

Concrete News

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Volume 29 / March 2025



Kuwait Chapter

Local Connection with International Links



Concrete News

Concrete News is published by ACI-Kuwait Chapter for sharing information, promoting exchange of technical knowledge amongst its membership, and enhancing the Chapter's position within Kuwait's engineering fraternity.

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■ President's Message



ACI-KC President, Mr. Ghassan Al Ghawas

We are delighted to share that this past year has been exceptionally productive for our Chapter. We have actively pursued our mandated program of technical activities and professional support for our members. In collaboration with the American Concrete Institute, we conducted several informative and well-attended technical webinars covering a wide range of topics.

Additionally, our program included engaging visits to construction sites of major urban center projects, providing valuable insights into contemporary engineering practices.

The Annual Awards Banquet, held on December 3, 2024, under the auspices of the Minister of State for Municipal Affairs and Ministry for Housing Affairs, His

Excellency Eng. Abdulatif Hamad Al-Meshari, was a highlight of the year. During the event, we proudly presented two prestigious awards: the Award of Excellence to the New Maternity Hospital project, and the Award for Achievement to Dr. Rana Al-Fares. These awards and the presentation ceremony are covered in this issue of Concrete News.

I would like to take this opportunity to extend my heartfelt thanks to our Board of Directors and Chapter Members for their unwavering support and cooperation during my term of office.

The Chapter has much to offer, and with more active participation from everyone, we can look forward to a fruitful year ahead.

■ Annual Awards 2023

Since 2001, ACI - Kuwait Chapter has recognized and presented two annual awards, one to an outstanding project and the other to a deserving individual. The Award of Excellence, which is for a project, and the Award of Achievement are presented during the Chapter's highly anticipated grand Awards Banquet.

Last year's well attended awards ceremony was held in the main auditorium of the College of Engineering and Petroleum, located in Kuwait University new campus in Shadadiya. The function was held under the patronage of His Excellency, the Minister of State for Municipal Affairs and Ministry of State for Housing Affairs, Mr. Abdulatif Hamad Al-Meshari.



Attendees at ACI Annual Awards Night 2023



Mr. Azizz Mamuji, ACI-KC Vice President and conductor of presentation ceremonies.



Dr. Khaldoun Rahal, ACI-KC Director and Master of Ceremonies.

■ Award of Excellence 2023

The Award of Excellence is bestowed on a local project of outstanding merit. The award itself, comprising a trophy, plaque and certificate, is given to the owners or developers of the project. Certificates of Excellence and plaques are also presented to the general or main contractor; the design and supervision consultants; and the main concrete supplier.

■ Award of Achievement

ACI - Kuwait Chapter's Award of Achievement is presented to an individual to recognize his or her longstanding and commendable contribution to Kuwait's development, or for significantly helping promote concrete technology and engineering education in the country.



His Excellency, The Minister, Awardees and ACI-KC Board Members

This year ACI-KC honoured the New Maternity Hospital, located in the Sabah Medical Region in Shuwaikh. The project was appreciated as “an aesthetically striking and sustainably designed specialized medical facility incorporating complex engineering and structural design with advanced electro-mechanical systems”. The award was presented to Ministry of Public Works.

The award this year was given to Dr. Rana Al-Fares for her ‘Dedication and commitment to academic and professional development, and contribution towards enhancing the built environment in Kuwait.’

■ Appreciation

The Board of ACI-Kuwait Chapter wishes to thank Acting Dean of the College of Engineering and Petroleum, Dr. Khaled Ahmed Al-Hazza, for allowing the Chapter's Annual Award function to be held in the Faculty's magnificent auditorium at the University's campus in

Shadadiya. The venue helped enhance the significance of the ceremonies and contributed to the success of the evening. The Board of Directors and Chapter Members sincerely appreciate Dr. Khaled Al-Hazza's gracious support.



■ Award of Excellence 2023

ACI-Kuwait Chapter's Award of Excellence for the year 2023 was presented to the New Maternity Hospital project, which was selected and cited as "An aesthetically striking and sustainably designed specialised medical facility, incorporating complex engineering and structural design with advanced electro-mechanical systems".

■ Background

In September 2014, following a bidding process, Ministry of Public Works commissioned PACE to undertake concept design services and produce design/build tender documents for the New Maternity Hospital. The hospital was to be located in Sabah Medical region, and the Consultant's design brief was clear. The utilisation of the project's 64,000 m² waterfront site facing Kuwait Bay had to be optimised, and the mandate was to create a world class specialist maternity hospital to meet Kuwait's growing healthcare needs.

The new facility had to be a culturally appropriate, with sustainably designed contemporary and efficiently engineered medical and electro-mechanical systems. It

was to accommodate a comprehensive programme of international standard in-patient and outpatient maternity care facilities, with a complete range of clinical and non-clinical support facilities.

■ Site utilization and Development Scope

The huge complex comprises four main buildings, each dedicated to a unique purpose: The Main Hospital; an Annex Building; car park structure; and a large central utility plant. The central component is the main hospital building which comprises three in-patient towers that are placed above a 6-floor diagnostic and treatment podium.



New Maternity Hospital

The Annex Building houses out-patient clinics, a medical training center, auditorium and a large emergency department, as well as administrative support facilities and basement parking. The multi-storey car park is a separate building; and the stand-alone central utility plant is linked to the hospital via a large service tunnel. The scale of the development is grand, with a built up area of almost 360,000 m².

