SOUVENIR
2026

59th ENGINEERS' DAY



Engineering Excellence for a Sustainable and Technologically Sovereign India

The Institution of Engineers (India)

(Established 1920, Incorporated by Royal Charter-1935)

Qatar Chapter

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The Institution of Engineers (India)
(Established 1920, Incorporated by Royal Charter-1935)
Qatar Chapter

CONTENTS

PAGE

1. Activities of IEI Qatar Chapter ---- 23
2. Code of Ethics for Corporate Members ---- 25
3. Executive Committee ---- 27
4. Ex. Officio Members ---- 28
5. Engg. Day Organizing Committee ---- 29
6. Womens wing Executive Committee ---- 30
7. Next-Generaion Building Management ---- 31
8. Dynamic Phase Balancing and Inverter Transformer Deployment in Kerala's Low ---- 35
9. Sustainable Outdoor Cooling for Public Realms ---- 39
10. Technical Seminar / Formation o NEF -26th Oct 2025 ---- 41
11. Technical Seminar - 7th Nov 2025 ---- 42
12. INTEGRATING MECHANICAL ENGINEERING, QA/QC AND HSE ---- 43
13. IEI Womens Wing, Health Talk - 14th Nov 2025 ---- 44
14. MECHANICAL ENGINEERING FOR A SUSTAINABLE FUTURE ---- 45
15. Feasibility and Economics of AI-Driven Management System Auditing ---- 47
16. Technical Webinar - 29th November 2025 ---- 48
17. Cryptography as the Silent Architecture of Digital Trust in Qatar ---- 49
18. Engineering Tomorrow: Women Engineers Chart the Course Toward a Smart and Sustainable Future 51
19. Reinforced Earth (RE) Walls ---- 55
20. Biometrics: The Constant in the World of Innovations ---- 57
21. The Invisible River: How Natural Gas Could Build the Cities of Tomorrow ---- 59
22. Technial Webinar -13th Dec 2025 ---- 60
23. Technial Seminar -28th Dec 2025 / Er. Dishari Roy Farewell (4th Jan-2026) ---- 61
24. Technial Webinar -17th Jan 2026 / Technial Webinar -15th Feb 2026 ---- 62
25. Lifting Plans ---- 63
26. Quality Engineering ---- 65
27. The Invisible Nervous ---- 67
28. Technial Webinar -31st MArch 2026 & 15th Feb 2026 ---- 68
29. Technical Webinar 25th April 2026 ---- 72
30. Modern Constuction Material ---- 73
31. International Labour day Health Awareness Session ---- 75
32. Happy Mothers Day - Womens Wing - Interactive Session ---- 77
33. Technical Webinar (5th June 2026) & 14th June 2026 ---- 78
34. Engineering the Future ---- 79
35. Where Small Details Meet Big Responsibility ---- 81
36. Technical Webinar 25th April 2026 ---- 82
37. AI as a Working Tool ---- 83
38. Technical Webinar - 2nd August 2026 ---- 84
39. From Primavera to Predicitve Planning ---- 85
40. Technical Webinar 25th April 2026 ---- 88
41. The New Pulse of Healthcare ---- 89
42. THE YOUNG ENGINEER IN THE AGE OF AI: SAME RESPONSIBILITY, NEW TOOLS ---- 91
43. Technical Webinar - 27th September 2026 ---- 92
44. Gandhi Jayanthi Celebration ---- 93
45. Round Table Discussion ---- 94
46. SAP's Autonomous Enterprise: Engineering the Future with Joule and AI Agents ---- 95
47. Technical Webinar - 11th October 2026 ---- 97
48. Farewell of Ambassodor & DCM ---- 98
49. Facility Management ---- 99
50. Factor of Safety ---- 101
51. Robotoc Engineering in Vascular Surgery ---- 103
52. Quality Does Not Slow the Project Down ---- 105
53. Strategic Procurement in as Era of Geopolitical Uncertainty ---- 107
54. Welcome Ambassodor ---- 109
55. Greet & Meet New Ambassodor ---- 110
56. Engineering Beyond the Grid ---- 111
57. Excom Meeting (Photos) ---- 115
58. IEI Participation IBPC Annual Meet ---- 116
59. AI-Enabled Cooling in Qatar: Advancing Climate Resilience, Energy Efficiency, and Human Health ---- 119
60. IEI Participation ---- 121
61. IEI Collaborating Partners ---- 122

INDEX

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Science is about knowing,
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HAPPY
ENGINEER'S DAY
15TH SEPTEMBER

The Institution of Engineers (India)

(Established 1920, Incorporated by Royal Charter-1935)

Qatar Chapter (Under the aegis of Embassy of India)



H.E. DR. K. SRIKAR REDDY

Ambassador of India

Ambassador

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MESSAGE

My best wishes to all the engineers on the occasion of 59th Engineers' Day. I am happy to note that The Institution of Engineers India (IEI) Qatar Chapter, since its inception in 1991, is celebrating the Engineers' Day as a tribute to the greatest Indian Engineer Bharat Ratna Sir Mokshagundam Visvesvaraya. This year's theme "Engineering Excellence for a Sustainable and Technologically Sovereign India" is very apt and relevant matching with the Government of India's Viksit Bharat-2047 vision.

I am glad that IEI Qatar Chapter, which is associated with The Embassy of India in Doha through the Indian Business and Professionals Council (IBPC) for over the 35 years, has been actively involved in organizing several technical activities, international engineering programs and various events which have contributed to the academic and professional development of the engineering fraternity in Qatar as a whole.

Over the 35 years, the IEI Qatar Chapter has been one of the most vibrant and dynamic overseas chapters of IEI. It has distinguished itself as a symbol of the strength of Indian Engineers in Qatar who are known for their professional excellence, innovation and dedication.

It makes me proud about the tremendous contribution made by Indian engineers in the diverse fields like construction, infrastructure development, Oil & Gas, Petrochemicals, IT and other domains as part of State of Qatar's development since many years. The export of engineering goods from India to Qatar, being one of the top 5 exports, plays an important role in the India-Qatar economic relations.

As we will be celebrating 58 years of full diplomatic relations between India and Qatar in 2026, I congratulate the Indian Engineers in Qatar for their relentless contribution in enhancing bridging and cementing the India-Qatar relations.

On this occasion of Engineers Day, I once again congratulate the Indian Engineers in Qatar and all members & office bearers of the IEI Qatar Chapter success in their future endeavors.

K. Srikar Reddy

(Dr. K. Srikar Reddy)


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58th Engineers Day Celebration

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58th Engineers Day Celebration





















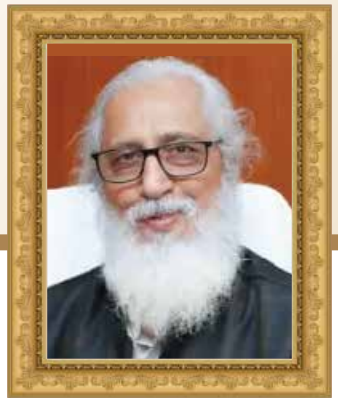

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MESSAGE

I am delighted to learn that the Qatar Chapter of the Institution of Engineers (India) is celebrating the 58th Engineers' Day on 10th October 2025, in honour of the 164th birth anniversary of Bharat Ratna Sir Mokshagundam Visvesvaraya - an engineering luminary and visionary statesman whose legacy continues to inspire generations of professionals.

This year's theme, *"Deep Tech & Engineering Excellence: Driving India's Techade,"* is both timely and forward-looking. As we navigate an era defined by transformative technologies-ranging from artificial intelligence and quantum computing to biotechnology and advanced materials-deep tech is reshaping industries and offering innovative solutions to global challenges. To truly harness the potential of India's Techade, it is essential to invest in frontier research, champion engineering excellence, and cultivate talent across all strata of society. Building inclusive and resilient ecosystems will be key to sustaining innovation and driving progress.

The Qatar Chapter of IEI stands as a shining example of these values, consistently fostering knowledge exchange, professional growth, and collaborative spirit among engineers and the wider technical community in Qatar. Their unwavering commitment to excellence and community engagement is deeply commendable.

I am confident that this celebration will serve as a catalyst for renewed dedication to engineering innovation, sustainability, and societal advancement.

I wish the event resounding success and convey my heartfelt greetings to all members and organizers of the Qatar Chapter of IEI.

Best Regards,

(Prof. Anil D. Sahasrabudhe)

Date: 24th Sep., 2025
Place: New Delhi



Er. Manish Mahendra Kothari, FIE
President, IEI India

The Institution of Engineers (India)

AN ISO 9001: 2015 CERTIFIED ORGANISATION
(ESTABLISHED 1920, INCORPORATED BY ROYAL CHARTER 1935)

Er Manish Mahendra Kothari, FIE
President

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A Century of Service to the Nation

MESSAGE

It is a privilege to extend my warmest greetings and heartfelt congratulations to the Qatar Chapter of The Institution of Engineers (India) on the occasion of the 59th Engineer's Day and the release of your distinguished Technical Souvenir. Since its inception in 1991 under the aegis of the Indian Business Professional Council and with the endorsement of the Embassy of India, the IEI Qatar Chapter has cultivated an admirable legacy. By fostering innovation and uniting a vibrant diaspora of talented professionals, you have firmly established yourselves as a vital hub of engineering excellence in the region.

This year's theme, *"Engineering Excellence for a Sustainable and Technologically Sovereign India"*, is both timely and profound, underscoring the dual mission of today's engineers: advancing technological self-reliance while safeguarding the planet for future generations. As India continues its rapid ascent on the global stage, the engineering fraternity stands as the literal and metaphorical architects of this transformation, with expertise across critical sectors—including oil and gas, infrastructure, and green technology—playing a monumental role in shaping a resilient and self-reliant nation. Living and working in Qatar, you embody a unique bridge between two dynamic nations, exchanging knowledge and spearheading developments that transcend borders. This Technical Souvenir is a testament to that collective intellect, offering a valuable platform for sharing breakthroughs and forward-thinking ideas, and I am confident that the contributions contained within these pages will inspire new benchmarks of innovation and collaboration.

I commend the leadership and members of the IEI Qatar Chapter for their unwavering dedication to elevating the engineering profession. May your Engineer's Day celebrations be a resounding success, and may you continue to break new ground in your pursuit of engineering excellence.

Er. Manish M. Kothari, FIE
President
The Institution of Engineers (India)

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Dr. Ashishsingh Dixit
Secretary & Director General, IEI India

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A Century of Service to the Nation

Date: 16.09.2026

Message

It gives me immense pleasure to extend my warm greetings and best wishes to the **IEI Qatar Chapter** on the occasion of the **59th Engineers' Day**, being celebrated on **17 October 2026**, with the theme **"Engineering Excellence for a Sustainable and Technologically Sovereign INDIA."**

Engineers have always played a pivotal role in shaping the nation's progress through innovation, technological advancement and the application of engineering knowledge for the betterment of society. The theme of this year's Engineers' Day aptly highlights the need to pursue excellence while fostering sustainable development and strengthening India's technological capabilities.

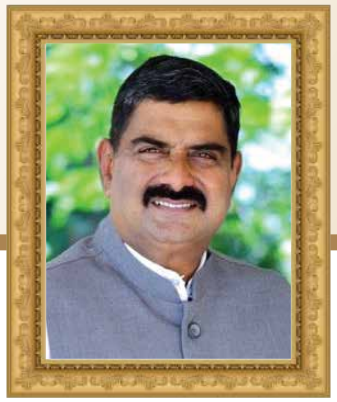
The **Qatar Chapter of The Institution of Engineers (India)**, since its inception in 1991, has been making valuable contributions towards strengthening professional interaction, knowledge sharing and fellowship among engineers and engineering professionals in Qatar. The Chapter's continued efforts in organising technical programmes and celebrating Engineers' Day provide an important platform for professional exchange and for highlighting the contributions of the engineering fraternity.

I am confident that the Technical Souvenir being brought out on this occasion, comprising valuable technical articles and professional contributions, will serve as a useful source of knowledge and encourage engineers to explore innovative solutions to the technological and sustainability challenges of our times.

I commend the office bearers and members of the **IEI Qatar Chapter** for their continued commitment and initiative in promoting engineering excellence and professional development. I also extend my appreciation to all contributors to the Technical Souvenir.

On this auspicious occasion, I convey my sincere greetings to the entire engineering fraternity in Qatar and wish the **59th Engineers' Day celebration** every success.

Dr. Ashishsingh Dixit
Secretary & Director General



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President,
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INDIAN SOCIETY FOR TECHNICAL EDUCATION
(Under the Societies' Registration Act XXI of 1860)

MESSAGE

It gives me immense pleasure to extend my warm greetings to the **Qatar Chapter of The Institution of Engineers (India)** on the occasion of the **59th Engineer's Day**, to be celebrated on 17 October 2026. The theme of this year's Engineer's Day, **"Engineering Excellence for a Sustainable and Technologically Sovereign INDIA,"** is particularly significant.

The publication of this **Technical Souvenir** is a proud moment for the Chapter. The valuable contributions from eminent professionals and engineering experts provide an excellent platform for sharing knowledge, experiences, innovations, and perspectives on contemporary engineering challenges and opportunities.

I extend my sincere appreciation to the office bearers, members, contributors, and organizing team for their dedicated efforts and wish the **59th Engineer's Day celebrations** every success.

May the engineering fraternity continue to inspire innovation, nurture young talent, and contribute meaningfully towards building a sustainable, technologically advanced, and self-reliant India.

My best wishes to the Qatar Chapter of IEI and the entire engineering community for a memorable and successful Engineer's Day 2026.

(Pratapsinh K. Desai)

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J K MENON

CHAIRMAN - IBPC, Qatar & ABN CORPORATION
Director – NORKA Roots

IBPC QATAR INDIAN BUSINESS & PROFESSIONALS COUNCIL | Under the Aegis of Embassy of India

"On the Occasion of the 59th Engineers' Day 2026"

It gives me immense pleasure to extend my warm greetings and best wishes to **The Institution of Engineers (India), Qatar Chapter**, and to the entire engineering fraternity on the occasion of the **59th Engineers' Day 2026**.

This year's theme, **"Engineering Excellence for a Sustainable and Technologically Sovereign India,"** is both timely and inspiring. It reflects the pivotal role engineers play in shaping a future where technological advancement and environmental responsibility move hand in hand.

India is entering an exciting era of technological transformation. Pioneering areas such as **hydrogen technologies, advanced biofuels, artificial intelligence and data-driven solutions, renewable energy, smart infrastructure, and carbon-conscious design** are opening new pathways towards a resilient and sustainable economy. The challenge before us is not simplify to innovate, but to innovate responsibly—ensuring that progress remains inclusive, resource-efficient, environmentally conscious, and beneficial to generations to come.
Engineering excellence today must therefore be measured not by what we can build, but based on how sustainable it can be, how to use the resources efficiently, and how to protect our environment responsibly. The principles of circularity, energy efficiency, decarburization, sustainable materials, and climate-conscious design must increasingly become integral to every engineering decision.

