CONCRETE NEWS

Volume 5, No. 2, May 2002

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aci american concrete institute

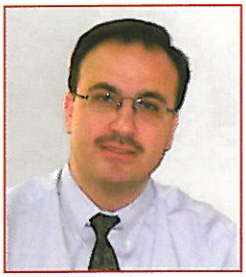
Kuwait Chapter

www.acikuwait.com

from THE PRESIDENT

Chapter Awards,

Who Are The Real Winners?



Anas A. Kassem
President

How would you feel if a group of professionals mostly unknown to you decided to host a dinner and present you with an award for one of your projects?

How would you feel if you were selected by a group of your colleagues and competitors to be honored for your personal contributions to the community?

As the recipient of these awards you would feel proud and happy. Working with the Awards Committee last year, I can assure you that everyone who was involved felt proud because these awards speak loudly of our collective desire to excel and our ability to recognize personal achievement.

To answer the question: Who are the real award winners? It is all of us.

Therefore, I encourage you to send in your nomination for the Award of Excellence, to be given to a project, and Award of Achievement to be given to an individual. The forms can be obtained from the Chapter's administrator or downloaded from our web page.

The Board of Directors will review all nominations, deliberate, visit project sites and select the recipients by a majority vote using secret ballots.

The Awards will be presented during our Annual Award Dinner in October , please make sure that you will attend.

CONTENTS

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 2002 Calendar of UPCOMING EVENTS

Publication Committee	*"Newslettter"* No. 2, May No. 3, December
Social Committee	*"Field Visit"* Site visit, June Factory, September **"Dinner"** Awards Banquet, October
Technical Committee	*"Seminar"* Flowable, Self-Compacting Concrete, June Minimizing Problems in Concrete Construction, October *"Training"* Form-Work Systems : Design & Execution, September Blended Cement and Supplementary Cementitious Materials, November
Membership Committee	*"Membership Directory"* *"Annual General Assembly"*, December

Who's WHO

BOARD OF DIRECTORS

1. Mr. Anas A. Kassem (Parsons Brinckerhoff)	President
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7. Dr. Khaldoun Rahal (Kuwait University)	Director
8. Ms. Malakah Noor (Misr Cont. & Eng.)	Director
9. Dr. Mohammed Nasseer Ul-Haque (Kuwait University)	Director

CHAIRPERSONS OF THE COMMITTEES

1. **Dr. Naji Al-Mutairi** (KFAS)	Exhibition & Nomination Committee
2. **Mr. Hamad Al-Tabtabaie** (Kuwait Investment Co.,)	Membership Committee
3. **Dr. Khaldoun Rahal** (Kuwait University)	Publication Committee
4. **Mr. Anas A. Kassem** (Parsons Brinckerhoff)	Public Relations Committee
5. **Mr. Mohd. Harb Madbouly** (Al Ghanim Specialities Co.,)	Social Committee
6. **Dr. Moetaz El-Hawary** (KISR)	Technical 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

Khaldoun Rahal	Malakah Noor
Abdulwahab Rumani	Keith Horsfield
Rajaarm B. Gaidhane	Tin Cho Mohammad

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e-mail: info@aciKuwait.com

Technical Seminar: Dr. Donald Pearson-Kirk, Parsons Brinckerhoff Infrastructure Ltd.

The Technical Committee organized a presentation made by Dr. Donald Pearson-Kirk, who is a Technical Director of Parsons Brinckerhoff Infrastructure Ltd. Held on the evening of 12th March 2002, the subject was: 'Testing and Monitoring the Durability of Concrete Structures'. The well-attended presentation covered the phased inspections of concrete structures and introduced the new UK National Technical Guide for investigation into Governmental Structures, to be launched on April 11th 2002.

Field Visit: Waterfront Project Phase V

The Social Committee organized a field visit to Waterfront Project Phase V, Salmiya on March 14 2002. Twenty-four members participated.