■ Design Approach and Components

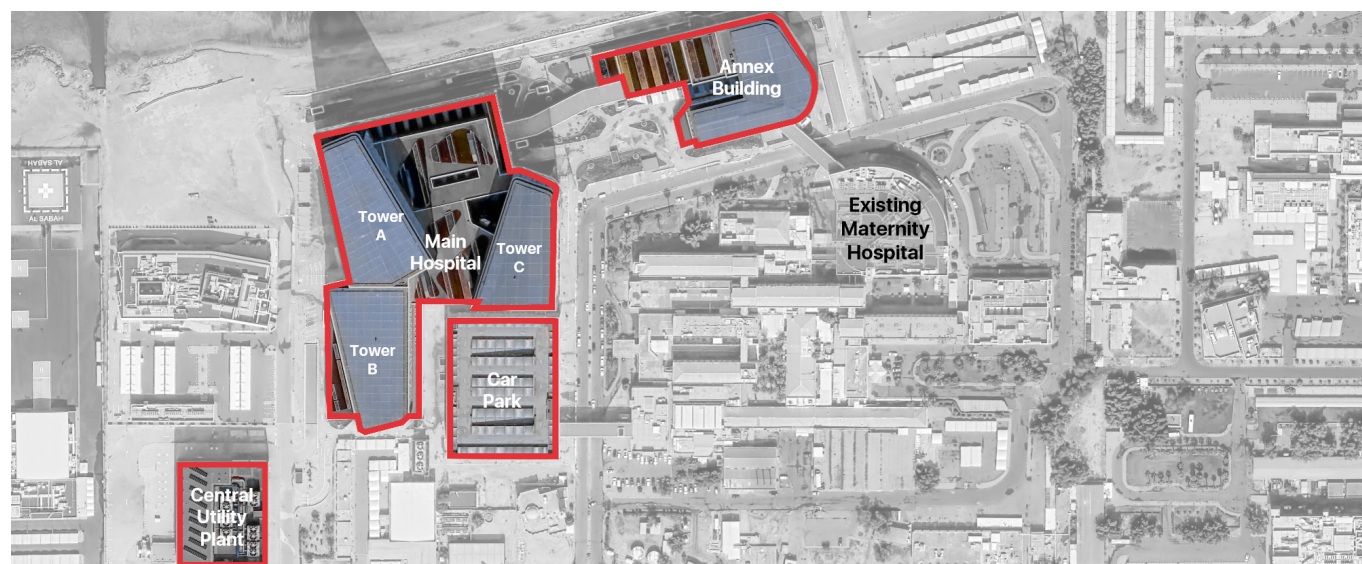
In their conception of this huge medical complex, PACE wanted to emphasise the site's proximity to Kuwait Bay and the views it offered. These were obvious influences, but more importantly the planning had to comply with infection control codes of Ministry of Health, and respect international guidelines of Facilities Guidelines Institute (FGI). There had to be seamless circulation between the

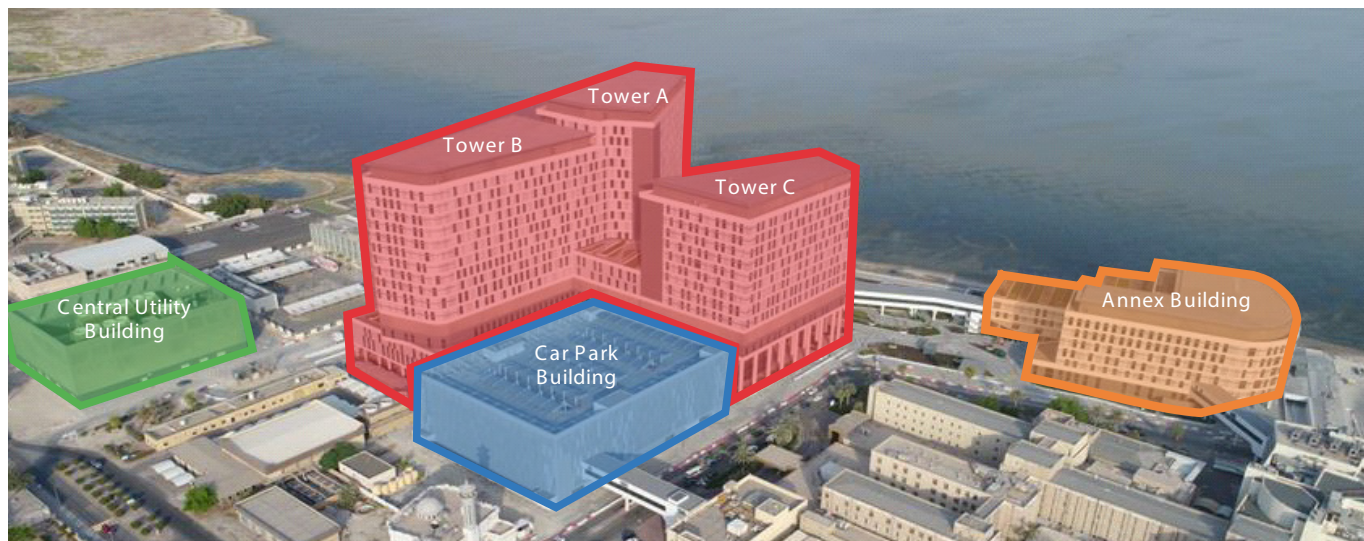
various new components, and with the adjacent existing Maternity Hospital. This unique location offered the opportunity to enjoy a direct sea view, and in fact over 90% of the in-patient rooms enjoy this advantage. This was achieved by careful positioning of the patient tower; and well-studied internal planning to enhance the healing environment.

The articulation of interconnected components projects a strong presence within the Sabah Medical Region, and when viewed from the sea, the entire complex is a visually striking architectural composition.

■ Components

The project's component mix is also quite impressive. The Main Hospital, with an area of just over 232,000 m², comprises three towers. These accommodate 460





in-patient rooms; two intensive care units (ICUs) for 249 neo-natal and 80 adult beds respectively; and 60 labour and delivery rooms. In addition, there are 28 operating rooms to cater to a range of procedures including for gynaecology, C-section, IVF and emergency services. An outpatient and diagnostic facility provides over 80 specialised healthcare services.

Also as would be expected, the complex is complemented with a wide array of medical support provisions, such as fully automated pharmacy, a full-facility radiology department as well as a range of central facilities which include the main laboratory, sterilisation unit and well-equipped kitchen and laundry. The Annex Building, with an area of over 5600 m², is also an important component. It comprises outpatient clinics, a training center and the hospital's administrative facilities.