Technological sovereignty further strengthens this vision. Developing indigenous capabilities, nurturing research and innovation, strengthening engineering talent, and creating globally competitive technologies will enable India to address its own challenges while contributing solutions with value to the world.

The **Indian Business & Professionals Council (IBPC), Qatar** deeply values the contribution of Indian engineers and professionals to the development of Qatar and to the advancement of India. The strong bonds between India and Qatar provide a meaningful platform for sharing knowledge, expertise, innovation, and sustainable practices. I am confident that greater collaboration between institutions, industry, academia, and professionals across both nations can accelerate the journey towards a cleaner, smarter, and more sustainable future.

On this significant occasion, I commend **The Institution of Engineers (India), Qatar Chapter** for its continued commitment to professional excellence, knowledge sharing, and the advancement of engineering values. May our engineers continue to think boldly, innovate responsibly, and lead with purpose.

Let us embrace a future where **engineering excellence serves humanity, technology respects nature, and innovation creates sustainable prosperity**.

I wish the Institution of Engineers (India), Qatar Chapter, and all engineers a very **Happy 59th Engineers' Day 2026**.

May we engineer a sustainable future, strengthen technological self-reliance, and build a better world for generations to come.

Warm Regards,
J K Menon
Chairman - ABN Corporation & IBPC - Qatar
Director - NORKA Roots



Thaha Muhammed Abdul Kareem
President, IBPC

IBPC INDIAN BUSINESS & PROFESSIONALS COUNCIL QATAR | Under the Aegis of Embassy of India

Date: 05 October 2026
Ref: IBPC/542/IEI/EDC/1053

I am pleased to learn that The Institution of Engineers (India) Qatar Chapter is celebrating the 59th Engineers Day Celebration being held on 17th October 2026 which is observed every year on the birth anniversary of Sir Mokshagundam Visvesvraya, a Bharat Ratna recipient and legendary engineer who dedicated his life to India's development.

I understand that the theme of the occasion is "Engineering Excellence for a Sustainable and Technologically Sovereign India". I am confident that the topic will provide an opportunity to members of the Institution of Engineers (India), and to those engineers who are residing anywhere in the world, to exchange ideas and deliberate on the subject while observing the 166th birth anniversary of Bharat Ratna Sir M. Visvesvaraya.

I wish the event a grand success.

Sincerely

Thaha Muhammed Abdul Kareem
President

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Dr. S.M. Ali

Executive Secretary, ISTE

ISTE

भारतीय तकनीकी शिक्षा संस्था

MESSAGE

It gives me immense pleasure to extend my warm greetings to the Qatar Chapter of The Institution of Engineers (India) [IEI] on the occasion of the **59th Engineer's Day,** to be celebrated on 17 October 2026. The theme of the celebration**, "Engineering Excellence for a Sustainable and Technologically Sovereign INDIA,"** reflects the important role of engineers in shaping the future of our nation.

The publication of this **Technical Souvenir** is a proud moment for the Chapter. The valuable contributions from eminent professionals and engineering experts provide an excellent platform for sharing knowledge, experiences, innovations, and perspectives on contemporary engineering challenges and opportunities.

I sincerely appreciate the efforts of all contributors, members, office bearers, and volunteers whose dedication has made this publication and the Engineer's Day celebrations possible. I am confident that the Qatar Chapter will continue to serve as a bridge for professional collaboration, knowledge sharing, and excellence in engineering.

On this special occasion, I convey my heartfelt wishes to all engineers and their families for continued success and fulfillment.

(Executive Secretary)

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Ahmad Jassim Jolo

Federation of Global Engineers, President

Date: 11th October 2026

Ref: FGE/IEIQC/2026/L0011

It is immense pleasure to learn that the Qatar Chapter of The Institution of Engineers (India) is celebrating the 59th Engineers' Day on 18th October 2026 and that a Souvenir is being brought out to commemorate the occasion.

I understand that the theme of the occasion is "Engineering Excellencefor a Sustainable and Technologically Sovereign India". I am confident that the topic will provide an opportunity to members of the Institution of Engineers (India), and to those engineers who are residing anywhere in the world, to exchange ideas and deliberate on the subject while observing the 166 birth anniversary of Bharat Ratna Sir M. Visvesvaraya.

i wish the celebration a great success and convey my good wishes to all members of the institution of Engineers (India) as well.

Sincerely

Ahmad Jassim Jolo

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Er. Abdul Sathar. FIE
P.Eng., B.Sc, MA, C.Eng(I), MIETE, MBA, ADCHE, PGDPM & IR
Hon. Chairman
The Institution of Engineers (India), Qatar Chapter

CHAIRMAN'S MESSAGE

Celebrations of Engineers' Day across the world provide an opportunity to honour the remarkable contributions of the engineering fraternity, reflect on the achievements of the past, and envision a future inspired by the ideals and vision of the revered Bharat Ratna Sir M. Visvesvaraya.

It gives me immense pride and privilege to share this message from Doha, Qatar, on the occasion of the 59th Engineers' Day.

The Institution of Engineers (India) – Qatar Chapter is delighted to publish this Technical Souvenir commemorating the birth anniversary of Bharat Ratna Sir M. Visvesvaraya, the legendary engineer and visionary whose innovative thinking and outstanding contributions transformed the approach to engineering, infrastructure development and public welfare. His enduring legacy continues to inspire generations of engineers to pursue excellence, innovation and service to society.

The theme chosen for this year's celebration, "Engineering Excellence for a Sustainable and Technologically Sovereign India," is highly relevant in the present era. As India advances towards becoming a globally competitive, technologically self-reliant and sustainable nation, engineers have a vital role to play in translating this vision into reality.

Innovation is the driving force of progress, and engineers are at the forefront of this transformation. Throughout history, engineering breakthroughs have challenged conventional thinking, reshaped industries and improved the quality of human life. Today, our responsibilities extend beyond designing structures and developing technologies; they encompass addressing critical societal challenges, protecting the environment, improving healthcare, strengthening agriculture, optimizing natural resources and advancing skill development.

Particular attention must be given to the challenges faced by farmers. Agricultural productivity, efficient crop preservation, affordable mechanization, water management and climate-resilient farming have become increasingly important. Industrialization has also contributed to labour shortages in agriculture, while global warming and unpredictable rainfall have created additional challenges for farming communities.

These challenges present significant opportunities for engineers to develop practical, affordable and innovative solutions. Smart irrigation, precision agriculture, renewable-energy-powered farming, AI-enabled crop monitoring and improved post-harvest storage can help enhance productivity, reduce waste and strengthen rural livelihoods. Our engineering solutions must be designed with the needs of ordinary people, especially those at the grassroots level, firmly in mind. The development of people is the true foundation of national development.

Engineers' Day is not merely a day of celebration; it is an occasion for reflection, responsibility and renewed commitment to our noble profession. Every engineer should take pride in contributing knowledge, creativity and integrity towards building a safer, more prosperous and sustainable society.

On this special occasion, I extend my sincere gratitude to all our well-wishers, sponsors, professional associates and supporters whose encouragement and cooperation have enabled the IEI Qatar Chapter to continue its activities as a vibrant professional engineering body in Qatar.

I warmly congratulate all fellow engineers on the occasion of the 59th Engineers' Day and wish the engineering fraternity continued success in its pursuit of excellence, innovation and service to humanity.

May the ideals of Sir M. Visvesvaraya continue to guide us in building a sustainable, technologically empowered and prosperous future for India and the world.

Er. Abdul Sathar. FIE, P.Eng, MBA

World Telecom Day Celebration 2026

Saturday 19th May, Al Majlis Hall, Oryx University













CONGRATULATORY MESSAGE

Celebrating the 59th Engineering Day, the 167th Birth Anniversary of Bharat Ratna Sir M. Visvesvaraya, and 35 Years of IEI Qatar Chapter



Er. ABDUL DEWALE MOHAMMED (ADM)

Founder & Group Chairman, AASGON & GSEF
Architect: GS-IDF & GSSDC
Author: The Honest Global South

On behalf of the Governing Councils of AASGON and GSEF, I extend our warmest congratulations to the Council, Board, leadership and members of the Institution of Engineers (India) — Qatar Chapter on the occasion of the 59th Engineering Day, commemorating the 167th birth anniversary of Bharat Ratna Sir Mokshagundam Visvesvaraya, one of India's most distinguished engineers, nation-builders and advocates of engineering excellence.

I am particularly honoured to join the Council, Board and members of the Qatar Chapter in celebrating another significant milestone — 35 years of the establishment of the Institution of Engineers (India) Qatar Chapter, established in July 1991 as an overseas chapter in the State of Qatar, serving Indian engineers residing and practising the engineering profession in Qatar.

The Chapter's jurisdiction encompasses the geographical boundaries of the State of Qatar, and its longstanding association with the Embassy of India in Qatar, under the patronage of the Ambassador of India, reflects the important role it has played in fostering professional excellence, engineering cooperation and the advancement of the engineering profession.

Advancing Engineering Through Knowledge and Professional Exchange

The aims and objectives of the Qatar Chapter — particularly the promotion of the general advancement of engineering and the facilitation of the exchange of professional opinions, knowledge and ideas among its members — remain highly relevant to the rapidly changing technological and development environment of our time.

Over the past 35 years, the Chapter has provided an important professional platform for engineers to learn, exchange knowledge, strengthen professional relationships and contribute their expertise to Qatar's development, while maintaining strong links with the wider engineering community of India.

The achievements of the Chapter demonstrate the enduring value of professional institutions that create opportunities for engineers to connect their knowledge and experience with the needs of society.

Engineering and the Transformation of the Global South

As the world confronts increasingly complex challenges — including infrastructure deficits, energy security, climate change, food security, digital transformation, industrialisation and the need to create productive employment for a growing young population — the engineering profession has an increasingly important role to play.

Engineering is not only about designing structures, machines and systems. It is about turning knowledge into capability, capability into productive capacity, and productive capacity into value and improved quality of life.

It is in this context that AASGON and GSEF are particularly pleased to associate ourselves with the Institution of Engineers (India), Qatar Chapter, and to recognise its contribution over three and a half decades to strengthening the engineering profession and facilitating professional cooperation.

The emergence of the Global South Engineers Association (GSEA) as one of the specialised ecosystems of the Global South Integrated Development Framework (GS-IDF) further reflects our shared conviction that the engineering capabilities of the Global South must be better connected to universities, research institutions, governments, industry, investors, development-finance institutions and communities. The challenge before the Global South is not simply a shortage of resources. It is also the need to strengthen the institutional connections through which existing knowledge, skills, technology and professional expertise can be transformed into productive power.

Honouring the Legacy of Sir M. Visvesvaraya

The legacy of Bharat Ratna Sir M. Visvesvaraya provides an enduring reminder of the contribution that engineering can make to nation-building, infrastructure development, industrial advancement and human progress.

His life and work represent the values of discipline, knowledge, innovation, professional excellence, public service and nation-building — values that remain fundamental to the engineering profession today.

As we commemorate his 167th birth anniversary, we should also reflect on the responsibility of today's engineers to prepare the foundations upon which future generations will build.

Looking to the Future

The 35th anniversary of the IEI Qatar Chapter is therefore not only an occasion to celebrate the past. It is an opportunity to look towards the future.

We encourage the Chapter to continue strengthening its role as a platform for:

- Professional excellence and ethical engineering;
- Knowledge and technology exchange;
- Engineering education and lifelong professional development;
- Research, innovation and technology transfer;
- Young engineer development and mentorship;
- International and South-South engineering cooperation;
- Engineering solutions for sustainable development; and
-Stronger engagement between engineers, industry, government, academia and society.

AASGON and GSEF are pleased to associate with the Chapter and recognise its 35 years of service, professional achievement and contribution to the engineering community in Qatar.

We look forward to continued opportunities for collaboration and to strengthening the connections between the engineering communities of India, Qatar and the wider Global South.

Our Warmest Congratulations

Once again, I extend my sincere congratulations to the Council, Board, office-bearers, past leaders and all members of the Institution of Engineers (India), Qatar Chapter on:

The 59th Engineering Day;

The 167th Birth Anniversary of Bharat Ratna Sir M. Visvesvaraya; and

The 35th Anniversary of the Establishment of the IEI Qatar Chapter.

May the Chapter continue to grow from strength to strength and inspire generations of engineers to use knowledge, innovation, professionalism and service to build a more productive, resilient and prosperous future.

Congratulations and best wishes for many more years of distinguished service to the engineering profession and to society.

World Telecom Day Celebration 2026

Saturday 19th May, Al Majlis Hall, Oryx University









IEI Qatar marks Information Society Day

The Institution of Engineers India (IEI) Qatar Chapter marked World Telecommunication and Information Society Day (WTISD) 2026 with a hybrid event in Doha on May 19, bringing together over 150 engineers, academics, industry leaders and students.

The event, themed 'Digital Lifelines: Strengthening Resilience in a Connected World' and in association with Oryx University and in partnership with Liverpool John Moores University, focused on digital transformation, artificial intelligence (AI), connectivity, inclusion and the future of resilient communication networks.

IEI Qatar Chapter chairman Abdul Sattar said the programme reflected the Institution's commitment to promoting awareness, education and empowerment through technology. He noted that the event provided a platform for experts and professionals to exchange ideas, discuss challenges and explore innovations for the benefit of the engineering community.

Chief guest Sandeep Kumar, deputy chief of mission at the Embassy of India, highlighted the importance of international collaboration in advancing digital transformation and AI, while Ghana's Ambassador Mohammed N Imaala stressed the role of technology in promoting inclusion, sustainable development and equal opportunities.

The keynote address was delivered by Shailesh CEO Cyril Anand, who spoke on "Building Networks for Infinite We Haven't Imagined Yet." He emphasised the need for adaptive and resilient communication networks capable of responding to future global challenges, highlighting the role of satellite connectivity and next-generation technologies in strengthening digital infrastructure.

A video message from International Telecommunication Union secretary-general Doreen Bogdan-Martin underscored the importance of connectivity in building sustainable and inclusive societies.

Other speakers discussed the role of telecommunications, AI and digital innovation in driving economic growth, healthcare advancement and social development.

Highlights included the "Digital Lifelines: One Minute, One Digital Shift" initiative led by the IEI Women's Qatar Chapter, promoting digital literacy and leadership among women in STEM, and a student presentation by Noble International School on future habitats for Mars.