It demonstrated the latest technique of advanced light weight (density of 50 kg/m^3) material like expanded polystyrene (ESP) for cladding to get any desired shape, size, color and texture along with the advantage of fire resistance. Fabrication and execution was conducted by M/S M.A Kharafi Co., as a sub contractors of M/S Ahmadia Contraction Co. The group also visited the marine work being executed by Gulf Dredging Co.

Chapter's Guide Books

The Technical Committee has published two Guide books; ACI/KC 03-2001 and ACI-KC 04-2001. The first provides information about implementation of concrete repair to professionals working in the field of repair under the specific conditions applicable to Kuwait while the second gives information on the placement, compaction and finishing of the concrete.

Tragic Demise of Eng. Tarek Ahmad El-Sayyed

The ACI-Kuwait Chapter and the Department of Civil Engineering at Kuwait University lost a member and a friend, Engineer Tarek Ahmad El-Sayyed on April 8,2002. Tarek was 34 years old, and a father of two children, Ahmad (3) and Hibatu-llah (1 -1/2). A special tribute to Tarek will be published in a future issue of Concrete News. We ask Allah to accept him into His Mercy, and bestow patience on his family.

Members' Dinner Banquet at Radisson SAS

The Social Committee organized a dinner banquet for the members of the Chapter on March 31, 2002 at the Radisson SAS Hotel. Sixty-five members attended the event and enjoyed the evening. A quiz contest (ref. Concrete technology) was also organized. Everyone participated and many participants won the prizes, which were sponsored by Al-Ghanim Specialities Co.

AN ODD JOB!

By Keith Horsfield

Sometimes, construction needs a little ' lateral thinking' in order to be able to construct what the designers intended. A bridge refurbishment contract recently supervised for the Ministry of Public Works by Parsons Brinckerhoff included an unusual feature - the strengthening of four bridges over an underpass in the city centre by the construction of reinforced concrete brackets cast in-situ between the deck slabs and retaining walls.

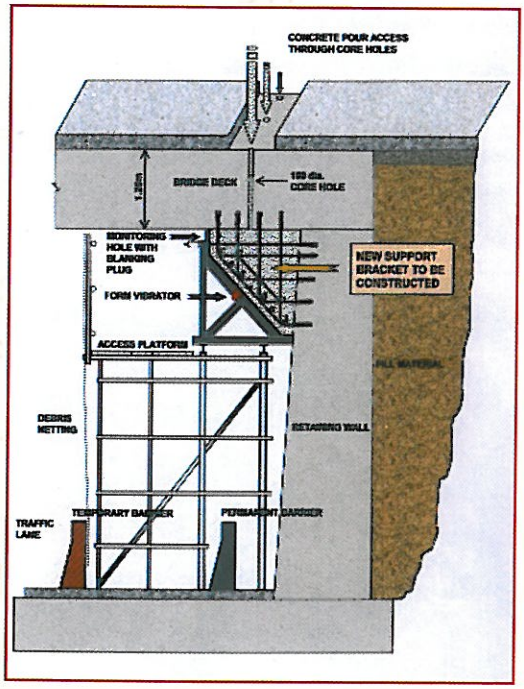
The contract stipulated that the finished brackets should be in intimate contact with the soffit and walls of the existing bridge, into which reinforcing bars were to be resin-fixed to provide

Detail of Completed Bracket

The contract originally specified that concrete be pumped into the shutter from below until it was 75mm below the soffit level, following which grout was to be used to fill the remaining space. However, in a trial of this method, it proved very difficult both to control the finished level of the concrete and to guarantee that the void above the concrete was fully filled with grout.

Because of these difficulties, the engineers on site developed an alternative 'one-step' placing method. After exposure of the top layers of the deck tension reinforcement, 100mm. diameter holes were diamond core drilled between the bars at about 3 metre centres, through the 1.25 m thick reinforced-concrete slab, into the bracket area. Once drilled, the holes were covered with steel plates to allow traffic to use the bridge until the bracket was ready to be poured.

