it is converted into control commands for the manufacturing machine using an interface. The individual elements are manufactured and rolled up automatically by the BAMTEC robot.

All requirements for country-specific standards are taken into consideration. By matching the use of reinforcement to fit the demand, and by avoiding unnecessary joints, BAMTEC technology leads to significant savings of reinforcement. This process can reduce the amount of reinforcement used by up to 40%. At the construction site, the prefabricated reinforcement carpets can be laid in less than 80% of the usual time (Fig. 1 to 3).

WORK PREPARATION BY THE SUPPLIER

Shifting work from the construction site to a plant where the work can be performed in a controlled environment and with the correct equipment results in a higher-quality product. Using prefabricated construction elements, like BAMTEC, in the reinforcement industry accelerates the installation process at the construction site and makes construction more economical

Selected for reader interest by the editors.



Fig. 2: Installation of a reinforcement element (carpet) manufactured using BAMTEC reinforcement technology



Fig. 3: At the construction site, the prefabricated reinforcement carpets can be laid in less than 80% of the usual time



Cornelia Haeussler is Managing Director and a member of the board of directors of BAM AG, based in Switzerland. She is also a part owner with her father Wilhelm Haeussler and her brother Franz

Haeussler of the engineering company Haeussler Planung GmbH in Kempten, Bavaria, Germany. Wilhelm Haeussler is the developer of the BAMTEC® System.

Eng. Hanan Al-Mutirat



Eng. Hanan Al-Mutirat graduated from Kuwait University with a degree in Civil engineering in 2002. Ms Hanan is presently working with the Ministry of Defense, the State of Kuwait, as part of the Military Engineering Projects, Structures Design Section, where she is engaged in engaged in

designing defense-related buildings.

She is also working as a part time for Boobyar Consulting Engineers, where she prepares structural designs for various types of structures including residential, commercial & multi-story buildings.

Ms Hanan Al-Mutirat has been a very active member of our ACI Kuwait Chapter; As a member of ACI-KC Social Committee, Ms Hanan has played an important role in successfully organizing our social events such as the recent summer camp.

She is also helping in reaching out to the new graduates in the industry to introduce them to the benefits of ACI-KC and to recruit active new members to our committees. In general, she shows interest in all ACI activities, technical or social.

Ms Hanan enjoys traveling and experiencing different cultures. She enjoys arts such as music and movies.

Ms Hanan is very proud of being part of the ACI-KC as she believes that this organization is providing a great benefit not only in technical matters but also in other areas such as social activities which she feels is an essential part of one's life. She enjoys the family atmosphere between members of the ACI-KC. And, that is one of the main reasons she would like to help our chapter to advance and be available to all in the concrete industry to benefit.

Profile

Ms. Hanan Ali Al-Mutirat

Education:

B.Sc. Civil Engineering,
Kuwait University, January 2002.

Contribution to ACI-Kuwait Chapter

Member, Membership Committee (2005)
Member, Social Committee (2005)
Encourage new members to join ACI.

Professional Profile:

Ms. Hanan Ali Al-Mutirat joined Military Engineering Projects in the Ministry of Defense, Kuwait in the August 2002 after her graduation from Kuwait University.

She is working in Military Engineering Projects, M.O.D. as design engineer in Structural Engineering division and is involved in designing structures related to defense projects.

Membership in Non-Profitable Organizations:

Kuwait Engineering Society (2003-to-date)
ACI-Kuwait Chapter (2004-to-date)

Strengthening Structural Elements Using CFRP

by Sarah Witt

Externally bonded fiber reinforced polymers are increasingly being used throughout the world as an alternative to more traditional building materials. This type of strengthening is a well established technique for seismic retrofit and is also becoming a popular choice for general strengthening and upgrading of structures. This includes adding capacity for an increase in loading, adding strength to existing structural members due to change in the configuration of the building, preservation of historical structures, and repair and protection of structures against corrosion. Fyfe company has been involved in this strengthening market since 1980s with the Tyfo® Fibrwrap® system being used on a variety of strengthening projects in the United States, Asia, Egypt, Saudi Arabia, and Kuwait. Recently, Fyfe company through their certified applicator "Stone & Wood Center" has completed strengthening of columns for a commercial complex in Kuwait.