The central utility plant building, with 3 levels of electro-mechanical equipment, and a services tunnel linking it to the hospital complex, is a necessary provision for such a large medical facility.

The 8 levels of an independent parking structure accommodate 1220 cars, and the two basement levels beneath the Annex Building provide a further 537 parking spaces. In total, the hospital is served by about 1750 parking spaces.

■ Interconnectivity, Massing and Design Features

Seamless interconnection between the new components and existing hospital was a critical consideration. Various pedestrian bridges facilitate this integration



New Maternity Hospital

and together they help create a cohesive healthcare campus. Two separate bridges, both with travellators, connect the Annex Building to the Main Hospital and existing Maternity Hospital. Two other bridges link the car park building with the new and existing hospitals. The integrated massing of the complex is enhanced by careful exterior and interior design, which have been conceived with quality and healing in mind. The objective was to create bright and tastefully detailed interior spaces with appropriate choices of colours and fittings and, accordingly, sustainably produced and medically

appropriate materials, finishes, furniture and equipment have been utilized throughout. This is reflected in the images of the wide variety of rooms, facilities, lobbies and special components shown here.

■ Engineering and Building Services

A sophisticated combination of structural and sustainably designed services engineering systems complement the design of this complex. Structural systems and concrete mixes of various grades were



Annex Building

- **Levels**
2 Basement
Ground
5 upper floors
- **Built up area : 56,748 m2**
- **Basement parking : 537 cars**
- **Programme**
Outpatient Clinics
Auditorium
Administrative Facilities



Central Utility Plant

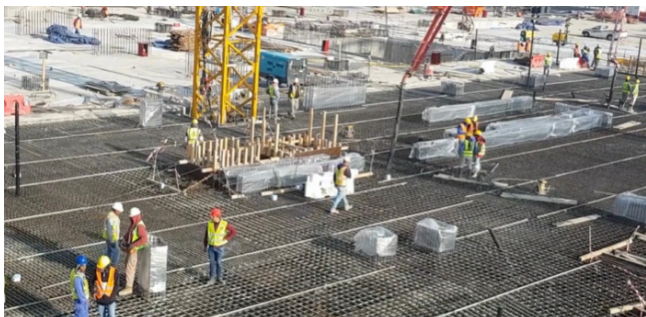
- **Levels**
2 Basements
Ground
2 upper floors
- **Built up area : 12,129 m2**



Car Park Building

- **Levels**
2 Basements
Ground
5 upper floors
- **Built up area : 49,901 m2**
- **Total parking : 1219 cars**





Structural System Highlights

- Engineering System Highlights
- Concrete Mix : K150 SRC, K350 OPC, K450 GGBS, K500
- Columns : K600
- Construction : Cast in situ and precast

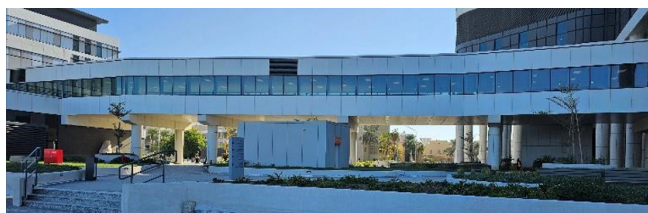
- Substructure : RC raft and tension piles
- Super structure : Shear walls and gravity columns,
- Floors : Hollow core and RC flat slabs
- Car park : Precast double Tees

MEP and Special Systems

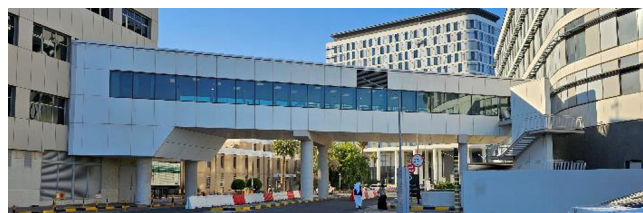
- Dual Systems for MRI and CT Scan
- Security and IP Surveillance Systems
- Access Control
- Parking Management
- Pneumatic Tube System
- Master Clock System
- Automated Waste and Linen Collection System

- Infant Protection System
- Nurse Call System
- Public Address System
- Queue Management System
- IPTV System
- Photovoltaic Solar system
- Building Management System

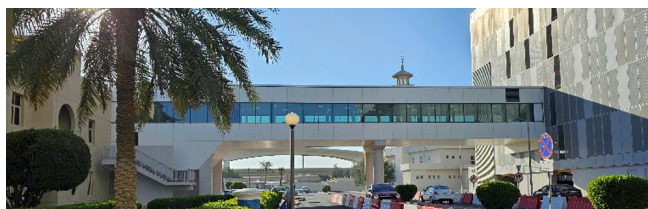




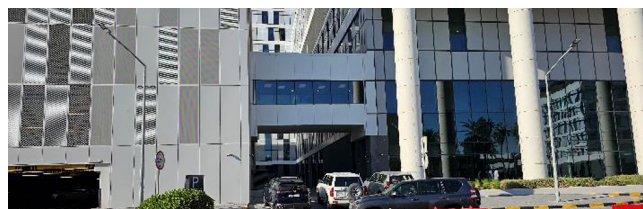
Main Hospital Building to Annex Building



Annex Building to Existing Maternity Hospital



Car Park to Existing Maternity Hospital



Car Park to Main Hospital Building



utilised to meet specific loading, performance and stability demands. Tension piles and reinforced concrete raft foundations provide the required stability and the superstructure comprises gravity columns, shear walls, and reinforced concrete and hollow-core slabs. Precast double-tees have been used in the car-park building.

The four link bridges are essentially steel structures. Another significant feature of the complex is a 320 m long sea-wall along the site's entire shoreline. As would expect, the development also incorporates an extensive array of sustainably designed and advanced electro-mechanical and special central systems.

Its total cooling demand is about 12,300 tonnes of refrigeration, which is backed by a large central utility plant building and comprehensive integrated environmental control systems.