After scabbling of the construction joint faces, starter bars for the new reinforcement cage were resin-fixed into the existing structure. On completion of the reinforcement, the shutters werefixed, braced, and filled with water both to check the grout-tightness of the shutters and to soak the existing concrete to minimise absorbtion of water. Once preparations were complete,the water was drained off the road above was closed and flowable K400 concrete was discharged from mixer trucks into hoppers placed over the cored holes. In order to ensure complete filling of the forms, the concrete was placed through the core holes sequentially, starting at the end where the soffit was lowest and progressing onto filling through the second hole only when the concrete in the first hole started to back-up in the second, showing that filling of that area of the shutter was complete. Complete filling from the last hole was achieved by placing the last of the concrete through an opening placed at the top of the stop-end of the shutter.



A one-piece steel shutter was decided on for reasons of ease of fixing, ease of maintaining alignment, to obtain a good finish and to enable the best use of electrically powered form vibrators, as timber shutters tend to absorb the vibration. These form vibrators were augmented with small diameter poker vibrators used down the core-holes.

With this revised method of placing, the concrete mix to be used had to fulfil certain criteria,

It had to:

- Flow freely with minimal vibration
- Be capable of passing down a 100mm diameter hole, under gravity, without blocking
- Develop strength quickly to allow the bridges to be re-opened to traffic in a reasonable time
- Be self-compacting as the opportunities for applying vibration were limited
- Resist segregation during the flow from one core hole to the next
- Be absolutely non-shrink, with preferably slight expansion before initial set

Formwork Ready for Concrete

The K400 mix design developed by Kuwait British Readymix Company fulfilled these requirements and gave three-day strengths of around 30N/mm², allowing the road above to be reopened to traffic quickly.

The mix design comprised:
470 kg/m³ SRC, washed sand, 10mm aggregate, and Kutplast RNA Plasticizer.

In addition, in order to give the required properties to the concrete, the following additives were used:

'Capgrout' Expanding Admixture – Added on site just prior to placing concrete.
'Kutplast NA/EDS' Plasticizer – Added on site, following slump testing, to give the high flow characteristics required.

With careful placing and vibrating and monitoring, the pours were carried out successfully and the roads above were opened to traffic three days after pouring, when concrete strengths of 30N/mm² had been achieved.

Client:
Ministry of Public Works(MPW)
MPW Project Engineer:
Engr. AbdulKareem Sultan
Main Contractor:
United Gulf Construction Company
Consultant:
Parsons Brinckerhoff International

If you have carried out an unusual concreting job, used unconventional techniques for forming or placing concrete, or wish to write about an interesting project, the Editorial Board would welcome further articles for inclusion in 'Concrete News'.

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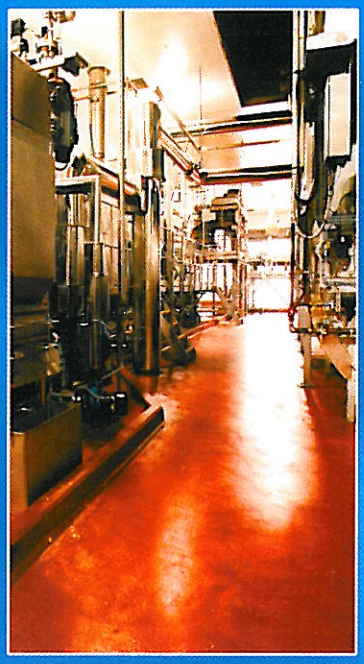
Construction Chemicals