The event concluded with remarks by Oryx University vice-president for academic affairs Prof Naidoo, who said the Institution with Qatar National Vision 2030 and underscored the importance of ensuring that technological progress remains inclusive, accessible and beneficial to all.

















The Institution of Engineers (India)
(Established 1920, Incorporated by Royal Charter-1935)
Qatar Chapter
(Under the aegis of Embassy of India) (Licensed with Qatar Financial Center (QFC)



Er. Abdul Zameer Ahamed Sab (FIEI, CEng(I), MIEI)
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MASHRAE, MASPE, MISHRAE, CMLEAN, MIEAust, APEC Engineer IntPE(AUS)
Honorary Secretary - Institution of Engineers India- Qatar Chapter

ACTIVITIES OF IEI QATAR CHAPTER FOR THE YEAR 2025-2026

I, Abdul Zameer Ahamed Sab-Honourable General Secretary for IEI Qatar Chapter wants to share a brief Introduction to Institute of Engineers (India) and the IEI Qatar Chapter including the overall activities on the historic 59th Engineers Day celebration on 17th October, 2026.

Introduction: The Institute of Engineers (India), registered under the Indian Companies Act, 1913 and formally inaugurated in the year 1921 by Lord Chelmsford. Who was then the Viceroy and Governor General of India. IEI was granted the Royal Charter of Incorporation by His Majesty the King George V of England in 1935. The main objective was "to promote and advance the science, practise and business of engineering in all of its branches in India." Now The Institute of Engineers India is a unique professional body having the track record of biggest community for Engineers, it's been a matter of pride for all engineers.

IEI Qatar Chapter: The council of Institute of Engineers (India) established an overseas chapter in the State of Qatar in July 1991 for the benefits of its members residing and practising engineering profession in Qatar. The IEI Qatar chapter under the aegis of the Indian Embassy in Qatar and is registered under the umbrella of Indian Business and Professional Council (IBPC).

The chapter is rendering excellent professional services to the engineering community of Qatar across all disciplines for past 36 years. One of the highlights of the IEI Qatar Chapter is the regular technical seminars and webinars focussing on engineering across different disciplines. The monthly meetings with the Executive committee members and the workshops conducted for the member engineers to broaden their knowledge and expertise in various fields. Proudly to mention the chapter provides a platform for technical interactions with expert leaders in the industry to share their insights for continuous professional development of the engineering community in Qatar. The signing of MOU's with other institutions and organizations in Qatar has really helped to develop a cross culture knowledge sharing platform. Apart from this, IEI Qatar Chapter provides support to the Engineers in Qatar to become Corporate members, Chartered Engineers and Professional Engineers in IEI and to be Fellow members of IEI knows as (FIEI).

On the occasion of 59th Engineers Day celebration on 17th Oct 2026, the Insitution of Engineers Qatar chapter records its appreciation to the services offered by the Indian Embassy officials and IBPC for their support.

As I take the privilege of presenting the activities for the 59th Engineers Day Celebration, I will walk you through the major accomplishments and knowledge sharing initiatives—including seminars, webinars, and professional talks—that have taken place since last year's Engineers Day held on 10 October 2025

"I would like to extend my sincere appreciation to all IEI Fellow Members, Executive Committee Members, Core Committee Members, and every volunteer whose dedication and support have enabled the IEI Qatar Chapter to reach this remarkable level of success.

The list of activities held after 58th Engineers Day (10th October 2025) are as follows:

1	10th Oct 2025	58th Engineers Day
2	26th Oct 2025	Additive Manufacturing
3	26th Oct 2025	Formation of NextGen Engineers Forum
4	7th Nov 2025	Qatar Sustainability Week
5	14th Nov 2025	IEI WW – Health Talk at KIMS Hospital
6	17th Nov 2025	IEI Participation for Monday Bites with IBPC
7	29th Nov 2025	AI Cybersecurity – Double edged Sword
8	13th Dec 2025	Value Engineering
9	28th Dec 2025	Powering the Future – Green Initiative
10	4th Jan 2026	Farewell Party- Er. Dishari Roy
11	17th Jan 2026	AI in Cybersecurity - GRC
12	15th Feb 2026	Data Privacy in the Digital Age
13	31st Mar 2026	Green Energy Movement
14	11th Apr 2026	Connected Intelligence
15	22nd Apr 2026	Earth day Celebration
16	25th Apr 2026	Next Generation Thermo Electric Materials
17	26th Apr 2026	EARTHNA Meeting with Qatar Foundation
18	30th Apr 2026	International Labour Day with Indian Doctors Club at Olive International School
19	9th May 2026	IEI WW – Mothers Day
20	17th May 2026	International Telecom and Information Society Day
21	5th June 2026	World Environment Day
22	14th June 2026	Enterprise AI Governance
23	23rd June 2026	International Women's Engineering Day
24	31st July 2026	37th Foundation Day of IEI Qatar Chapter
25	22nd Aug 2026	Theme Webinar – 59th Engineers Day
26	5th Sep 2026	Modern Engineering
27	9th Sep 2026	Royal Charter Day
28	27th Sep 2026	AI Driven Engineering with SRM University
29	2nd Oct 2026	Gandhi Jayanthi Day
30	8th Oct 2026	IEI WW Round Table Session
31	11th Oct 2026	AI Vigilance for Industrial Safety

Why Join IEI?

When you join The Institution of Engineers (India), you are instantly connected to the largest and most diverse professional engineering body in India. In fact, IEI has more than 500,000 members working across all fields of engineering around the world.

Become a part of the IEI family and you gain access to a vast network of potential friends, colleagues and mentors.

With industry leading programs and resources, membership is a tremendous asset for any engineer working in India and abroad. Apply now to gain access to the people, places and promote your career, and life, deserves.

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Honorary Life Fellow (HLF)

Corporate
Fellow (FIE)
Member (MIE)
Associate Member (AMIE)

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Student Member (SMIE)
Member Technologist (MTIE)
Associate Member Technologist (AMTIE)
Senior Technician (Sr Tech IE)
Institutional Member (IM)

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Scan the Barcode to learn more and be a part of our family.

IEI Qatar Chapter

The council of the Institution of the Engineers of India established on an overseas chapter in the State of Qatar in the Arabian Gulf in July 1991 for the benefit of its members residing and practicing engineering profession in Qatar. The jurisdiction of the Qatar Chapter shall be the geographical boundaries of the State of Qatar. The Qatar Chapter operates under the sponsorship of the Indian Embassy in Qatar and under the patronage of the Ambassador of India.

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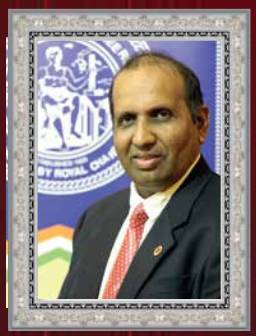

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Next-Generation Building Management:

AI and IoT-Driven Optimisation for Sustainable Performance



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Introduction

Buildings are central to modern life, yet they account for approximately 30% of global energy demand and are responsible for nearly 40% of energy-related carbon emissions, making the sector critical to climate mitigation and global sustainability efforts. As building owners and operators pursue energy efficiency, lower carbon emissions, resource optimisation, improved indoor air quality, and occupant well-being, conventional approaches to building management are increasingly being challenged.

Next-generation Building Management System (BMS) integrates Internet of Things (IoT), Artificial Intelligence (AI), cloud computing, Digital Twins, and building automation with existing facility equipment to create more connected, intelligent, and sustainable buildings. This convergence moves buildings beyond conventional BMS toward predictive, adaptive, and continuously optimised performance, with the potential to improve energy efficiency, operational resilience, autonomous control, and occupant comfort.

The Need for AI-Driven, IoT-Enabled BMS

A conventional BMS centrally monitors and controls HVAC, lighting, pumps, electrical, fire, and other MEP services using mainly on-premises architecture, wired connections, fixed schedules, and predefined rules and setpoints. This can increase manual intervention and make modifications more dependent on additional wiring, hardware, and controller reconfiguration. Limited analytics and fixed control logic may also reduce responsiveness to changes in occupancy, weather, indoor conditions, and actual building demand.

AI Driven IoT- enabled BMS shifts this rule-based, reactive model toward a connected, data-driven approach with the following capabilities:

- **Energy Savings:** 30-50% reduction in HVAC and lighting energy and operating costs through AI-based optimisation and control.
- **Remote Access and Visibility:** Real-time monitoring, control, trends, and energy analytics via web/mobile access.
- **Comfort and IAQ:** Zone-level comfort control, continuous indoor air-quality monitoring, and demand-based ventilation.
- **Wireless and Scalable Retrofit:** Wireless sensors and controls simplify installation, expansion, and retrofit with less cabling and disruption.
- **AI-Powered Predictive Operation:** Uses real-time data and AI to detect patterns, identify faults, predict performance issues, and support proactive maintenance and optimisation.
- **Adaptive Control:** Continuously adjusts operation based on occupancy, weather, indoor conditions, and actual demand.
- **Sustainability and Standards:** ASHRAE-aligned HVAC sequences can support WELL, LEED v4, and carbon-reduction objectives.

Smart BMS Architecture

The smart BMS architecture comprises four layers - Sensing, Field Automation, Gateway, and Cloud - that work together for real-time data collection, automation, monitoring, and intelligent control. These layers support HVAC optimisation, energy management, predictive operation, and occupant comfort.

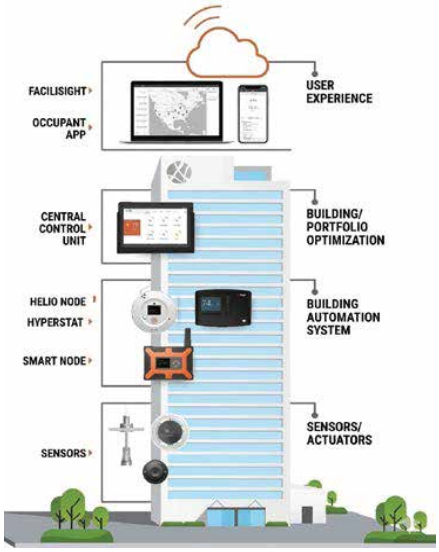

Fig. 1: Smart BMS Architecture (Courtesy: www.75f.io)

Sensing Layer

Sensors and actuators at the field level continuously monitor parameters such as temperature, occupancy, humidity, pressure, IAQ (CO_2, VoC, and Particulate Matter - PM 2.5), lux level and sound. Devices communicate with controllers through wired or wireless connections.

Field Automation Layer

IoT-enabled, software-defined equipment and terminal-box controllers i.e. smart nodes, together with thermostats, execute pre-programmed or custom control sequences for functions such as demand-controlled ventilation and VFD speed control.

Gateway Layer

The Gateway Layer, centred on the Central Control Unit (CCU), coordinates connected building systems and provides responsive local control and data handling.

Cloud and AI Layer

The cloud platform securely processes building data using AI and machine learning to provide building and portfolio optimisation, predictive insights, and proactive controls. Facility managers can monitor operations remotely, while occupants can interact through the occupant application.

Network Architecture

The network architecture connects the cloud platform, internet gateway, CCU, smart nodes, sensors, actuators, and HVAC equipment. A low-power wireless network supports field communication, while the gateway provides the connection to the Internet or customer network.



Fig. 2: IoT-BMS connectivity diagram (Source: www.75f.io)

- **Central Control Unit (CCU):** Head-end controller providing monitoring, control, IoT connectivity, data processing, and predictive analytics.
- **Internet Gateway:** Provides internet access via 4G/5G NB-IoT or FTTH connectivity, with Ethernet or Wi-Fi connection to the CCU.
- **Smart Node:** Wireless field controller connecting sensors, actuators, HVAC equipment, and other energy systems for local monitoring and control.
- **IEEE 802.15.4 LR-WPAN:** Provides Low-power, self-forming, self-healing wireless network between the CCU and smart nodes over 900 MHz band, with strong building penetration, long range, secure and minimal interference.

HVAC Optimisation and Control

HVAC and lighting are among the highest energy-consuming systems in commercial buildings. HVAC alone accounts for 40-60% of building energy use, while 20-30% of that energy may be lost through inefficiencies such as conditioning unoccupied spaces, overcooling, unbalanced airflow, over-ventilation, simultaneous heating and cooling, and fixed schedules.

Smart BMS solutions address these losses through Dynamic Airflow Balancing (DAB), Dynamic chilled-water Balancing, outside-air optimisation (OAO), demand-control ventilation (DCV), automated scheduling, energy analytics, and continuous IAQ monitoring.

1. Dynamic Chilled Water Balancing (DCWB)

DCWB dynamically optimises chilled-water (CHW) flow in AHU circuits while maintaining required temperature and occupant comfort. By integrating the CCU, existing BTU metering, sensors, and a new actuator, the system continuously monitors and fine-tunes performance, helping mitigate low Delta-T syndrome, reduce CHW consumption, and lower energy costs.

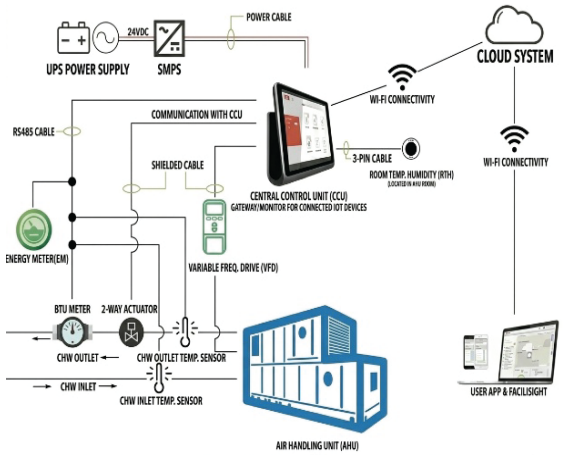

Fig. 3: Dynamic Chilled Water Balancing (Source: www.75f.io)

2. Indoor Air Quality and Demand-Controlled Ventilation

An advanced thermostat continuously measures temperature, humidity, CO_2, VOCs, PM2.5, light level (lux), sound, and occupancy. Cloud-based machine learning combines these data with weather forecasts to support proactive comfort and IAQ optimisation.

DCV adjusts outdoor-air intake based on zone CO_2 concentration and occupancy. When CO_2 rises above the configured threshold, the DCV damper modulates to increase ventilation; during low occupancy, outdoor-air intake is reduced to save energy. The thermostat can provide the DCV damper signal, provided the supply-fan speed controller or VFD accepts an external analogue signal for motor-speed control.