There is also a very wide range of normal, special and medical systems, as well as carefully designed equipment provisions and appurtenances. All systems are commensurate with the varying needs of a specialised medical facility. The total power demand of the development is 37 MW and this is supplied through five electrical substations. The wide array of electrical and low voltage systems cover all necessary requirements for a sophisticated state-of-the-art medical facility. Included amongst these are 100% emergency

power supply, and a comprehensive ICT infrastructure. Also, the building has been provided with advanced security, surveillance and access control systems, with various other special installations. Furthermore, 64 elevators and 8 travellators are distributed throughout the sprawling campus to facilitate staff, patients and visitor movement.

In conclusion, it is clear that the New Maternity Hospital provides state-of-the-art facilities for diagnosis and treatment of obstetrics and gynaecology patients, all supplemented with a major neonatal unit and backed up by a wide array of medical, engineering and administrative support facilities.

Awardees

Developer

Ministry of Public Works

Design and Supervision Consultants

PACE Architecture, Engineering & Planning, Kuwait

General Contractor and Main Concrete Supplier

Impresa Pizzarotti, Italy

■ Award of Achievement 2023



Dr. Rana Al-Fares

ACI-KC's Award of Achievement for the year 2023 was given to an individual whose life has been greatly moulded by her parental influences.

Her grandfather was a long-time member of the Municipal Council and her father, Mr. Abdullah Al Fares, served Kuwait for many years as Undersecretary of Ministry of Interior, and later as Governor of Hawalli.

Her late mother, Ms Fouzia Al-Sulaiman, a Masters Degree holder, devoted her life to education as a school Principal. Our awardee, proudly and lovingly attributes her education, career, accomplishments and being what she is today, to her mother's loving mentoring, guidance and encouragement.

In recognizing her integrity, commitment, sincerity, professionalism, humility and achievements, the Chapter proudly presented its Award of Achievement to Dr. Rana Al Fares. She was cited for her "Dedication and commitment to academic and

professional development, and contribution towards enhancing the built environment in Kuwait". Dr. Rana Al Fares's distinguished career encompasses and is characterised by academic and educational excellence; research and publications; directorships;



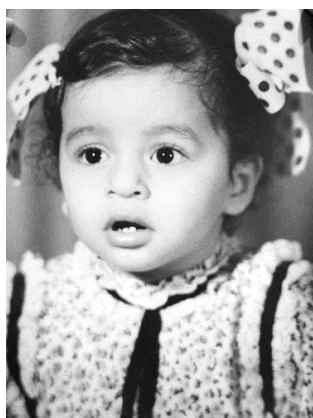
Dr. Rana receiving her award from, His Excellency the Minister of State for Municipal Affairs and Ministry of State for Housing Affairs, Mr. Abdulatif Hamad Al-Meshari.

environmental concerns; advisory consultations; and various national level assignments as a member of Kuwait's executive government.

■ Childhood and Education

Dr. Rana was born in the mid-1970s. Her kindergarten and primary schooling were at schools in Nuzha and Mansouriya, and high school was finished at Al-Asma Bint Al Harith School in Surra.

Throughout this period, her mother's life moulding influence came into play, as she wanted to ensure that



her daughters grew up as independent well-groomed individuals. In fact, every summer during the long school holidays from Grade 4 onwards, they were sent to boarding schools in England. The positive impact this had on Dr. Rana at that tender age is certainly reflected in her career path.

University education started at Kuwait University's Khaldiya Campus, where in 1996 she obtained her B.SC. Degree from College of Engineering and Petroleum. After a short stint as a Project Engineer in the Special Projects Administration of Ministry of Public Works, it was time for post-graduate studies in USA.

This was at the prestigious University of Southern California, also known as USC, in Los Angeles. Her Masters of Science degree in 1999 was followed by her doctorate at the same university in Geographic Information Systems (GIS). The latter reflects her keen concern for the environment. Time leading up to her Doctorate in 2004 was interspersed with teaching assignments both at Kuwait University and University of Southern California.



University of Southern California, USA



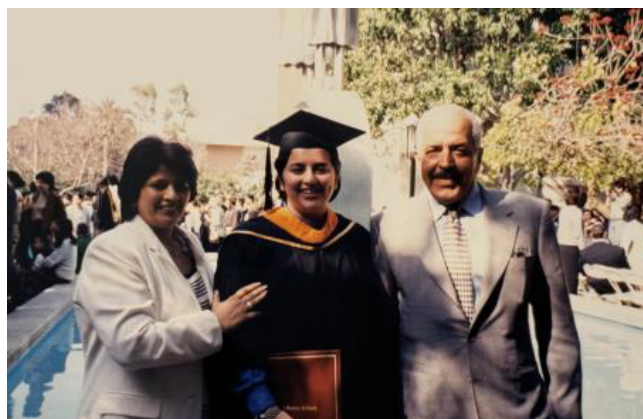
■ Career

Her career is an interesting chronology of important and progressively more responsible moves, with her impressive portfolio encompassing: academia; consultations; directorships; critical research papers; as well as awards and vital political appointments.

Starting at Kuwait University, her 8 years as an Assistant Professor transitioned to becoming Associate Professor in 2012, a position she still holds. Over this period, however, she was extremely busy within and outside her academic pursuits. Given Dr. Rana's exemplary work ethic, it was no surprise that in 2008 she was appointed as Assistant Vice President of Kuwait University Planning.

Just a year later, however, through a special decree and Audit Bureau approval, she became the Director of Kuwait University Construction Programme, more commonly known as KUCP. This came with the vital responsibility for overseeing Kuwait University's multi-billion dinar development venture, the new Sabah Al Salem University City in Shadadiya.

This high profile management responsibility was a challenging change from a purely academic environment. It called for some very fast learning.