After many years of use, an existing structure often needs to be upgraded to accommodate changes in the original structural design. Fiber reinforced polymers ("FRP") offer an ideal way to achieve these new design loads because of their high strength to weight ratio, minimal impact on the existing structure and speed of installation.

A typical project was recently completed in Kuwait. A commercial complex was upgraded by using Tyfo® CFRP fabric. The columns failed core tests and were needed to be strengthened as well as two floors were to be added to the building. Columns at the basement and ground floor were wrapped by layers of Tyfo® SCH 41S Carbon composite system.

Sometimes during the course of a building service life, additional equipment is needed, resulting in increased dead and live loading. At the King Abdul Aziz University in Jeddah, Kingdom of Saudi Arabia, new HVAC equipment was being placed on the roof structure. The existing beam that supported this equipment was flexurally deficient in its ability to support the additional weight of the new unit. The Tyfo® SCH 41S Carbon Composite system was installed on the bottom of the beam to provide additional flexural capacity, with 'U' shaped wraps placed to provide anchorage.

A change of use of a structure often necessitates structural strengthening and FRP can be a quick, easily installed structural solution. A structure may need to be strengthened without a change of use. Initial design errors of deterioration over time may necessitate structural repairs. Fiber reinforced polymers are an ideal strengthening technique for buildings and bridges.

Fiber reinforced polymers also offer an excellent strengthening solution for corrosion damaged structures as well as a method of protecting structures against future deterioration. Engineers throughout the world have used this technology to solve their structural problems in an efficient and economical manner. FRP's are extremely versatile and can be designed for a wide variety of projects, and may be the ideal solution for a number of structural problems that cannot be efficiently solved using conventional means.

The American Concrete Institute (ACI) committee 440 is recognized in developing FRP Composite specifications for concrete structures.

Case Study

Strengthening Columns Using CFRP At a Shopping Complex in Kuwait

by Saeed S. Sulaimani

1. Site Inspection

A site inspection was undertaken by Stone & Wood Center for columns to be strengthened at a commercial complex in Kuwait. The structure consists of a two-story commercial building. The columns had failed core tests. The client wanted to add two floors as well as covering an open area to serve as a shop.



Figure 1 Surface preparation.

2. Design Phase

In determining the requirements of the project, Stone & Wood Center gathered all necessary data concerning the strengthening works involved:

- Quality of concrete
- Conditions of the columns
- Dimensions of the columns
- Steel reinforcement
- Additional loads

After studying the case and following various discussions between Al-Turath Consultants Kuwait, and Fyfe Company Design Engineers, full assessments of the case study was achieved and the design and conclusion were to wrap layers of Tyfo SCH-41S Carbon Fiber to the particular columns concerned.

3. Rehabilitation works

As the strengthening works of columns by traditional methods was not agreed, Stone & Wood Center advised the new repair technologies and correct selection of materials to be adopted for this project to meet the structural requirements of the modified plan. We emphasized that using CFRP to strengthen the columns



Figure 2 Fitting layers of CFRP.

had more advantages than those of traditional methods. Using FRP had been judged as the best remedy to strengthen elements of the structure for a number of reasons. These included the



Figure 3 The final shape of CFRP.

prevention of any disruptions and delay of works.

Using CFRP to strengthen the elements of a structure (the column) had minimal effects on the activities of the shopping complex as this method can be applied simply by repairing the cracks, voids and pinholes and wrapping the element with CFRP, unlike the traditional repair wherein you have to chip the surface of concrete for bonding, fix anchors, place additional steel all around the element, erect and formwork, pour of concrete in areas often with limited access, followed by curing and plastering etc..



KUWAIT CHAPTER THANKS OUR ORGANIZATIONAL MEMBERS

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