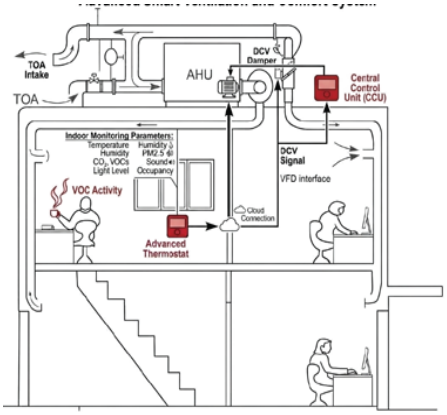

Fig. 4: Indoor Air Quality Monitoring (Courtesy: www.75f.io)

3. Outside Air Optimisation (OAO) or Economizer

OAO monitors return-air CO_2, temperature, and humidity together with outdoor conditions to determine ventilation requirements and whether outside air can provide useful free cooling. CO_2-based DCV regulates outdoor-air intake, while comparative enthalpy-based economiser logic evaluates free-cooling potential and optimises the outdoor-air damper position.

The optimised outdoor-air flow is coordinated with Variable Air Volume (VAV) and Dynamic Air Balancing (DAB) to match actual cooling demand and maintain required supply-air conditions. Mixed-air temperature and humidity are continuously monitored, with minimum-temperature protection for safe operation. The sequence dynamically adapts to occupancy, weather, and building load to optimise energy efficiency, ventilation, indoor air quality, and occupant comfort.

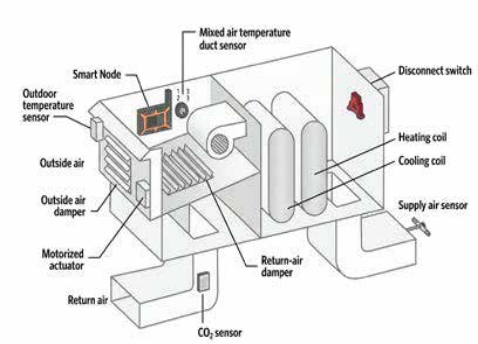

Fig. 5: Sensors installation on AHU for OAO (Courtesy: www.75f.io)

AI-Driven Predictive Operation and Maintenance

Wireless sensors continuously monitor temperature, occupancy, humidity, and indoor environmental conditions across building zones. These data can be combined with weather forecasts, historical trends, and dynamic thermal models in the cloud, where machine-learning algorithms predict thermal loads and optimise control strategies. The system can proactively adjust temperature, airflow, and ventilation to maintain comfort, coordinate HVAC operation, reduce equipment stress, and improve energy efficiency.

Predictive maintenance extends the same data-driven approach to equipment health. IoT sensors and AI analytics monitor developing faults before they cause failures. Depending on the application, vibration, current, temperature, pressure, CO_2, and humidity measurements can help identify bearing wear, abnormal motor loading, refrigerant-related issues, or ventilation problems.

Individual Comfort

AI- and IoT-based control uses real-time data to regulate temperature, humidity, lighting, and ventilation according to occupancy and demand. Fine-grained zone control maintains setpoints while improving energy efficiency, comfort, and productivity.

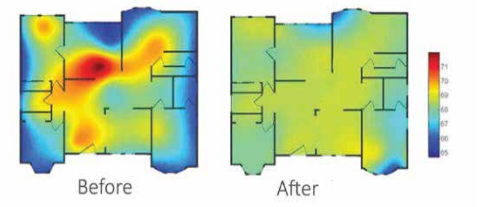

Fig. 6: Building heat map before and after optimisation
(Courtesy: www.75f.io)

Energy Management

The cloud platform provides a centralised view of HVAC and lighting energy use through heatmaps, occupancy data, trends, analysis, and granular reporting. Real-time sensor data enables dynamic VFD modulation so HVAC operation can match actual demand. Energy and BTU meters at AHU level, together with floor and distribution-board meters, provide measurement and verification of consumption and savings opportunities.



Fig. 7: Actual operating costs compared with baseline after implementation (Courtesy: www.75f.io)

After implementation, actual operating costs remained below the baseline, indicating measurable energy and cost savings.

Conclusion

The next generation BMS represents a shift from conventional building automation to intelligent, connected, and adaptive operation enabled by IoT, AI, and Digital Twin technologies. AI-driven IoT BMS can reduce energy consumption through optimised HVAC and lighting while enabling remote operations, predictive maintenance, real-time analytics, and greater visibility into building conditions. The central value is not simply connecting more devices, but turning real-time data into intelligent action that continuously adapts to changing conditions, supporting lower energy use, reduced operating costs, improved occupant well-being, and more sustainable and resilient buildings.

Abbreviation	Full Form
AI	Artificial Intelligence
AHU	Air Handling Unit
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BTU	British Thermal Unit
CCU	Central Control Unit
CHW	Chilled Water
DB	Distribution Board
DAB	Dynamic Airflow Balancing
DCV	Demand-Controlled Ventilation
DCWB	Dynamic Chilled Water Balancing
FTTH	Fibre to the Home
HVAC	Heating, Ventilation and Air Conditioning
IAQ	Indoor Air Quality
IEEE	Institute of Electrical and Electronics Engineers
IoT	Internet of Things
LEED	Leadership in Energy and Environmental Design
LR-WPAN	Low-Rate Wireless Personal Area Network
MEP	Mechanical, Electrical and Plumbing
OAO	Outside Air Optimisation
VAV	Variable Air Volume
VFD	Variable Frequency Drive
VOCs	Volatile Organic Compounds
WELL	WELL Building Standard



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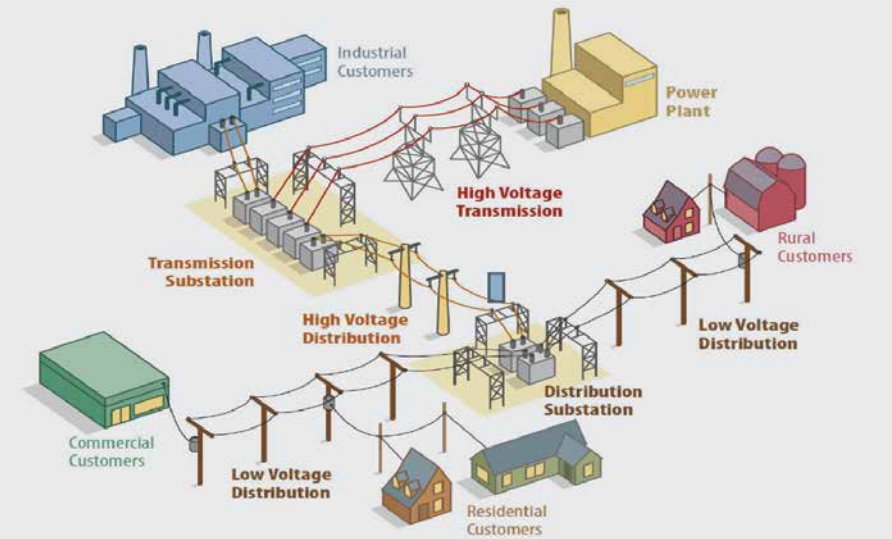

Dynamic Phase Balancing and Inverter Transformer Deployment in Kerala's Low-Voltage Distribution Networks

A Strategic Framework for Mitigating Technical Losses, Voltage Asymmetry, and Transformer Degradation in High-PV Environments



Er. Salihudeen K.M.
B.Tech, MBA, FIE, C.Eng, UPDA-Expert License

Abstract

Kerala's low-voltage (LT) distribution system is characterized by a massive population of single-phase domestic consumers connected across three-phase distribution transformers. When these connections are unevenly distributed, the resulting phase asymmetry creates cascading technical and financial consequences: escalated I^2R losses, hazardous neutral-current heating, unequal voltage drops, and accelerated transformer degradation.

The rapid proliferation of rooftop solar photovoltaic (PV) systems—particularly single-phase inverters installed on three-phase service connections—has transformed this from a static load imbalance issue into a dynamic, time-dependent phenomenon with bidirectional power flow. This article presents a comprehensive technical and administrative framework for KSEB to transition from ad-hoc manual phase assignment to data-driven, multi-objective phase optimization, augmented by strategic deployment of inverter transformers to enhance life expectancy and reliability of distribution assets in high-PV environments.

1. Introduction: The Hidden Cost of Asymmetry

For administrative planners and financial reviewers, distribution grid efficiency is measured by Aggregate Technical and Commercial (AT&C) losses. While commercial losses require administrative policing, technical losses are governed strictly by physics. In a perfectly balanced grid, power flows through the three phase conductors optimally. When loads are unbalanced—due to clustered heavy appliances or solar panels on one phase—the grid is forced to use the neutral conductor as a "return pipe" for excess current.

This asymmetry acts as a hidden tax on utility operations:

· Energy Waste: Technical losses increase quadratically; a 20% load imbalance can cause a 5% spike in localized energy loss.
· CAPEX Strain: Imbalance stresses distribution transformers, reducing effective capacity and lifespan through localized overheating.
· Customer Dissatisfaction: End-of-line consumers experience voltage fluctuations, leading to grievance tickets and appliance damage.
· Solar Integration Bottlenecks: Unbalanced solar injection prevents KSEB from achieving renewable hosting targets without expensive infrastructure upgrades.
· Transformer Mortality: Unbalanced loading, harmonic injection, and thermal cycling accelerate insulation degradation, shortening transformer life by 30–50%.

Addressing phase imbalance represents a high-yield, low-CAPEX intervention that reclaims lost energy and defers expensive upgrades.

2. Technical Fundamentals: Phasors, Neutral Heating, and Legacy Infrastructure

In an ideal balanced three-phase, four-wire system, phase currents are equal in magnitude and separated by 120°:
$\bar{I}_R = I\angle 0°,\ \bar{I}_Y = I\angle -120°,\ \bar{I}_B = I\angle +120°$ (1)

The neutral current is the vector sum:
$\bar{I}_N = \bar{I}_R + \bar{I}_Y + \bar{I}_B = 0$ (2)

Total conductor loss is constrained to phase conductors:
$P_{loss} = 3 \cdot I^2 R_\varphi$ (3)

In reality, KSEB feeders exhibit severe imbalance. Consider a 160 kVA transformer during evening peak:

Phase Current Power Factor Phasor
R 180 A 0.85 lagging $180\angle -31.8°$
Y 120 A 0.95 lagging $120\angle -138.2°$
B 90 A 0.98 lagging $90\angle +108.5°$

The phasor addition yields a massive neutral current:
$\bar{I}_N \approx 82$ A (4)

Many legacy LT lines use reduced neutral conductor cross-sections (e.g., ACSR "Weasel" for neutral vs. "Rabbit" for phases), making neutral resistance 1.5–1.6× higher than phase resistance. Total loss becomes:
$P_{loss} = \Sigma I_\varphi^2 R_\varphi + I_N^2 R_N$ (5)
In this scenario, neutral heating alone ($82^2 \times 1.6\ R_\varphi = 10{,}758\ R_\varphi$) dissipates more wasted heat than the entirety of Phase B's load ($90^2 \times R_\varphi = 8{,}100\ R_\varphi$).

3. The Prosumer Paradigm: Reversal of Power Flow

Rooftop solar fundamentally alters grid physics. A single-phase solar installation makes the home a "prosumer." Net active and reactive power at any time t for phase φ is:

$P_{\varphi,net}(t) = P_{\varphi,load}(t) - P_{\varphi,pv}(t)$
$Q_{\varphi,net}(t) = Q_{\varphi,load}(t) \pm Q_{\varphi,inverter}(t)$ (6)

If solar PV is clustered on Phase R, during solar noon $P_{R,pv}$ may vastly exceed $P_{R,load}$, making $P_{R,net}$ negative—Phase R exports power while Phases Y and B continue importing.

The approximate voltage deviation along a radial line is:
$\Delta V \approx (P_{net}\ R + Q_{net}\ X) / V_{nom}$ (8)
When P_{net} becomes large negative due to solar export, ΔV becomes negative, causing local voltage rise above nominal. If Phase R exports

while Phase B draws heavily, severe phase-to-phase voltage asymmetry occurs, potentially tripping protective relays or damaging consumer electronics.

4. The Three-Phase Prosumer Problem: Single-Phase Solar on Three-Phase Connections

A critical and often overlooked dimension is the growing population of three-phase service connections hosting single-phase solar inverters. Commercial establishments, small industries, apartment complexes, and large residences typically have:

· Three-phase loads (motors, HVAC, elevators)
· Single-phase loads distributed across phases
· Single-phase solar inverters installed on only one phase

When a three-phase consumer installs a single-phase inverter, solar generation is injected entirely into one phase:

$P_{R,net}(t) = P_{R,load}(t) - P_{R,pv}(t)$
$P_{Y,net}(t) = P_{Y,load}(t)$
$P_{B,net}(t) = P_{B,load}(t)$ (7)

Consider a three-phase commercial consumer with a 10 kW single-phase inverter on Phase R:
Time Phase R Net (kW) Phase Y Net (kW) Phase B Net (kW) Neutral Current
06:00 +8 +6 +7 Low
12:00 –2 (export) +6 +7 High
15:00 +1 +6 +7 Moderate
19:00 +12 +8 +9 High

During solar noon, Phase R exports while Phases Y and B import. The neutral conductor carries the full imbalance, causing:



· Excessive neutral heating in service cable and transformer
· Voltage rise on Phase R while Phases Y and B experience voltage drop
· Transformer zero-sequence circulating currents degrading insulation
· Increased I^2R losses in phase and neutral conductors

When multiple three-phase prosumers on the same feeder install single-phase inverters on the same phase, the imbalance compounds. A feeder with 20 such consumers, each with 5 kW single-phase solar, could see 100 kW concentrated on one phase during peak generation—while other phases import 80 kW each. This creates severe voltage asymmetry (potentially exceeding 5–8% VUF), neutral current exceeding phase current in extreme cases, transformer derating, and protection coordination failures.

Regulatory Implications for KSEB:

1. Should single-phase inverters be permitted on three-phase connections without phase-balancing requirements?
2. How should net metering account for phase-wise export when only one phase exports?
3. Should KSEB mandate three-phase inverters above a certain capacity?
4. Should unbalanced solar injection attract a technical loss surcharge?

A balanced regulatory approach would require phase rotation of single-phase inverters across phases, mandate three-phase inverters above 5 kW on three-phase connections, introduce time-of-day tariff signals, and establish a phase imbalance threshold (e.g., 10% current unbalance) beyond which corrective action is mandatory.

5. Inverter Transformers: Strategic Intervention for Enhanced Life and Reliability

The cumulative effect of unbalanced loading, harmonic injection, and thermal cycling places unprecedented stress on conventional distribution transformers. Inverter transformers (also known as solar or PV transformers) are specially designed for operation with power electronic converters.