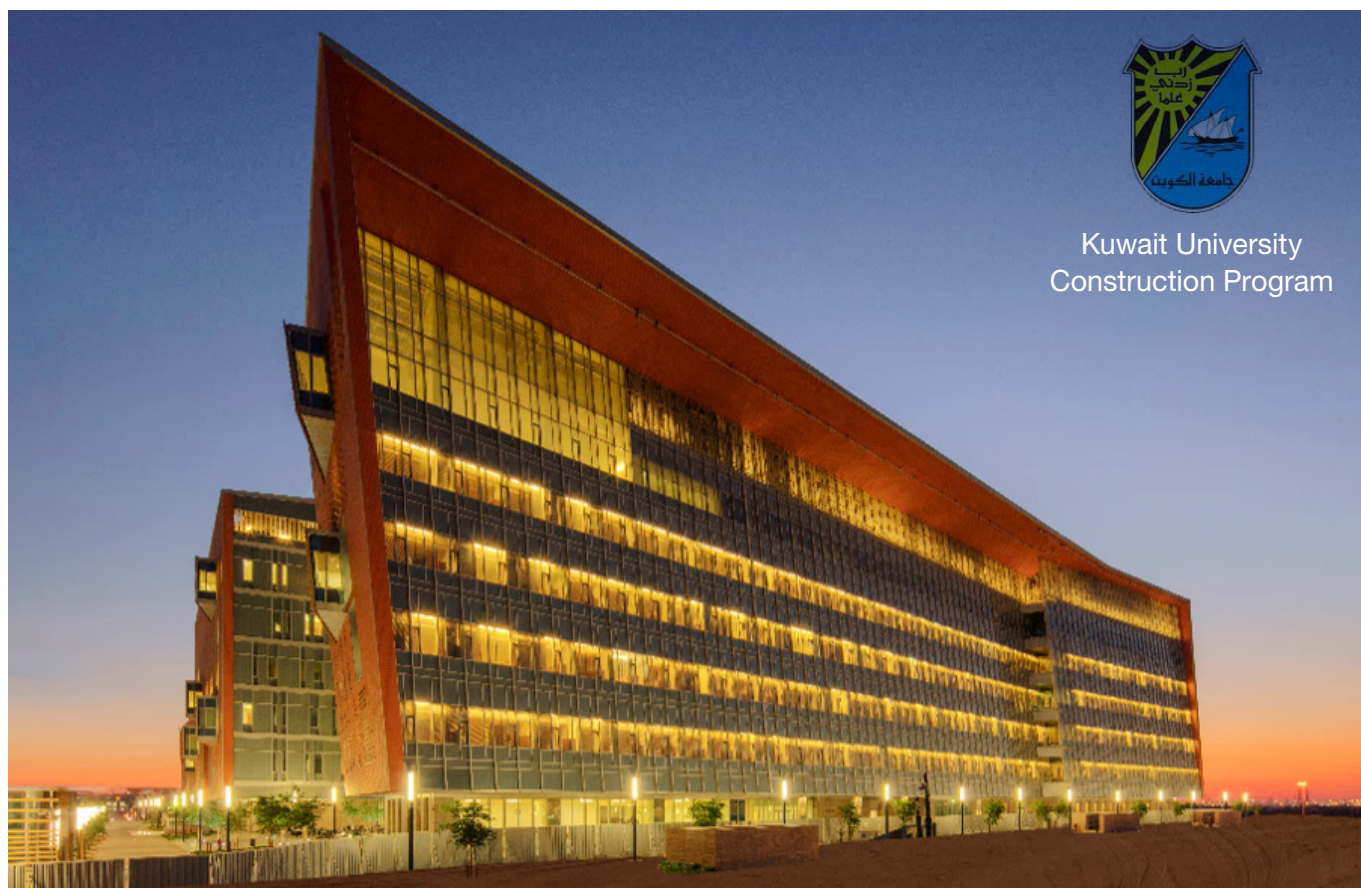
Execution of the major infrastructure works of the campus was in its inception, and construction of the College of Engineering and Petroleum commenced under her tenure as KUCP Director.

Dr. Rana attributes considerable personal development and professional growth to the 5 years as KUCP Director. It involved extensive interaction with various state agencies and prominent personalities, and all this occurred with extensive media coverage

throughout. The ensuring public exposure and a reputation for dedication, hard work and integrity brought her to national prominence and further important appointments.



New University City Campus at Shadadiya



Kuwait University
Construction Program

College of Engineering and Petroleum, Kuwait University

■ National Prominence



In 2014, she was appointed Assistant Undersecretary of Governmental Performance Follow-up Agency, and within two years was promoted to Deputy Head of this Agency. A year later, Dr. Rana became the first female Vice Chairman of Central Authority for Public Tenders (CAPT).

The next step was even more significant. In 2019 she was summoned to meet His Highness, Sheikh Sabah Al Khaled Al Hamad Al Sabah, the Prime Minister at that time. With no indication for the purpose of this meeting, her anxiety was understandable, and she



sought her father's advice. Knowing his Highness's reputation for kindness, honesty and sincerity, his advice to her was to not refuse to undertake whatever she was asked to do.

His Highness asked her to become the Minister of Public Works and Minister of State for Housing Welfare, and despite not having any political aspirations, she accepted this important responsibility. Shortly thereafter, in the next cabinet reshuffle, she was made Minister of Public Works and State Minister for Municipal Affairs, the first female to be appointed to this position. Further changes in her ministerial portfolios followed and each of these appointments was particularly significant. First came the change to Minister of Public Works and Minister of State for Communications and Information Technology Affairs, and shortly thereafter to Minister of State for both, Municipal Affairs as well as Communications and Information Technology Affairs, the portfolios she held till March 2022.



■ Sahel App

Early in 2021, His Highness Sheikh Sabah Khaled Al Hamad Al Sabah entrusted her with the responsibility to develop, enhance and launch the Sahel App. He gave her 6 months to develop a more inclusive digital medium compared to Kuwait Mobile ID App that was in use at the time.

With the help of some amazingly talented people, her dedicated guidance and cooperation with Public Authority for Civil Aviation, she delivered. This is for her, quite understandably, an achievement that she is very proud of. It is well known what the Sahel App is capable of. With over 2.5 million current users, and more than 73 million completed transactions, this powerful App's impacts are obvious. The facts listed here emphasise the significant efficiency, cost and environmental benefits achieved through Sahel's digitization efforts.