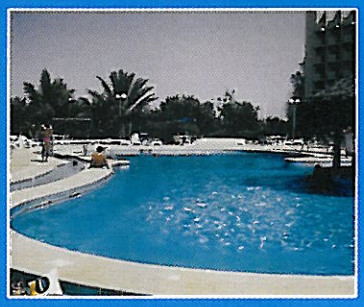
Car Park System

Protective coatings

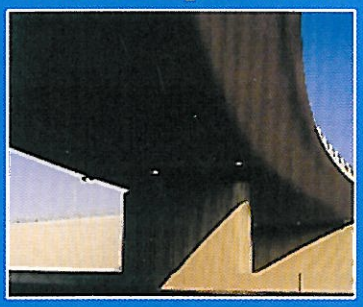


Flooring systems

Surface improvement

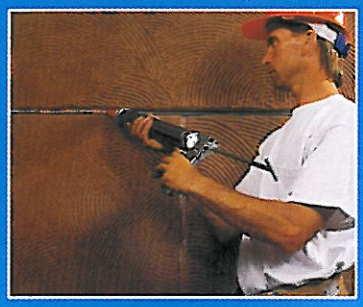


Tiling

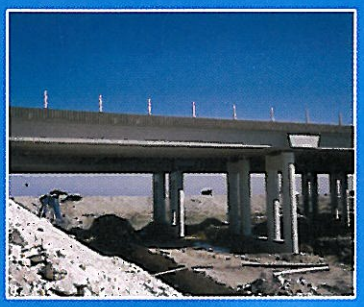


Concrete repair

Admixtures for mortar

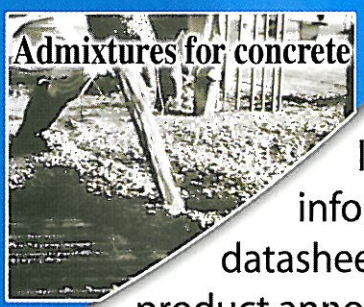


Joint sealants



Corrosion protection

Waterproofing



Admixtures for concrete

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online offers an unprecedented level of customer support, around the clock, 365 days a year. please visit our website for the latest news, technical information, datasheets and product announcements.

www.mbt-middle-east.com

Master Builders Technologies

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Construction Chemicals

Master Builders Technologies (MBT) is the leading supplier of chemical based solutions to the world's construction Industry. It is the flagship brand within the construction chemical division of Degussa AG.
Globally , MBT focus on improving , protecting & repairing concrete . In the Arabian Gulf and great Middle East region , this translates to providing system solutions which enhance durability and reduce the lifecycle costs associated with ownership of a concrete structure in some of the harshest of natural environments.

MBT is pleased to announce the appointment of its new agent

Works and Building Company - (Al-Qatami)

Works and Building Company is one of the oldest established organisations in Kuwait. Al-Qatami was founded in 1952 to meet the needs of the construction industry in the Kuwait market .

MBT products range:

Concrete admixtures & corrosion inhibitors.
Construction grout & anchoring.
Traffic membranes & screeds .
Engineered expansion & seismic joints.
Elastomeric joint sealants.
Reflective wall coating.
Concrete repair systems.
Waterproofing membranes .
Shotcrete admixtures.
Active watertight jointing systems.
Decorative, protective, facade coatings.
Post - tensioned cable grouting admixture.
Performance flooring.
Cathodic protection Systems.

AL-QATAMI

Contact details: Works and Building Co.
Tel : (965) 481 4815 - Fax: (965) 481 2763 /4842798
P.O Box. 415 - 13005 Safat Kuwait
E-Mail :wbtrade @ kems.net
Location:Shuwaikh Industrial Area

Master Builders Technologies

Admixture's key role in corrosion inhibition

MBT Middle East of the UAE elaborates on how its Rheocrete 222+ admixture, a film-forming amine, plays a vital role in corrosion inhibition first by increasing the time taken to reach chloride threshold level at the steel reinforcement in concrete and through adsorption.

Rheocrete 222+ admixture is a classic mixed inhibitor, affecting both the anodic and cathodic reactions of corrosion. It contains an amine component that forms a protective film at the reinforcement surface. It also contains a waterproofing component that reduces chloride, oxygen and moisture permeability.

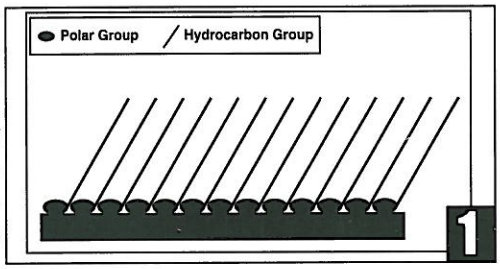
To appreciate the dual performance of Rheocrete 222+ admixture as an active-passive system inhibitor, the individual components must be defined and their mechanisms understood. Only then can their synergistic sum can be more realized and appreciated.