5.1 Limitations of Conventional Transformers

Standard distribution transformers were designed for passive, linear loads with predictable daily cycles. Solar inverters introduce:
1. Harmonic Distortion: Inverters inject 3rd, 5th, 7th, and higher-order harmonics, causing increased eddy current losses, additional stray losses, higher operating temperatures, and faster insulation degradation.
2. DC Injection: Small DC components cause core saturation, increased magnetizing current, audible noise, vibration, and premature insulation aging.
3. Zero-Sequence Currents: Unbalanced solar injection creates zero-sequence currents that circulate in the delta winding, cause additional heating, and reduce effective capacity.
4. Thermal Cycling: Daily solar rise and fall creates repeated thermal expansion/contraction, mechanical stress on insulation, loosening of clamping structures, and increased risk of turn-to-turn faults.
5. Reverse Power Flow: During peak solar generation, power flows from LT to HT, reversing designed direction, changing impedance characteristics, affecting protection coordination, and altering loss profiles.

5.2 Design Features of Inverter Transformers

Feature Conventional Transformer Inverter Transformer
Core Material Standard CRGO silicon steel High-grade CRGO or amorphous metal
Flux Density 1.5–1.7 T 1.2–1.4 T
Winding Design Standard copper/aluminium Electrostatic shields, foil windings
Harmonic Handling K-1 to K-4 K-13 to K-20
DC Offset Tolerance Low High
Temperature Rise 55–65°C 45–55°C
Insulation Class Class A or B Class F or H
Neutral Design Standard Reinforced (200% of phase)
Cooling ONAN ONAN with enhanced ducts

Key Design Features:
· High K-Factor Rating: K-13, K-17, or K-20 ratings indicate ability to handle harmonic loads without overheating.
· Electrostatic Shielding: Reduces common-mode noise transmission, attenuates high-frequency harmonics, protects sensitive loads.
· Reinforced Neutral Conductor: Sized at 200% of phase conductor with enhanced insulation and temperature sensors.
· Lower Flux Density Operation: Reduces core losses, lowers harmonic generation, decreases audible noise, extends insulation life.
Enhanced Thermal Management: Larger cooling ducts, synthetic ester or high-grade mineral oil, increased radiator surface area, temperature monitoring with alarms.

5.3 Life Extension Quantification

Transformer life is governed by the Arrhenius equation:
Life $\propto e^{(E_a / kT)}$
A rule of thumb is that every 6°C reduction in operating temperature doubles transformer life. Inverter transformers, operating 10–15°C cooler under the same harmonic and unbalanced conditions, achieve:
Parameter Conventional Transformer Inverter Transformer Improvement
Hot Spot Temperature 98°C 85°C –13°C
Insulation Life 15 years 30+ years 2×
Failure Rate 3–5% per year 0.5–1% per year 80% reduction
Maintenance Interval 1 year 3–5 years 3–5×
Harmonic Losses 15–20% of total 5–8% of total 60% reduction

5.4 Economic Justification
While inverter transformers cost 20–40% more upfront, lifecycle economics are compelling:

Cost Element Conventional Transformer Inverter Transformer
Initial Cost (160 kVA) ₹4,00,000 ₹5,20,000
Annual Maintenance ₹25,000 ₹8,000
Expected Life 15 years 30 years
Replacement Cost (15 years) ₹4,00,000 —
Lost Revenue from Failures ₹50,000/year ₹10,000/year
Total 30-Year Cost ₹18,25,000 ₹8,60,000
Net Savings — ₹9,65,000 per transformer

5.5 Deployment Strategy for KSEB
Tier 1 (Immediate): Feeders with >50% solar penetration, repeated transformer failures, high three-phase prosumer concentration, known harmonic issues.
Tier 2 (Phased): Feeders with 25–50% solar penetration, transformers approaching end of life, areas with planned solar expansion.

Tier 3 (Standard Specification): All new installations in solar-prone areas, replacements where lifecycle cost justifies premium.
Tier 4 (Monitoring): Feeders with <25% solar penetration; upgrade when penetration exceeds threshold.
Complementary Measures: Dynamic phase balancing, harmonic filters, smart metering, voltage regulators (OLTC), and battery energy storage.

6. Dynamic Optimization Strategy

Because solar generation peaks at noon and collapses by evening peak, phase imbalance is no longer static. A configuration balanced at 13:00 hrs may be disastrously unbalanced at 19:30 hrs. The presence of single-phase solar on three-phase connections adds complexity: the same consumer can export on one phase and import on the other two simultaneously.

KSEB must adopt an algorithmic, multi-objective optimization framework. Let S be the set of all allowable phase connection permutations. The utility must minimize a cost function J integrated over 24 hours:

$$\min_S \int_0^{24h} [w_1 \, P_loss(t) + w_2 \, \Delta V_dev^2(t) + w_3 \, I_N^2(t) + w_4 \, U_I^2(t) + w_5 \, T_hs^2(t)] \, dt \quad (9)$$

Where:
· P_loss(t) = total active power loss in lines and transformer
· ΔV_dev(t) = voltage deviation beyond statutory limits (±6%)
· I_N(t) = neutral current heating and zero-sequence effects
· U_I(t) = Voltage Unbalance Factor ($|V_-| / |V_+|$)
· T_hs(t) = transformer hot-spot temperature governing insulation life
· w_1–w_5 = KSEB administration's priority weights

Additional Constraints for Three-Phase Prosumers:
· Phase-wise net injection limit: $|P_\varphi,net(t)| \le P_\varphi,max$
Phase-wise net injection limit: $|P_\varphi,net(t)| \le P_\varphi,max$
· Neutral current constraint: $I_N(t) \le I_N,rated \times 0.8$
· Voltage unbalance constraint: $U_I(t) \le 2\%$
· Transformer hot-spot constraint: $T_hs(t) \le 95°C$
· Solar inverter phase assignment: Phase(inverter_1) ≠ Phase(inverter_2) ≠ Phase(inverter_3)

7. Roadmap for a Data-Driven KSEB Pilot

Step 1: Target Selection — Select 10 diverse 160/250 kVA transformers with deep solar penetration, three-phase prosumers with single-phase inverters, pure-consumption profiles, and mixed commercial/residential loads. Identify at least 3 transformers for inverter transformer deployment.

Step 2: Instrumentation — Install multi-channel power quality analyzers at feeder heads to log RMS currents, phase angles, neutral currents, VUF, THD, transformer top-oil and hot-spot temperatures, and consumer generation data at 15-minute intervals for 90 days.

Step 3: Digital Twin Simulation — Feed time-series data into the optimization model (Eq. 9). The solver outputs optimal phase reassignment, recommended phase rotation for three-phase prosumers, identification of economically justified three-phase inverter retrofits, transformer replacement recommendations, and targeted infrastructure upgrades.

Step 4: Physical Intervention & Verification — Execute recommended phase swaps at service poles and meter boxes. Reconfigure solar inverter connections where feasible. Deploy inverter transformers at 3 pilot sites. Continue logging for 30 post-intervention days to quantify reduction in kWh losses, voltage deviation, neutral current, transformer temperature, and harmonic distortion.

Step 5: Regulatory Integration — Develop phase balance requirements for new solar installations, mandatory phase rotation schedules for multi-inverter sites, technical loss surcharge framework for persistently unbalanced prosumers, and inverter transformer specifications for high-PV feeders.

8. Economic Analysis: The Case for Intervention

Parameter	Without Intervention	With Optimization + Inverter Transformers	Savings
Technical Losses (per 160 kVA)	8–12%	3–5%	5–7%
Transformer Lifespan	15 years	30+ years	100% extension
Neutral Conductor Failures	2–3/year	0–1/year	60% reduction
Voltage Complaints	15–20/month	3–5/month	75% reduction
Solar Hosting Capacity	Limited	2–3× increase	Doubled
Transformer Failure Rate	3–5%/year	0.5–1%/year	80% reduction
Maintenance Cost	₹25,000/year	₹8,000/year	68% reduction

For a typical 160 kVA transformer serving 80–100 consumers with 30% solar penetration, annual savings from reduced technical losses alone reach ₹1.5–2.5 lakhs, with deferred CAPEX benefits of ₹5–8 lakhs over extended lifespan. Including inverter transformer deployment, 30-year lifecycle savings reach ₹9–10 lakhs per transformer.

9. Conclusion

Phase asymmetry is a compounded physics problem that quietly degrades utility assets and inflates technical losses. The emergence of three-phase prosumers with single-phase solar inverters adds a critical dimension: the same service connection can simultaneously export on one phase and import on the other two, creating dynamic imbalance e that no static phase assignment can address. The cumulative stress of harmonics, DC injection, thermal cycling, and zero-sequence currents accelerates transformer aging beyond conventional design limits.

As Kerala accelerates its residential solar transition, unchecked unbalance will bottleneck grid stability, limit renewable hosting capacity, inflate technical losses, and cause premature transformer failures. By viewing phase allocation as a dynamic, computable optimization problem—and by deploying inverter transformers as strategic assets for high-PV feeders—KSEB can reclaim technical losses, improve voltage quality, extend transformer life, and seamlessly host the next generation of renewable prosumers.

The path forward requires:
· Data visibility through comprehensive power quality instrumentation
· Algorithmic optimization accounting for 24-hour dynamic behavior
· Inverter transformers designed for harmonic-rich, unbalanced, reverse-power-flow conditions
· Regulatory frameworks incentivizing balanced solar injection
· Targeted physical interventions maximizing benefit per rupee spent

The technology exists. The economics are favorable. The only question is whether KSEB will act proactively or reactively to the coming wave of distributed generation.

Appendix A: Glossary of Key Terms

Term	*Definition*
AT&C Losses	Aggregate Technical and Commercial losses
VUF	Voltage Unbalance Factor (ratio of negative to positive sequence voltage)
Prosumer	Consumer who both consumes and produces electricity
I^2R Loss	Resistive power loss proportional to square of current
Zero-Sequence	Component of unbalanced three-phase current flowing in neutral
THD	Total Harmonic Distortion
K-Factor	Transformer's ability to handle harmonic loads without overheating
CRGO	Cold Rolled Grain Oriented silicon steel
ONAN	Oil Natural Air Natural cooling
OLTC	On-Load Tap Changer
Hot-Spot Temperature	Highest transformer winding temperature, governs insulation life
Arrhenius Equation	Relates insulation aging rate to operating temperature

Appendix B: Key Equations Reference

Equation	*Description*
(1)	Balanced phase currents (120° separation)
(2)	Neutral current in balanced system = 0
(3)	Total phase conductor loss (balanced)
(4)	Neutral current under asymmetry (example)
(5)	Total loss including neutral conductor
(6)	Net power for prosumer (load – solar)
(7)	Three-phase prosumer with single-phase solar
(8)	Voltage deviation along radial line
(9)	Multi-objective optimization cost function with transformer hot-spot

Appendix C: Inverter Transformer Specification Template

Parameter	*Specification*
Rated Capacity	160 kVA / 250 kVA / 400 kVA
Voltage Ratio	11 kV / 433 V
K-Factor	K-13 or higher
Flux Density	≤ 1.4 T
Neutral Conductor	200% of phase conductor
Insulation Class	Class F or H
Temperature Rise	≤ 50°C (top oil), ≤ 55°C (winding)
Cooling	ONAN with enhanced ducts
Electrostatic Shielding	Yes, between primary and secondary
DC Offset Tolerance	≥ 10 mA
Harmonic Withstand	Per IEEE C57.110
Protection	Buchholz relay, OTI, WTI, MOG
Monitoring	Temperature sensors, current transformers
Standard	IS 2026 / IEC 60076 with harmonic amendments

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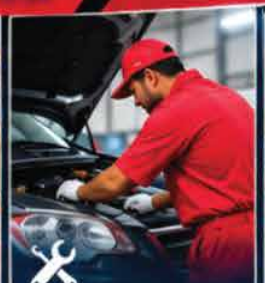
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Sustainable Outdoor Cooling for Public Realms:

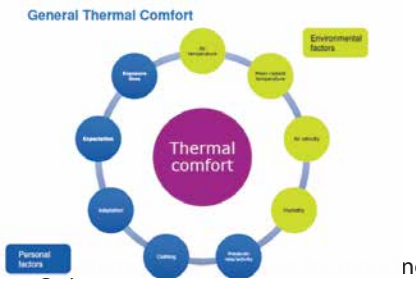
Performance Evaluation of PV Assisted Cooling Technology



Er. Abdul Zameer Ahamed Sab
(FIEI, CEng(I), MIEI)

Outdoor cooling has emerged as a critical engineering challenge in hot arid regions, particularly in the Gulf, where extreme ambient temperatures and high solar radiation significantly impact thermal comfort in public spaces. Qatar, with summer temperatures frequently exceeding 45°C, has accelerated the adoption of innovative cooling technologies to support outdoor urban activities, tourism, sports infrastructure, and public realm development.

Comfort cooling concept for outdoor cooling application for incorporating a Hybrid radiant cooling system in combination with other passive cooling techniques such as Solar shading.

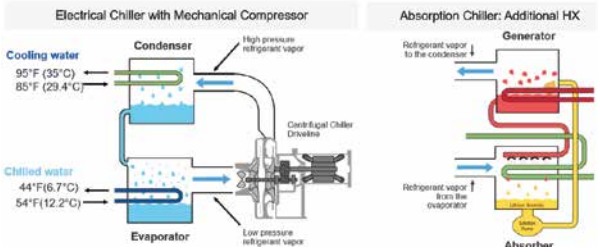


Passive co ng sensible heat, cannot dehumidify or remove moisture from the air, making local climatic conditions a major limiting factor in their performance. In humid environments such as Qatar, these limitations necessitate the integration of mechanical air conditioning to maintain acceptable comfort levels. To overcome these constraints in outdoor spaces, Hybrid Radiant Cooling systems provide a more comprehensive solution by addressing key environmental parameters including mean radiant temperature (MRT), air velocity, humidity, and air temperature. This combined approach significantly enhances thermal comfort and ensures more stable cooling performance under challenging climatic conditions.