Total Services	: 411
Current Users	: Over 2.5 million
Completed Transactions	: Over 73 million
Car Trips Saved	: Over 36 million

- Impacted traffic congestion
- Lowered transportation related emissions
- Savings in trip costs
- Optimized government resources

■ Recognition

Interspersed throughout her wide ranging career are a number of awards and recognitions. One special one is her devotion to the international organization “Donate Life”. Dr. Rana donated a part of her liver to her late mother, and this is something she speaks about fondly and with a lot of pride.

While all this was going on, she also found time for academic research. As her professorship at KU continues, her latest solo research on optimal landfill selection through Applied GIS Analysis and Geotechnical Investigation has just been published. It has been credited with the rare Q1 status in the prestigious Annals of GIS publication.



■ Personal

Outside work, Dr. Rana is a person of many interests. She enjoys reading, and her other hobbies include scuba diving, photography and classic cars. She has quite a collection of the latter.

She is also a committed fan of England’s Chelsea Football Club.

Dr. Rana’s father leads a retired man’s happy life. Her sister Nada owns her own business and Lama is a Team Leader in Kuwait Petroleum Company. Her brother Abdulrahman is head of ICU at Amiri Hospital, and youngest sibling Fawaz is a writing instructor in the English Department of GUST.



■ ACI-KC Technical Activities and Site Visit

In line with the Chapter's mandate for organizing interesting technical activities, a number of well attended seminars and webinars were conducted during the year.

■ Seminar 1 : Advancing Construction Horizons

The subject of this seminar was by-lined Exploring Innovations and Challenges of 3D Concrete Printing.

Dr. Ahmed Al-Naseem, CEO of Abyan Building Construction Company conducted the seminar, which was held on Monday, 22nd January, 2024 at Kuwait Society of Engineers.

Dr. Al-Naseem delved into the convergence of innovative 3D automated construction technology and robust load-bearing wall design principles, focusing on integration of AC 509 standards and advanced methodologies emanating from ACI 318M design code.

■ Seminar 2 : Design Considerations for Reinforced and Non-reinforced Load-bearing Wall Systems

The seminar, held on 7th May, 2024 at Kuwait Society of Engineers expanded on the previous subject that Dr. Ahmed Al-Naseem covered in his earlier presentation. He elaborated on the importance of methods of 3D printing, and the impact of current trends and advancements in this field.

■ Webinar : "Curing is Good"

ACI Chapter Talks Webinars Program is a popular series of talks and presentations organized by American Concrete Institute. These webinars give ACI-Kuwait Chapter a valuable opportunity to enhance its technical activities program; and provides our members with important information on a wide range of concrete technology issues.

A webinar entitled 'Curing is Good' was held on 19th November, 2024, and the presentation was given by Mr. William Gold, Senior Engineer and Fellow of ACI, who has over 25 years of experience in concrete and construction chemicals industry. He is also the former Chairperson of ACI 440 on FRP Reinforcement of Concrete Structures. The webinar moderator from ACI Kuwait Chapter was Dr. Moetaz El-Hawary, Past President and Chairperson of the Technical Committee.

The technical focus of this presentation was on:

- Defining curing and related terms
- Recalling different curing methods
- Examining research findings on curing
- Reviewing minimum curing requirements from ACI, AASHTO, and Department of Transportation in various states in USA.
- Explaining curing timing in relation to construction activities

The webinar was accompanied by a random draw, in which one of Kuwait Chapter's attendees had the opportunity to select between three different prizes, worth up to US \$799.

■ 3D Concrete Printing Site Visit

The Social Committee of the ACI-KC has organized a visit to a 3D Concrete Printing Villa project at Al-Mutlaa City on Saturday the 3rd of February 2024. Dr. Ahmad Al-Naseem the CEO of Abyan Building Construction Company has explained 3D concrete printing and explained all the processes on a Villa project. The ACI-KC would like to thank Dr. Ahmad Al-Naseem for giving the opportunity to ACI-KC members to see this new technique.

■ Readymix Concrete : History

Pyramids to Burj Khalifa and Beyond.....

Concrete is the second most consumed material in the world after water. We encounter it almost everywhere and do not even think about it. Plain concrete has been known to humankind for more than 2000 years, and reinforced concrete as a composite material has been in use for over 170 years. It is such a common material and used so often that most engineers do not even think about it any depth.

■ History

It will, therefore, be interesting to take a short trip into its history and see where this material comes from, its origin and how it developed over the years giving rise to an incredible amount of purposeful and admirable structures.

6500BC:

The earliest recording of concrete like structures date back to 6500BC. Underground cisterns for storing water were built by Bedouin traders in the desert oases of Syria and Jordan. These still exist in those regions today.

3000BC:

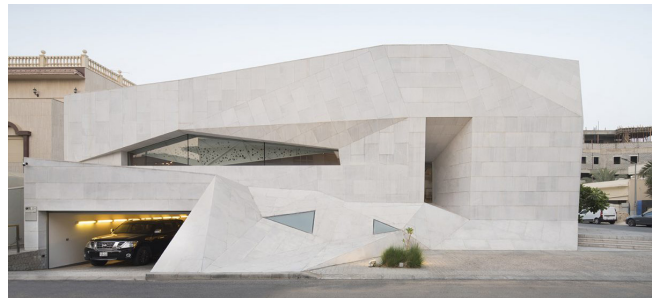
Ancient Egyptians used mud mixed with straw to bind dried bricks. They also used gypsum mortars and lime mortars in the the great pyramid Giza.

600BC:

The Greeks discovered a chemical reaction that changed the ways concrete could be used. By mixing a natural pozzolan which contained silica-alumina with lime they created concrete that would harden in air as well as under water.

300BC:

A form of cement was also used to build the great wall of China.