The time to corrosion initiation is reduced based upon the ability of the waterproofing organic esters to partially hydrolyse and bind with the calcium ions provided from the $Ca(OH)_2$ in the initial hydration mechanism of cement. This binding creates fatty acids and their calcium salts that provide a hydrophobic coating within the pores. This causes a reversed angle of contact in which the surface tension forces now push the water out of the pore instead of into the pore. The reduced diameter of the pore, due to the lining of hydrophobic calcium salt, also reduces chloride ion migration through the capillary pore matrix. This provides passive system corrosion inhibition by increasing the time it takes to reach the chloride threshold level at the steel reinforcement in concrete.

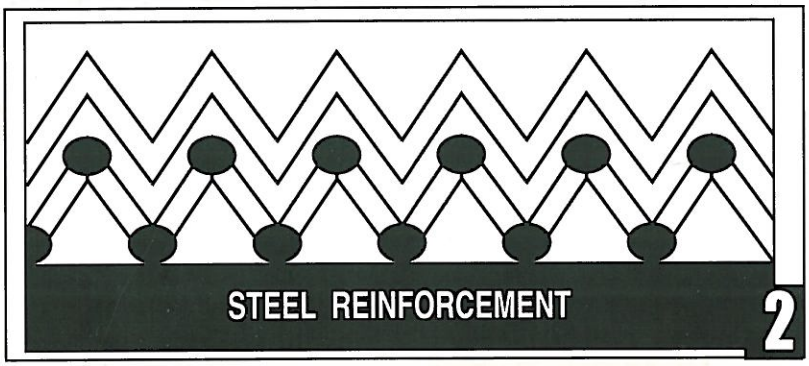
This reduction in chloride migration is particularly important when concrete cracks. Chlorides cannot easily diffuse laterally from the crack in concrete treated with Rheocrete 222+; thus the spread of corrosion along the reinforcement is minimized.

Adsorption is an important step in the inhibition mechanism of organic, film-forming corrosion inhibitors. Adsorption results from the polar or charged nature of the organic molecule/ionic species first establishing a physisorbed surface film (through van der Waals forces) which may further stabilize through chemisorption to form a donor type bond. Once the inhibitor has adsorbed onto the metal surface, it can then affect corrosion reaction in many ways: by offering a physical barrier to the diffusion of ions or molecules to or from the metal surface; direct blocking of anodic and/or cathodic reaction sites; and interaction with adsorbed corrosion reaction intermediates.

The film-forming amine in Rheocrete 222+ admixture is especially effective in adsorbing onto the steel reinforcement because of its chemical structure-a polar head with a long hydrophobic tail. The polar end of the surface-active amine The film-forming amine adsorption to the steel reinforcement can be visualized simply in the idealized view in *Figure 1*. The polar head is multiple bonded at the steel is oriented toward the steel reinforcement and forms multiple attachments to the surface metal atom. This is called chelation, which is beneficial in two ways: Firstly, enhanced chemisorption through chelate formation at the steel reinforcement provides a corrosion inhibiting film that is difficult to desorb, or remove. Secondly, surface chelation enhances already existent corrosion inhibition properties, via multiple bonding with the metal surface and formation of stable chelate rings.The film-forming amine adsorption to the steel reinforcement can be visualized simply in the idealized view in *Figure 1*. The polar head is multiple bonded at the steelreinforcement while the hydrophobic tail is angled away from the steel reinforcement surface.



The hydrophobic tail provides two primary important functions: it attracts excess non-adsorbed film-forming amines and similarly structured waterproofing esters to the reinforcement site by providing a structure for interdigitated stacking between hydrophobic molecules. This effectively builds a layering of molecular monolayers upon the adsorbed film-forming amine allowing for an increase in layer thickness at the reinforcement. Additionally, thermodynamic stability is also gained with the trans-conformation stacking. A representation of this stacking is shown in *Figure 2*.