Using Water as a Refrigerant,

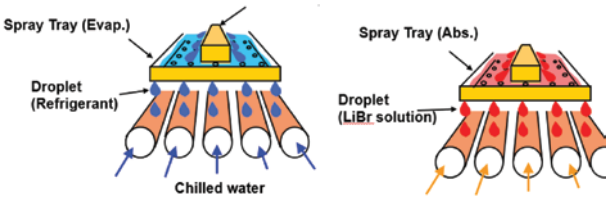
Electrical chillers rely on mechanical compressors to drive the sumption,





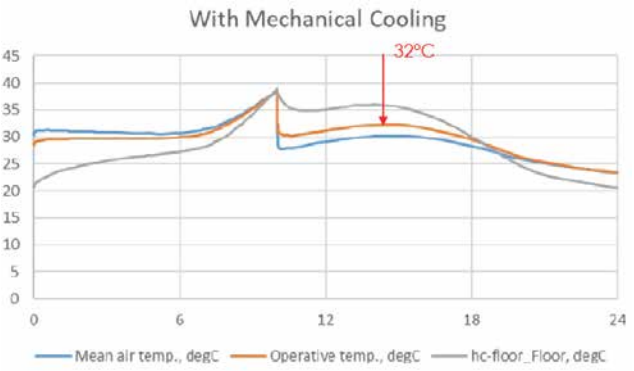
more moving parts, and increased maintenance requirements. In contrast, absorption chillers use thermal energy—often waste heat or low cost heat sources—to operate, eliminating the need for a mechanical compressor. This makes absorption chillers far more energy efficient, with negligible electrical demand, minimal vibration, and significantly lower maintenance. While electrical chillers offer faster response and higher COP under certain conditions, absorption chillers provide superior sustainability, operational flexibility, and long term cost advantages, especially in applications where waste heat is readily available.

A chiller is designed with lowest salt solution concentrations Lithium Bromide (LiBr) is a hygroscopic salt solution used in absorption chillers to absorb refrigerant water vapor. The concentration of the solution refers to the proportion of LiBr salt by weight within the mixture. A 0% solution contains no salt and consists of 100% water, which acts as the refrigerant. In contrast, creating a strong absorbent mixture capable of efficiently capturing water vapor during the absorption cycle



Absorption chillers offer a highly cost effective cooling solution, particularly when waste heat or low cost thermal energy sources are available. Their flexible operating envelope allows 50–100% flow variation and a wide turndown ratio of 20–100%, enabling efficient performance across diverse load conditions. These systems support a broad temperature range from positive temperatures to sub zero applications while delivering large delta T capabilities. As a sustainable and environmentally friendly technology, absorption chillers feature zero GWP, minimal maintenance requirements, and almost no moving parts, resulting in negligible electrical consumption and long term operational reliability.

Simulated building model using IDA ICE simulation for energy and thermal comfort based on ASHRAE Climate data



In summary, the integration of solar powered absorption chillers with hybrid radiant cooling presents a highly sustainable and efficient solution for outdoor cooling in hot and humid climates such as Qatar. Absorption chillers, driven by low cost or waste heat sources, offer exceptional operational flexibility, wide temperature applicability, and minimal electrical consumption, making them both cost effective and environmentally responsible. Their use of lithium bromide solution as the absorbent enables reliable vapour absorption across varying concentrations, supporting stable cooling performance. When combined with hybrid radiant systems that address mean radiant temperature, air velocity, humidity, and air temperature, this technology overcomes the limitations of passive cooling and significantly enhances outdoor thermal comfort. Together, these innovations form a robust pathway toward greener, low maintenance, and climate adaptive cooling strategies for the region's future developments.

Achievements of 2025-2026





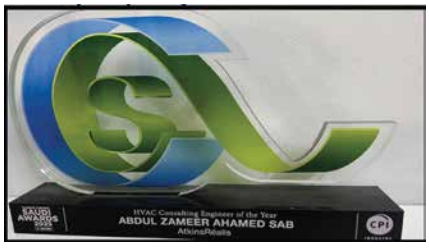












TECHNICAL SEMINAR/WEBINAR

26th October 2025 at ibis Hotel, Doha

Topic : Additive Manufacturing: Shaping the Future of Industry and Smart Cities





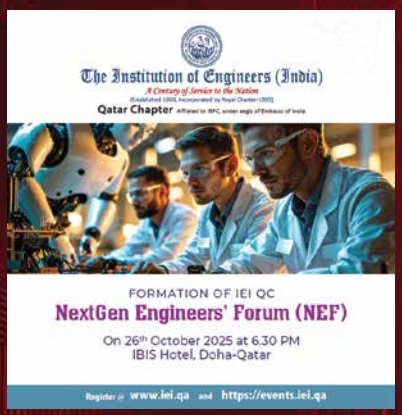






FORMATION OF NEXTGEN ENGINEERS' FORUM (NEF)

26th October 2025 at ibis Doha, Doha











SEMINAR AND PANEL SPEAKER SESSION

7th November 2025 at Bharat Taste Restaurant, Doha













Integrating Mechanical Engineering, The Role of QA/QC

A Practical Approach to Quality, Reliability and Workplace Safety



Er. Azeem Salahudeen
Mechanical Engineer

Introduction

Mechanical engineering projects depend on equipment performance, installation quality, compliance with specifications and safe execution. Mechanical engineering, Quality Assurance and Quality Control (QA/QC), and Health, Safety and Environment (HSE) are often managed as separate functions, but they are closely connected. Integrating them from planning through installation, testing and handover helps prevent defects, reduce rework, protect workers and deliver reliable systems.

1. The Role of Mechanical Engineering

Mechanical engineers translate design requirements into practical systems and installations. Their responsibilities may include reviewing drawings and specifications, selecting suitable materials and equipment, coordinating interfaces, checking installation methods, and confirming that systems operate as intended. Examples include HVAC systems, pumps, pipework, fire-fighting systems and other mechanical services. Accurate coordination and use of approved documents are essential to avoid clashes, incorrect installation and unnecessary modifications.

2. Quality Assurance and Quality Control

Quality Assurance focuses on planned processes that prevent defects, while Quality Control uses inspections, measurements and tests to verify that completed work meets the approved requirements. Effective QA/QC includes approved material submittals, method statements, inspection and test plans (ITPs), calibration of measuring equipment, material traceability, inspection requests and proper documentation. For mechanical works, checks may cover pipe routing and supports, jointing or welding records, pressure testing, equipment alignment, duct installation, insulation and commissioning results. Nonconforming work should be recorded, corrected and re-inspected before it is accepted.

3. HSE: Planning Safe Work

HSE must be considered before work starts, not only during inspections. Teams should review the risk assessment and method statement, obtain required permits, conduct toolbox talks, inspect tools and access equipment, establish exclusion zones where needed, and confirm that workers are competent and equipped with appropriate personal protective equipment. Mechanical activities may involve lifting operations, work at height, pressure testing, hot work, electrical isolation or manual handling. Hazards must be assessed for the actual task and controlled in accordance with project procedures and applicable requirements. Equipment must be isolated and verified safe before maintenance where hazardous energy could be present.

4. Why Integration Matters

A quality defect can also create a safety risk. For example, an incorrectly installed pipe support may lead to system damage, while poor housekeeping can cause trips and obstruct access for inspection or emergency response. Similarly, rushing work to meet a deadline may result in missed inspections or unsafe shortcuts. Coordinated planning helps teams identify these links early. Mechanical engineers, QA/QC inspectors, HSE personnel, supervisors and subcontractors should communicate clearly, use the latest approved documents, record findings and close actions before proceeding to the next stage.

5. Continuous Improvement

A practical improvement cycle is Plan–Do–Check–Act (PDCA): plan the work and controls, execute the approved process, check results through inspections and safety observations, and act on findings to prevent recurrence. Lessons from defects, near misses, audits and commissioning should be shared with the team. Useful indicators include inspection pass rates, repeated nonconformities, timely closeout of actions, completion of toolbox talks and reporting of hazards and near misses. The aim is not merely to complete paperwork, but to improve real site performance.

Conclusion

Successful engineering delivery requires systems that are technically correct, verified for quality and installed safely. When mechanical engineering, QA/QC and HSE work together, projects can reduce rework, improve reliability, protect people and achieve a stronger handover. Quality and safety are shared responsibilities throughout the project lifecycle—not final checks at the end.

IEI WOMEN'S WING, HEALTH TALK

14th November 2025 at KIMS Health Medical Center, Al Meshaf















Mechanical Engineering For A Sustainable Future

Innovating Today, Engineering Tomorrow



Er. Mohammad Shad
Lead Mechanical Engineer- AEB, Qatar
Past President – ISHRAE Qatar Chapter
Joint Secretary – IEI Qatar Chapter

Introduction

Mechanical engineering has always been central to technological progress, industrial development and human well-being. Today, climate change, energy security, resource scarcity, urbanization and rapid technological change make the discipline more important than ever. Modern mechanical engineering combines technical excellence with sustainability, digital innovation and economic efficiency, spanning intelligent automation, renewable energy, robotics, advanced materials, digital twins and energy-efficient systems. Engineers' Day is an opportunity to recognize the profession's achievements and reflect on its responsibility to create positive outcomes for people, industry and the planet.

1. Mechanical Engineering: The Foundation of Modern Industry

Mechanical engineering applies mechanics, thermodynamics, fluid mechanics, heat transfer, materials science and control engineering to the design and operation of systems used in manufacturing, power, oil and gas, transport, construction, healthcare and water treatment. Engineers select, install, commission and maintain equipment while improving safety, reliability, productivity and lifecycle value. Efficient pumps, compressors and heat exchangers, supported by good system design, can deliver significant long-term energy and cost savings.

2. Smart Manufacturing and Industry 4.0

Industry 4.0 connects equipment with sensors, industrial Internet of Things (IIoT), cloud computing, analytics and advanced controls. Monitoring vibration, temperature, pressure, flow and power can help engineers identify developing faults before they cause breakdowns. Predictive maintenance can reduce unplanned downtime and extend asset life, provided the data, analysis and maintenance practices are reliable.

3. Artificial Intelligence, Robotics and Engineering Automation

Robots and automated systems improve manufacturing consistency, reduce repetitive tasks and support inspection in hazardous or difficult-to-access locations. AI can assist with operational analysis and design optimization by comparing options against strength, weight, temperature, cost and manufacturing constraints. However, AI supports rather than replaces engineering judgment: calculations, codes, safety requirements and results must be independently verified.

4. Sustainable Energy and a Low-Carbon Future

Mechanical engineers contribute to wind, solar thermal, geothermal and hydroelectric systems, energy storage, and efficient heating and cooling. Variable-speed drives, correctly sized motors, optimized piping, effective insulation and heat recovery can reduce energy losses. Sustainability requires evaluating the complete system—not only individual equipment—and combining efficient components with sound design, controls and ongoing performance monitoring.

5. Mechanical Engineering and Water Sustainability

Desalination, water treatment, pumping and wastewater reuse depend on reliable, efficient mechanical systems. Engineers can reduce energy use through efficient pumps, pressure management, leakage reduction and energy-recovery devices. Properly treated reclaimed water can also support suitable non-potable applications, subject to local regulations and safeguards. The goal is to provide reliable water services while minimizing resource use and lifecycle costs.

6. Digital Twins and Asset Management

A digital twin is a digital representation of a physical asset or process, updated using real-world information. Combining engineering models with operating data can help monitor equipment, identify performance deviations and test operating or maintenance scenarios before changes are made. Its value depends on reliable data, validated models, cybersecurity and appropriate engineering controls.

7. Advanced Materials and Additive Manufacturing

Advanced alloys, polymers, composites and coatings improve strength, corrosion resistance and durability. Additive manufacturing, or 3D printing, can create complex components, reduce material waste in suitable applications and combine multiple parts into one. Engineers must still assess material properties, fatigue, quality assurance, post-processing, certification and whole-life impacts before adopting these methods.

8. Circular Economy and Lifecycle Engineering

A circular economy promotes durability, repair, reuse, remanufacturing and recycling rather than a use-and-discard model. Engineers should assess equipment beyond its purchase price, considering energy consumption, maintenance, reliability, environmental impact and end-of-life options. Lifecycle cost analysis can show why a more efficient asset may provide better long-term value despite a higher initial cost.

9. Skills and Responsibilities of the Future Mechanical Engineer

Future engineers need strong technical fundamentals, practical experience, digital literacy, communication skills and ethical responsibility. CAD, simulation, automation, data analysis, condition monitoring and energy management are increasingly valuable, alongside continuous professional development. Integrity, teamwork, verified calculations, compliance with standards and public safety remain essential.



10. The Way Forward: Engineering a Better Tomorrow

Progress depends on integrating innovation with sustainability and collaboration among engineers, industry, academia, governments and professional organizations. Research, workforce development, energy efficiency and knowledge sharing can accelerate improvement. Experienced engineers should mentor young professionals, while all engineers promote safety, quality and continuous improvement across design, operation, maintenance and decommissioning.

Conclusion

Mechanical engineering stands at the intersection of industrial progress, technological innovation and environmental responsibility. AI, automation, renewable energy, digital twins, advanced materials and circular-economy principles offer opportunities to improve reliability, productivity and resource efficiency. Their benefits depend on sound judgment, reliable data, applicable standards and professional accountability. Engineers' Day reminds us to innovate with purpose, engineer responsibly and create solutions that benefit present and future generations.



Feasibility and Economics of AI-Driven Management System Auditing

HOW AI WILL TRANSFORM INFRASTRUCTURE PROJECT DELIVERY IN QATAR



Er. ARVIND KUMAR SHARMA, FIE
Gharnata Consultant and Engineers

"The true value of AI in auditing is not merely reducing costs, but creating smarter decisions, stronger governance, and sustainable business excellence."

Introduction

Organizations worldwide are under increasing pressure to improve quality, compliance, operational efficiency, and stakeholder confidence while controlling costs. Traditional Management System Audits, although effective, often require significant investments in manpower, travel, documentation review, and audit preparation. With the emergence of Artificial Intelligence (AI), organizations now have an opportunity to transform auditing from a periodic compliance activity into a cost-effective and value-generating business function. The feasibility of AI-driven auditing is no longer a question of technology availability but of strategic implementation and organizational readiness.

The Economic Challenge of Traditional Auditing

Conventional auditing relies heavily on manual review of records, sampling techniques, interviews, and site visits. As organizations grow, the volume of data generated through Quality Management Systems (QMS), Environmental Management Systems (EMS), and Occupational Health and Safety Management Systems (OHSMS) increases exponentially. Consequently, audit costs rise due to greater resource requirements, longer audit cycles, and the potential risk of undetected nonconformities. Furthermore, limited sampling may not always reveal emerging trends or systemic weaknesses within complex business processes.

The Economic Value of AI-Driven Auditing

AI-powered auditing systems offer significant economic advantages by automating repetitive tasks such as document reviews, compliance checks, trend analysis, and risk identification. Instead of manually evaluating a small sample of records, AI can assess entire datasets in near real time. This capability reduces labor-intensive activities, shortens audit durations, and improves audit coverage.

The economic benefits extend beyond direct cost savings. AI can identify quality issues, process deviations, and compliance risks at an early stage, enabling preventive actions before costly failures occur. Reduced rework, fewer customer complaints, improved regulatory compliance, and better resource utilization contribute to measurable financial gains and enhanced organizational performance.

Assessing Organizational Feasibility

The successful implementation of AI-driven auditing depends on several key feasibility factors. The first is digital maturity, where audit records, procedures, corrective actions, and performance data must be available in electronic formats. The second factor is data quality, since AI systems are only as reliable as the information they analyze. The third consideration is organizational competence, ensuring that auditors and managers possess sufficient understanding of both management systems and AI technologies.