Pyramids of Egypt



Great Wall of China



Colosseum in Rome

200BC:

The Romans discovered a similar chemical reaction to the Greeks when they mixed volcanic, pozzolanic ash with lime.

They used a mixture of volcanic ash lime and sea water forming sturdier concrete which could also hold up when submerged in water.

They built the Colosseum in Rome about a third of which is still standing after more than 2000 years. The Romans successfully implemented use of concrete in the majority of their construction. Roman concrete has endured thousands of years of weathering

Middle Ages:

After the fall of Roman Empire in 476 AD the technique for making pozzolan cement was lost until the manuscript describing it was found in 1414. This rekindled the interest in building with concrete.

1700s:

Technology took a big leap forward in 1793 when John Smeaton discovered a more modern method for producing hydraulic lime for cement. He used limestone containing clay that was fired until it burned into clinker which was then ground into powder. His discovery was marketed as "Roman Cement". Historic Eddystone Lighthouse in England built using this cement stood for nearly 118 years (1759 – 1877).

1800s:

In 1824 Joseph Aspdin, considered father of the modern cement, invented "Portland Cement" by

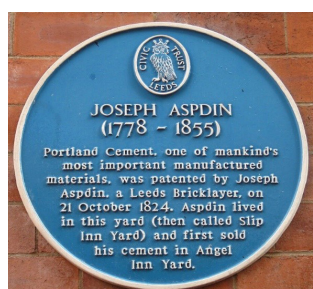


Eddystone Lighthouse in England

burning clay and limestone together until carbon dioxide was removed. He named the cement after the high-quality building stones quarried in Portland, England. Thames tunnel was the first large scale application of Portland cement.

1849:

Steel-reinforced concrete as we know it today, and which effectively combines the best of both i.e. compressive strength of normal concrete with tensile strength of steel, was invented by a French gardener Joseph Monier.



He was looking for a replacement for clay and wooden pots. He tried making concrete ones but they cracked. In an attempt to make them strong he came up with the idea of using simple iron structure which he then covered with concrete. The results surprisingly exceeded all expectations.

1853:

A French industrialist, Francois Coignet, was the first to construct a building made entirely of reinforced concrete in France.



1880s:

Process of prestressing steel was patented. Prestressing revolutionized the use of reinforced concrete allowing large spans in beam girders and slabs.

1890:

Concrete had a very short setting time. Workers had to mix small quantities to ensure that they can place the concrete before it sets. Addition of gypsum in cement while grinding clinker, was introduced in USA to control cement setting times.

Reinforced concrete subsequently boomed across the construction industry and it quickly became a material that found use in all types of structures.



1900s:

First reinforced concrete high-rise 16 story Ingalls Building in Cincinnati, USA, was constructed in 1903.

New Development

The first readymix concrete facility was established in Baltimore, USA in 1913. This development revolutionized the construction industry.

Therefore, just as production technology developed, with concrete being the essential element, its properties have also undergone tremendous evolution over the years. New grades have been created and the possibilities for use in various environments have expanded.



Ingalls Building, USA

By 2010 about 100 years later, heights of concrete structures have reached from 16 storeys (53M) in 1903, to the 163 floors (830M) world tallest tower, Burj Khalifa, in UAE.

However, to date, with all these advancements we do not expect reinforced concrete structures to last like those of plain concrete which lived for hundreds of years. This is simply because steel is prone to corrosion, hence causing early damage to the concrete. For corrosion free high strength durable structures, a new generation of glass fiber reinforced plastic (GFRP) rebars have more recently promoted as an alternative to steel reinforcements.



Burj Khalifa in UAE

■ The Future?

Concrete is so widely used and is such an easy to use material that we cannot expect its replacement soon. However, there will be more frequent optimization of concrete structures related to economical use of cement, which is significant contributor to the “ carbon footprint”. The future will undoubtedly lie in UPHC (ultra high performance concrete) which is already being experimented with and producing promising results for optimizing concrete structures.

Other new technologies and innovations are constantly emerging to improve sustainability. Smart cements and new additives are being developed some of which when used in concrete have important and positive impacts:

- Absorb carbon dioxide from the surrounding environment over their life time reducing carbon footprint of the building material.
- Help in producing self curing concrete and self-healing concrete which contain bacteria that repair or seal cracks when exposed to air and water.

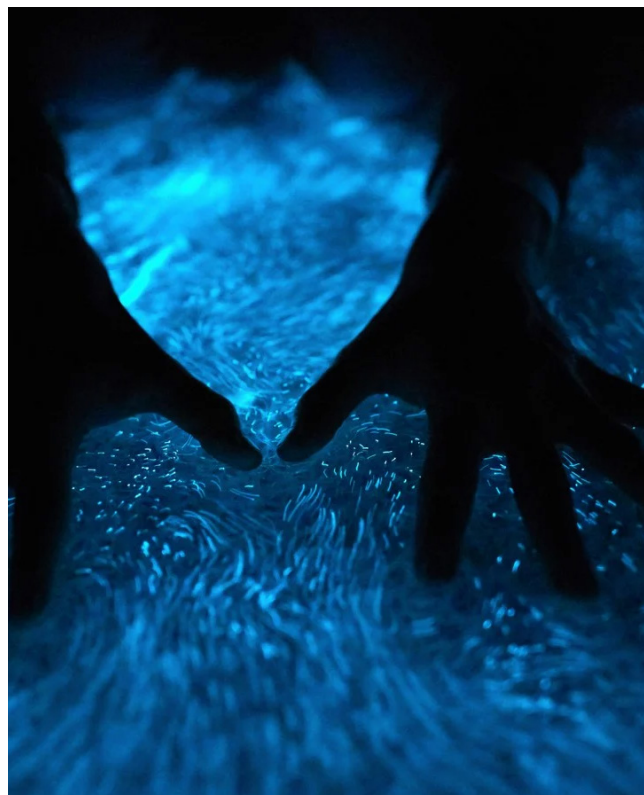
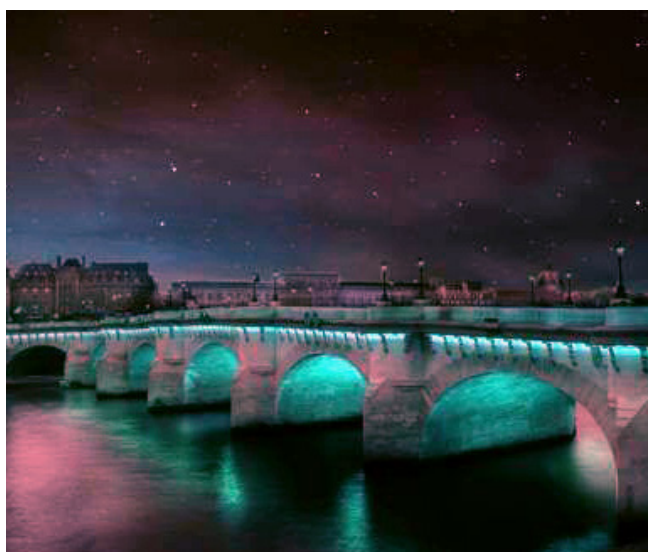