Electrical impedance spectroscopy (EIS) studies have shown the ability of the film to form a protective corrosion resistive layer on the steel reinforcement and Fourier Transform Infrared studies have shown the adsorbed film to be effectively several layers in thickness and irremovable by water and chemical washes.

The benefit of the adsorbed film is twofold. First, it leads to an increase in the chloride threshold at the steel surface. Second, it provides a hydrophobic layer that minimizes the availability of water at the steel surface, thereby impacting the cathodic reaction and the rate of corrosion after initiation.

Rheocrete 222+ is manufactured in the region by Dubai-base MBT Middle East, part of the Degussa Construction Chemicals Group of Germany.

ADVANTAGES OF RHEOCRETE 222+

- Single dosage of 5 l/cu m
- Provides corrosion inhibition through dual mechanisms
- Superior corrosion inhibition in cracked concrete relative to 30 per cent calcium nitrite inhibiting admixtures.
- Sulphate resistance
- Normal set product that is easily used in elevated temperatures
- Historical data, including product references

This article is contributed by MBT Middle East, sponsor of this issue of CONCRETE NEWS.

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Construction Chemicals

Add years of service life to your reinforced concrete with two levels of corrosion inhibition

AL OATAMI

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Their support and willingness to share knowledge is appreciated.

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مشرف للتجارة والمقاولات

RECAFCO

Mrs. Ibtisam Al-Kazemi

If you have attended any of the events organized by the social committee in 2001, you must have seen Mrs. Ibtisam Al Kazemi. She has been in charge of the Social Committee and instrumental in the success of many important events sponsored by the Chapter.

You must have seen people praising her for the hard and fruitful work she has done.

Mrs. Al-Kazemi joined ACI-Kuwait Chapter in 1998, and at the same time volunteered for the Membership committee. For two years, she was responsible for recruiting engineers from the Kuwait Municipality to the Chapter, and of course for renewal of their memberships. In the year 2000, she became the chairperson of that committee.

The following year, Mrs. Al Kazemi volunteered to chair the Social Committee. During this year, ACI-KC established the Award Program and she was in charge of arranging for the Award Banquet 2001 which turned out to be one of the most successful events for our chapter.

Ibtisam graduated from the Department of Civil Engineering at Kuwait University in January 1990. After a three months break, she joined the Kuwait Municipality as a structural engineer. Her job description included tasks such as review and approval of structural drawings submitted by design offices (residential, business, and industrial structure), and design of additions to existing residential buildings.

In 2000, Engineer Ibtisam was seconded for 2 years to the National Council for Culture, Arts and Letters, Department of Architectural and Engineering Affairs. In this department, Eng. Ibtisam was involved in the maintenance, repair and modifications to historic buildings in Kuwait.

Since graduation, Engineer Al-Kazemi has attended numerous training programs related to Concrete Technology and Structural Engineering, including those offered by the ACI-KC.

Eng. Ibtisam has contributed to many organizations, but her contribution to the ACI-KC is the one she is most proud of. She believes that the Chapter has contributed a lot to Kuwait in general, and to the concrete industry in particular in spite of the limited financial resources. The success of the chapter is due to the interest and support of its individual and organizational members, as well as the devotion of the members of the board and the committees. She believes that the chapter offers unique services and opportunities to the members.

Mrs. Ibtisam Al-Kazemi

Contribution to ACI-Kuwait Chapter:

- Chairperson, Social Committee (2001)
- Chairperson, Membership Committee (2000)
- Member, Membership Committee (1998-1999)

Professional Profile:

Mrs. Al-Kazemi joined the Kuwait Municipality in April 1990 after graduation. Recently, she was seconded to the National Council for Culture, Arts and Letters as a structural engineer involved in the maintenance, repair and modifications to Historic Buildings.

Education:

- B.Sc. Civil Engineering, Kuwait University, January 1990

Membership in Non-Profitable Organizations:

- Kuwait Engineering Society (1990 – present)
- ACI-Kuwait Chapter (1998 – present)
- ACI International (2002)