Equally important is leadership commitment. Organizations should view AI not as a replacement for auditors but as a strategic tool that enhances professional judgment and decision-making capabilities.

A Practical Cost-Benefit Framework

Before implementing AI-enabled auditing, organizations should evaluate the following factors:

Investment Costs: AI software, data integration, training, cybersecurity measures, and system maintenance.

Operational Benefits: Reduced audit hours, lower travel expenditures, improved audit accuracy, faster reporting, and enhanced compliance monitoring.

Strategic Benefits: Better risk prediction, stronger governance, greater customer confidence, and improved business resilience.

A comprehensive evaluation often demonstrates that the long-term benefits significantly outweigh the initial implementation costs, particularly in medium and large organizations with complex operations.

A Phased Implementation Approach

To maximize return on investment, organizations should adopt a phased approach. Initial deployment may focus on document analysis, corrective action tracking, and audit scheduling. As confidence and data maturity increase, AI can be expanded to predictive analytics, supplier performance monitoring, risk assessment, and continuous auditing functions. This incremental strategy minimizes implementation risks while providing measurable business benefits at each stage.

The Future Business Case

As organizations move toward Industry 5.0, AI-driven auditing will become an essential component of modern governance and operational excellence. Future auditors will increasingly act as strategic advisors, interpreting AI-generated insights to support business decisions. The greatest value will arise from combining Human Intelligence (HI), professional experience, and ethical judgment with the analytical power of Artificial Intelligence.

Conclusion

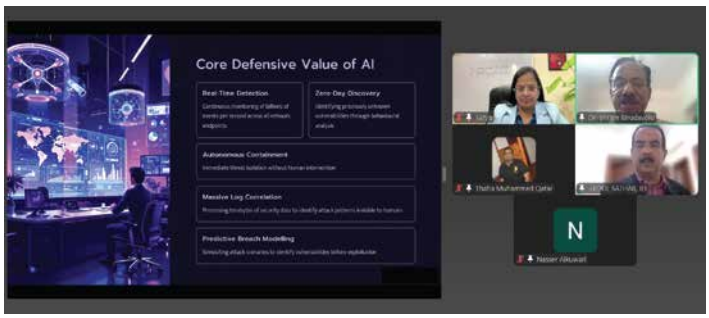
The feasibility of AI-driven Management System Auditing is strongly linked to an organization's digital maturity, data quality, and leadership vision. From an economic perspective, AI offers compelling advantages through reduced auditing costs, enhanced audit effectiveness, improved risk management, and stronger organizational performance. Organizations that invest wisely in AI-enabled auditing today will be better positioned to achieve sustainable growth, quality excellence, and competitive advantage in the future.

Technical Webinar 29th November 2025

Topic : AI IN CYBERSECURITY: A DOUBLE-EDGED SWORD









Cryptography as the Silent Architecture of Digital Trust in Qatar

An engineer's duty in the age of cloud and artificial intelligence



Er. NOOR AFZA
M.Tech (CSE)
(Founder & Managing Director
@OIBS, Corporate Trainer)

Executive Summary

As Qatar accelerates toward its Qatar National Vision 2030 (QNV 2030) and executes its Digital Agenda 2030, the state's transformation relies on a invisible yet foundational pillar: cryptography.

Cryptographic protocols serve as the structural steel of digital trust. They ensure that sovereign data, financial networks, national infrastructure, and e-government operations remain secure, verifiable, and resilient. Under the oversight of the National Cyber Security Agency (NCSA) and guided by the National Cyber Security Strategy 2024–2030, Qatar utilizes advanced encryption and public key infrastructure (PKI) to build digital sovereignty in a hyper-connected world.



Cryptography in Qatar's National Digital Pillars

Government & Citizen Trust: Public Key Infrastructure (PKI)

- National Digital Identity: Advanced cryptographic signatures underpin Qatar's e-government access, guaranteeing non-repudiation, authentication, and privacy.
- National Information Assurance (NIA) Framework: Managed by NCSA (ver. 2.1), the NIA framework designates cryptographic security as one of its core domain controls, enforcing strict cryptographic requirements across all government and public entities.

Financial Ecosystem & Economic Diversification

- Banking and Payment Gateways: End-to-end symmetric encryption (AES-256) and secure transport layer security (TLS 1.3) protect transaction pipelines overseen by the Qatar Central Bank (QCB).
- FinTech & Tokenization: Qatar's growing digital banking landscape relies on cryptographic hashing (e.g., SHA-256) and tokenization to safeguard digital payments and sensitive financial records without exposing raw user credentials.

Smart Cities & Energy Infrastructure

- Lusail City & Pearl-Qatar Smart Grids: Sensor networks, automated transit, and municipal Internet of Things (IoT) rely on lightweight cryptography to secure operational technology (OT) and prevent data tampering.
- Energy Sector Resilience: Qatar's LNG supply chains and critical energy infrastructure utilize secure hardware security modules (HSMs) and asymmetric encryption to isolate key industrial control systems from external intervention.

Strategic & Regulatory Architecture

Governance Framework

The enforcement of cryptographic standards in Qatar is governed by the National Cyber Security Agency (NCSA), which establishes baseline mandates for cryptographic algorithm selection, key lifecycles, and access policies.



Conclusion

Cryptography acts as an invisible, silent foundation that makes Qatar's modern digital transformation possible. By embedding cryptographic controls directly into regulatory standards, critical infrastructure, and national identity systems, Qatar maintains a secure environment that safeguards digital trust and supports long-term economic growth.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Engineering Tomorrow:

Women Engineers Chart the Course Toward a Smart and Sustainable Future



Er. Dilba RK
Civil Engineer
President, IEI Women's Wing, QC

The engineering profession stands at a turning point. Artificial intelligence, digital twin technology, building management systems and predictive analytics are no longer distant promises they are reshaping how engineers design, build and maintain the world around us. Yet amid this rapid digital transformation, a pressing question remains: can innovation and sustainability truly advance hand in hand?

This was the central theme explored at a round table discussion organised by the IEI Women's Wing Qatar Chapter on 9th October 2026, in connection with the Engineers' Day Celebration. Held at Bharat Taste Restaurant in Doha, Qatar, the session titled Engineering Tomorrow: Advancing a Smart and Sustainable Future through Innovation and Digitalization brought together thirteen women engineers from diverse disciplines — healthcare, offshore structures, architecture, chemical engineering, IT, security, supply chain management, quality assurance and academia. Moderated by Er. Dilba Midlaj, President of IEI Women's Wing Qatar, the discussion drew on two deceptively simple questions: How has AI changed your workflow? And in this age of technology, how can we be more sustainable?

The answers that emerged painted a compelling picture of an industry in transition one where the sharpest minds are not merely adopting technology, but interrogating it.

When the Tools Change, the Thinking Must Follow

Across disciplines, one message was unanimous: AI has not simply added new tools to the engineer's workbench it has altered the nature of engineering work itself.

In offshore engineering, Er. Greeshma Ravindran, Senior Structural Engineer and Deputy Lead at McDermott, pointed to the rise of digital twin technology. Virtual replicas of physical structures now allow engineers to simulate performance, anticipate failures and optimise maintenance cycles capabilities that compress months of reactive troubleshooting into hours of predictive insight.

Architecture tells a different story. Er. Asima Moosan, Senior Architect and Project Coordinator at Gharnata Design Consultants, reflected on the disappearance of pure hand-drawn architectural drawings. Where the discipline once demanded pencil, scale ruler and an artisan's patience, it now runs on virtual reality walkthroughs, parametric design and

advanced CAD tools capable of recommending materials. The gains in speed and precision are undeniable, she noted, but something of the craft has been quietly traded away.

In security engineering, Er. Jumana Thabsu, Estimation Engineer at Austin Security Services, described how AI has transformed ELSV and surveillance systems. Data collection that once relied on manual monitoring and disconnected platforms is now integrated, intelligent and capable of real-time analysis across an entire facility.

The academic world is feeling the shift just as keenly. Er. Shamna Mubashir, a Chemical Engineer now teaching at UDST, spoke about how AI-assisted learning platforms, simulation software and digital laboratories are redefining the classroom. Educators, she observed, must continuously evolve their methods to remain effective in a landscape where students often encounter new tools before their professors do.
Er. Shabana Shafi brought the conversation to human resources and IT, highlighting how AI-driven Applicant Tracking Systems have reshaped recruitment. While these tools promise efficiency, they also introduce new problems qualified candidates filtered out by algorithms, and a growing disconnect between human talent and automated screening.
The thread connecting these perspectives was articulated clearly by Er. Anisha Asharuff, Manager of Projects and Integration: in a world where tools, platforms and processes evolve at pace, the defining professional skill is not adoption but adaptability.



Sustainability Is Not a Trade-Off — It Is the Standard

The second question how to remain sustainable in an era of rapid technological change — drew responses that went well beyond environmental platitudes.
Er. Jisha Naveen, Director of Operations and Healthcare Engineering Consultant at M&M Consultancy Services, delivered one of the discussion's most focused arguments. Smart engineering, she maintained, should not fixate solely on constructing new intelligent buildings. The greater opportunity lies in transforming existing healthcare facilities into smarter, safer and more sustainable environments. Hospitals operate around the clock, with HVAC, medical gases, electrical distribution, water supply and life-safety systems directly supporting patient care. By integrating Building Management Systems, Computerised Maintenance Management Systems, IoT monitoring and predictive maintenance, healthcare facilities can shift from reactive maintenance to intelligent, condition-based operations. However, she was emphatic on one point: sustainability and energy efficiency must never compromise patient safety, infection prevention or critical clinical services.
Er. Muth Mary Abraham, SCM Consultant at PHCC, broadened the frame further. One of the most promising applications of AI in sustainability, she argued, is intelligent resource management. When organisations can accurately predict demand, maintain optimal inventory and prevent unnecessary waste, they are not only reducing expenses they are conserving resources and shrinking their environmental footprint. This principle, she noted, applies across healthcare, construction, marine engineering, academia and many other sectors.
Er. Tabassum Yasin, a Quality Assurance Senior Engineer at Aspire Zone and a Chemical Engineer working in Command and Control, argued that smart engineering is not only about adopting new technologies it is equally about using information and resources wisely. Digital systems, data analysis, standardised processes and rigorous reporting can all support better operational decisions. Reliable systems, clear procedures, sound data management and a culture of knowledge sharing help organisations sustain efficiency and performance over the long term. The future of engineering, she proposed, lies in combining technology with human expertise and continuous learning.
Er. Sina Jayan, Procurement Manager at Voltage Engineering Ltd, took the discussion in a humanitarian direction. While the engineering community focuses on matching the pace of technological change, she cautioned, there are communities at risk from natural disasters glacial slides, tsunamis, earthquakes that urgently need the attention of applied engineering. Technology created by humans must serve human welfare first. Warning systems, environmental monitoring and disaster-resilient infrastructure deserve the same innovative energy being directed at commercial automation. Her message was direct: technological development paired with humanitarian values will have far-reaching positive implications.

The Learning Never Stops

Several speakers turned the conversation inward, reflecting

not only on what technology demands of organisations, but on what it demands of each individual engineer.

Er. Noor Afza, Founder and Managing Director of OIBS and IEI Edu Co-Ordinator, captured this sentiment most vividly. Arriving as a speaker, she found herself transformed into an active learner by the breadth of expertise around the table. Her key takeaway was unequivocal: knowledge upgrading is fundamental to sustainability. Without continuously evolving our understanding, she argued, we cannot effectively practise sustainability in our respective fields. The path forward requires evolution continuously refining approaches; transformation turning knowledge into meaningful action; and adaptability staying responsive to new environmental and technological realities.

Er. Shamna Abdulla echoed this view from a cross-disciplinary lens. The discussion reinforced for her that AI, digitalisation and sustainability must progress hand in hand. Interacting with professionals from diverse engineering fields offered valuable real-world perspectives on the growing influence of AI and the importance of adapting to technological advancements without losing the fundamental engineering principles that guide us. The key, she reflected, is not just to keep up with change, but to embrace it responsibly and meaningfully.

Dr. Sajitha also contributed her expertise to the discussion, adding depth to the panel's multidisciplinary perspective on how engineering education and practice must evolve together in the digital age.

Engineering Tomorrow, Together

What became clear over the course of this discussion was that "smart engineering" is not a destination but a discipline. It is not about replacing what exists with expensive technology. It is about applying innovation, digital intelligence and competent engineering practice to make existing systems safer, more reliable, efficient and sustainable.

The round table also demonstrated something that no single keynote could: the value of cross-pollination. An architect's nostalgia for hand-drawn plans and a healthcare engineer's insistence on patient safety are not opposing positions — they are complementary reminders that technology must serve, not supplant, the human judgment at the heart of every engineering decision.

As Er. Dilba Midlaj observed in her closing remarks, the diversity of voices around the table spanning structural, chemical, IT, architectural, healthcare and environmental engineering proved that multiple ideas and experiences lead to the strongest assessments. The event was a reminder that the future of engineering will not be shaped by any single discipline working in isolation, but by professionals willing to listen across boundaries, challenge assumptions and hold innovation accountable to the communities it is meant to serve.

The IEI Women's Wing Qatar Chapter continues to create platforms for exactly this kind of collaborative, forward-looking dialogue one conversation at a time.



The round table discussion "Engineering Tomorrow: Advancing a Smart and Sustainable Future through Innovation and Digitalization" was organised by the IEI Women's Wing – Qatar Chapter on 9th October 2026, in connection with the Engineers' Day Celebration 2026. The event was moderated by Er. Dilba Midlaj, President, IEI Women's Wing Qatar.

Speakers: Er. Noor Afza, Er. Jisha Naveen, Er. Greeshma Ravindran, Er. Jumana Thabsu, Er. Sina Jayan, Er. Shamna Mubashir, Er. Asima Moosan, Er. Muth Mary Abraham, Er. Anisha Asharuff, Er. Tabassum Yasin, Dr. Sajitha, Er. Shamna Abdulla and Er. Shabana Shafi.