Translucent Concrete

Other very interesting and fascinating development work is also being done on:

- **Translucent concrete:** This cutting edge technology concrete contains fiber optics allowing light to transmit between layers. It is customizable, allowing designers and architects the ability to add transparency to structures depending how transparent the concrete is required.
- **Energy conducting concrete:** Lancaster University's professor Mohammed Saafi created a process to turn buildings, bridges and even lamp posts into batteries to decrease cost of energy through use of smart cement. It can potentially store and discharge 200-500 Watts per square meter.
- **Light-generating concrete:** Jose Carlos Rubio developed a new type of smart cement which can absorb solar energy during the day, and then emit light for approximately 12 hours. Many light generating concrete products emit blue or green light and its brightness level can also be adjusted. It is eco friendly commonly used on roadways, bridges and pathways to improve visibility and safety.

Seeing these continual innovations from Roman to modern cement, and the more recent smart cement with the developmental approach focussing on strength and durability, as well as sustainability, the future of concrete is brighter than the light it generates. Replacing it with another construction material in coming future appears to be almost impossible.



1930

Air entraining agents were introduced to improve concrete's resistance to freeze/thaw damage.

1936

First major concrete Hoover and Grand Coulee were built. They still exist today.

1970

Fiber reinforcement in concrete was introduced to counter shrinkage cracking.

1980

Superplasticizers were introduced as admixtures to improve concrete workability.

1985

Silica fume was introduced as pozzolanic additive to enhance concrete strength.

1988

Self Compacting Concrete was developed in Japan.

1997

New additive manufacturing processes were developed for 3D concrete printing mixture.

Article contributed by:

Mr. Abdul Wahab Rumani

■ ACI - KC Board of Directors

The Annual General Meeting of the American Concrete Institute - Kuwait Chapter was conducted on 19th June, 2023, and the new Board of Directors comprising the following elected members was confirmed for the 2023-2024 term :

President	:	Mr. Ghassan Alghawas
Vice President	:	Mr. Azizz Mammuji
Past President 1	:	Dr. Moetaz El-Hawary
Past President 2	:	Dr. Khaldoun Rahal
Director/Secretary	:	Mr. Mansoor Rao
Director/ Treasurer	:	Mr. Abdul Wahab Rumani
Director	:	Dr. Hasan Kamal
Director	:	Dr. Jafarali Parol
Director	:	Mr. Moath Al Manayes
Director	:	Ms. Dana Drobiova

■ About the Chapter

■ Chapter Committees

The Chapter's affairs and activities are executed through various Committees :

- Technical Committee
- Membership Committee
- Publication Committee
- Social Committee
- Nomination Committee
- ACI-KC Students ' Committee

Technical Committee

Chairperson : Dr. Moetaz El-Hawary

Roles and Responsibilities :

- Identifying technical topics of interest to Chapter Members and arranging seminars, short courses and workshops on various topics.
- Reviewing and submitting to Chapter Members, ACI International committee reports on subjects of relevance to Kuwait.
- Reviewing proposed revisions of ACI Standards and submitting comments to Chapter's Board of Directors for submission to ACI International.
- Serving objectives of the Chapter by organizing training courses and technical workshops.
- Promoting local research and testing programs to resolve technical issues of importance for durable concrete construction in Kuwait.

Students' Committee

Chairperson : Dr. Moetaz El-Hawary

Roles and Responsibilities :

- Activities are generally in line with ACI-Kuwait Chapter objectives.
- Encouraging student participation in all activities of ACI-Kuwait Chapter.
- Student participation guided and organized by an elected Board of Directors, and sub-committees appointed from within their membership.
- Activities include technical and social events, and further information can be found on www.ACIQ8.com.

Membership Committee

Chairperson : Mr. Mansoor Rao

Roles and Responsibilities :

- Recruiting new individual members and organizations.
- Issuing and renewing membership identity cards.
- Publishing and updating Chapter's membership directory.
- Facilitating interaction amongst members and communicating their concerns to the Board of Directors and other Committees.

Publication Committee

Chairperson : Mr. Azizz Mamuji

Roles and Responsibilities :

- Publishing periodic newsletters covering the Chapter's activities and providing general information of use to Chapter members.
- Printing and distributing copies of technical reports to Chapter members, as well as to interested individuals and concerned organizations.
- Preparing reports and Chapter news for publication in ACI's Concrete International magazine.

Social Committee

Chairperson : Ms. Dana Drobiova

Roles and Responsibilities :

- Organizing major annual Chapter events and programs for members.
- Organizing field trips to major construction projects and industries.
- Arranging participation of the Chapter in selected national events.

Nomination Committee

Chairperson : Mr. Azizz Mamuji

Roles and Responsibilities :

- Nominating individuals who have the interest, leadership qualities and willingness to serve the Chapter, for selection to the Board of Directors.
- Submits names, prior to the Chapter's Annual General Assembly, for election by members.



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