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Reinforced Earth (RE) Walls



Er. SHAIK MASTAN
M.Tech, MBA, C.Eng

This article describes the Reinforced Earth (RE) wall—also known as a mechanically stabilized earth (MSE) or reinforced soil wall—is an engineered retaining structure that combines compacted backfill soil with internal tension-resisting elements like metallic strips or plastic geogrids

Key Components of an RE Wall

An RE wall relies on three core interactive elements:

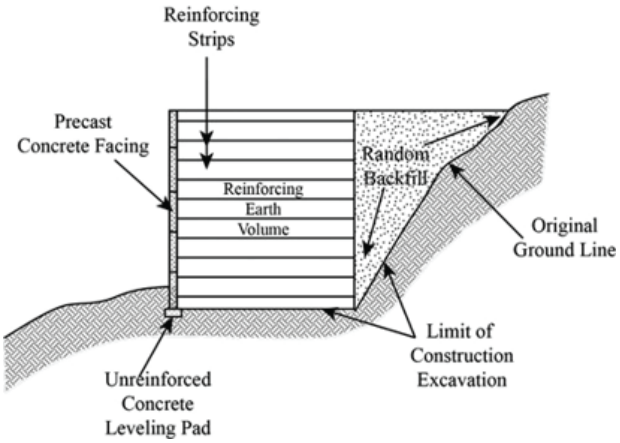
• Facing Units: The outer skin (made of segmental precast concrete panels, modular blocks, or full-height rigid slabs) that prevents soil erosion at the face.

• Reinforcement Material: Horizontal strips, mats, or geogrids extending backward into the soil mass to create frictional grip and tensile strength.

• Backfill Soil: Carefully selected granular or cohesive fill compacted tightly over the reinforcement layers to transfer loads safely.



RE Wall Panel Construction



Cross Section

Construction Methodology

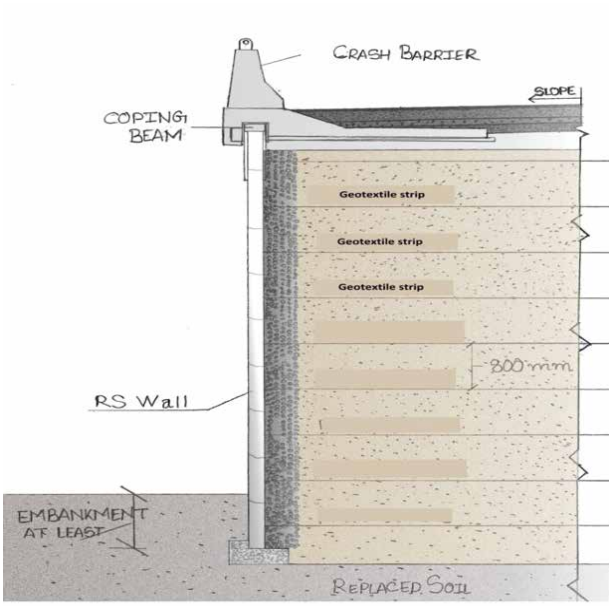
1. Site Preparation: Excavate, grade, and compact the foundation level where the wall will rest.
2. Levelling Pad: Cast a plain cement concrete (PCC) levelling pad to support the bottom row of panels or blocks accurately.
3. Facing Erection: Place the initial course of precast panels or interlocking blocks using external bracing and alignment tools.
4. Backfilling and Compaction: Spread and compact approved granular backfill lifts behind the facing up to the first reinforcement level.
5. Reinforcement Installation: Lay and connect the

geogrids or strips securely to the facing elements, then place subsequent soil layers.

6. Repetition and Capping: Repeat the sequence of filling, compacting, and layering until reaching the top, finishing with a coping beam.



RE Wall Blocks Construction



Cross Section

Panels Vs. Blocks: Choosing the Right System

• RE Panel Walls: Utilize large precast concrete panels. They offer superior structural capacity and durability, making them ideal for high embankments, highway approaches, and heavy traffic corridors.

• RE Block Walls: Use smaller interlocking blocks. They provide a flexible, faster, and more economical solution best suited for low-to-medium height embankments or non-critical zones

How does it work:

The principle is surprisingly simple:

1. Friction is Key: The soil and the reinforcement strips create friction against each other. As the soil tries to settle and push outward, the rough surface of the strips grips the soil particles, preventing them from moving.

2. Tension Holds it Together: The soil pushes down and out. This force creates tension (a pulling force) in the reinforcement strips. The strips are very strong in tension, so they resist this pull, anchoring the entire soil mass together.

3. The Facing: The front of the wall is made of concrete panels or blocks. These are not the main structural component; they are more like a protective "skin." Their job is to prevent the soil from spilling out at the front and to look nice. They are attached to the reinforcement strips.

Why Are Reinforced Earth Walls So Popular?

RE walls have become a standard in modern construction for several great reasons:

• Strong and Flexible: They can be designed to hold back enormous loads and can even withstand some ground movement, like minor earthquakes, better than rigid concrete walls.

• Cost-Effective: They are often much cheaper to build than traditional, massive concrete gravity walls because they use less concrete and require less heavy construction equipment.

• Fast to Build: The process is simple and repetitive: place panels, lay reinforcement, add and compact soil, repeat. This can be much faster than pouring and curing large amounts of concrete.

• Aesthetic: The concrete facing panels can be textured or colored to look like natural stone or brick, making the wall blend in beautifully with its surroundings.

• Space-Saving: They are much thinner than other types of retaining walls, which is a huge advantage when space is limited.

Common Failure Modes and Design Considerations

Engineers evaluate both external and internal stability using modern limit-state design principles:

• External Stability: Checking against sliding, overturning, and deep-seated bearing capacity failure of the overall mass.

• Internal Stability: Preventing strip/grid rupture from tensile overstress or pull-out failure (loss of soil-to-reinforcement adherence).

• Drainage Management: Inadequate internal drainage or poor compaction near drainage paths can lead to saturation, fine particle loss, and localized collapse.

A Real-World Example

• Think of a highway being cut through a hillside. To create a flat, wide road, engineers must cut into the hill. This creates a steep slope on one side that would be unstable and could collapse.

• Instead of building a giant, expensive concrete wall, they build a Reinforced Earth wall at the base of the cut. The wall holds back the hill, creating a stable, vertical face and maximizing the available space for the road.

Conclusion:

A Reinforced Earth wall is a brilliant example of synergy, where the whole is greater than the sum of its parts. By combining simple soil with strong reinforcements, engineers create a durable, cost-effective, and flexible structure that can tame the earth and build the infrastructure we rely on every day.



Biometrics:

The Constant in the World of Innovations



Er. Sumi Vinayan
Business Manager, Allied Enterprises

Technology stacks turn over every few years. Passwords gave way to one-time codes, which gave way to push approvals and hardware keys. Mainframes became clouds, and clouds are now being reshaped by AI. Through all of this, one idea has stayed fi xed: the most reliable way to know who someone is, is to measure something about who they are. Biometrics is the constant that every new wave of innovation ends up building on.

This article looks at why that is, how biometric systems actually work, where they fail, and what keeps them relevant as the threat landscape shifts.

Why Biometrics Endure

Authentication has always rested on three factor types: something you know (a password), something you have (a token or phone), and something you are (a biometric). The fi rst two can be shared, stolen, phished, or forgotten. The third is tied to the person, which makes it convenient and hard to hand over casually.

That property explains why each new platform, from smartphones to wearables to cars to payment terminals, adopts biometrics early. The interface changes, but the need to bind a digital action to a physical human does not.

Biometrics are not new either. Fingerprints were used for identifi cation in the late 19th century, and automated fi ngerprint matching entered law enforcement in the 1960s and 70s. What changed is cost, speed, and accuracy: sensors are now cheap enough to sit in every phone, and deep learning has pushed face and voice recognition far beyond what hand-engineered features could do.

Anatomy of a Biometric System

Despite the variety of modalities, almost every system follows the same pipeline:

1. Capture. A sensor (camera, capacitive or ultrasonic fi ngerprint reader, microphone, infrared projector) acquires a raw sample.
2. Quality check and preprocessing. The system rejects blurry, poorly lit, or partial samples and normalizes the rest.
3. Feature extraction. The raw sample is reduced to a compact representation. Classical systems extracted minutiae from fi ngerprints; modern face systems use neural networks that map an image to an embedding vector.
4. Template creation. The extracted features are stored as a template, ideally not the raw image.
5. Matching. At verifi cation time, a fresh sample is converted to a template and compared against the stored one, producing a similarity score.
6. Decision. A threshold turns the score into accept or reject.

Two modes of operation matter. Verifi cation is a one-to-one check ("Are you who you claim to be?"), as when unlocking a phone. Identifi cation is one-to-many ("Who are you?"), as when searching a database. The second is far harder, because error rates compound with database size.

Modality	Strengths	Weaknesses
Fingerprint	Mature, cheap, fast, widely accepted	Worn or dry fingers, latent-print spoofing
Face	Contactless, works with ordinary cameras	Lighting, pose, aging, deepfakes, privacy concerns
Iris	Very high accuracy, stable over time	Specialized sensors, user cooperation needed
Voice	Works remotely over phone	Noise, illness, voice cloning
Palm vein	Hard to observe or copy	Less common hardware

No single modality is best. The right choice depends on the environment, the cost of a wrong decision, and how much friction users will tolerate.

The adversary moves: spoofi ng and liveness

The security of a biometric depends not only on matching accuracy but on whether the sample came from a live person. A **presentation attack** uses an artifact, such as a printed photo, a replayed video, a silicone fingerprint, or a mask, to fool the sensor.

Defenses are known as **presentation attack detection (PAD)**, or liveness detection:

- **Passive liveness** analyzes texture, refl ections, depth, and micro-movements without asking the user to do anything.
- **Active liveness** uses challenge-response, such as turning the head or reading random digits aloud.
- **Hardware-based depth and spectral sensing** , such as structured light or infrared, makes fl at spoofs much harder

There is also a second class of attack, the injection attack, where synthetic media is fed directly into the data pipeline, bypassing the camera. Generative AI has made realistic fake faces and cloned voices cheap to produce, so defending the capture channel (trusted hardware, signed camera streams, device attestation) is becoming as important as the algorithm itself.

The lesson is that biometrics sit in an arms race. The modality stays constant; the defenses must keep evolving.

Privacy and the problem of permanence

A stolen password can be reset. A compromised fi ngerprint cannot. That permanence is biometrics' defi ning risk, and it shapes good engineering practice:

- **Store templates, not raw images**, and encrypt them at rest and in transit.
- Keep matching on the device where possible, so templates never leave the user's hardware.
- Use secure enclaves or trusted execution environments to isolate template storage and comparison.
- Apply template protection schemes such as cancelable biometrics (transformations that can be revoked and reissued) or fuzzy extractors and homomorphic encryption for matching on protected data.
- Minimize collection and retention, and obtain explicit consent.

Where biometrics are heading

Several trends are worth watching:

• Multimodal fusion. Combining face with voice, or fi ngerprint with behavior, raises accuracy and makes spoofi ng harder, since an attacker must defeat several signals at once.

• Continuous and passive authentication. Instead of a single gate at login, systems can assess confi dence throughout a session using behavioral signals.

• Edge AI. More efficient models let capture, liveness, and matching run entirely on-device, improving both privacy and latency.

• Deepfake-resistant verifi cation. Expect more emphasis on hardware attestation, cryptographic provenance of captured media, and detection models trained against synthetic content.

• Digital identity wallets. Government and industry credentials increasingly pair a verifi ed identity document with a biometric check to bind the credential to its holder.

• Standards and evaluation. ISO/IEC 30107 for presentation attack detection and ongoing NIST evaluations give buyers an objective way to compare systems.

Practical guidance for builders

If you are designing or choosing a biometric system, a few principles hold regardless of technology:

1. Match the modality to the risk. Unlocking a notes app and approving a wire transfer need different assurance levels.
2. Always pair biometrics with liveness detection and, for remote use, protection against injection attacks.
3. Provide a fallback. Some users cannot enroll or will be rejected sometimes; a dignifi ed alternative path is essential for accessibility and resilience.
4. Test across populations and conditions, not just on the data that was convenient to collect.
5. Design for breach. Assume templates could leak, and choose architectures where that does not translate into account takeover.
6. Be transparent. Tell users what is collected, why, where it is stored, and for how long.

Conclusion

Innovation reshapes the surrounding technology constantly: sensors improve, models get larger, attackers get more creative, and regulations tighten. Yet the underlying need stays the same, which is to connect a digital action to a real person with confi dence and with minimal friction. Biometrics answer that need better than any other factor, which is why they keep reappearing at the center of each new platform.

Their staying power, however, is not automatic. It depends on engineering that respects accuracy limits, defends against evolving attacks, and protects the permanence of the data involved. Done well, Biometrics remain the constant.





Er. AMAN SHARMA
Engineer

The Invisible River: How Natural Gas Could Build the Cities of Tomorrow

Imagine the Year 2050

Picture an Indian metropolis born of a single pipeline-where a young engineer watches electric buses hum past, factories forging the materials of tomorrow. Earlier, thousands of families who once migrated in search of employment now find opportunities close to home.

Look closely at a modern hospital, a highway asphalt layer, an automobile assembly line, or children's toy, At first glance these industries look unrelated. However, Beneath the surface, they share an invisible ancestor: natural gas. This is not merely the fuel that cooks our food, generates electricity, or propels vehicles on our highways. It is an invisible river of molecules that can be transformed into the very building blocks of modern industry.

The Gas We Thought We Knew

Most people associate natural gas with electricity, cooking, or CNG. But natural gas is more than a fuel. It is a mixture of hydrocarbons, primarily methane, sometimes accompanied by ethane, propane, butane and other compounds.

These molecules can become the starting materials for an enormous range of industrial products. Ethane can become ethylene, which converts into polyethylene for pipes, packaging and containers. Propane can be converted into propylene, a building block for plastics used in automobiles, appliances and medical products. Methane transformed into methanol, ammonia, hydrogen and other chemicals that support additional manufacturing industries. Some of these products undergo several more transformations before reaching consumers.

A gas molecule extracted from beneath the desert could eventually contribute to a water pipe in an Indian village, an adhesive in a furniture factory or a component in a hospital.

Not every product follows a natural-gas-based route, of course. Crude oil, recycled materials and other feedstocks also support these industries. But the opportunities arising from natural gas are far greater than its familiar uses suggest.

When a Pipeline Becomes an Industrial Corridor

Imagine a pipeline crossing a developing region. Initially, it supplies fuel to a power station and gas to a fertilizer factory. Now imagine a chemical complex emerging nearby. It produces methanol, ammonia or polymers, depending on available feedstocks and commercial demand.

Smaller manufacturers begin purchasing these materials. One makes agricultural pipes. Another produces packaging. A third manufactures automotive components. Others supply industrial chemicals, equipment and maintenance services. Soon, transport companies, warehouses, laboratories and training institutes appear. The output of one factory becomes the raw material of another. An industry begins to attract more industry.

The pipeline has now become more than an energy transportation system. It has helped establish an industrial corridor. This is how manufacturing ecosystems can grow: not through a single giant factory, but through hundreds of interconnected businesses.

From Molecules to Regional Prosperity

A single gas tap doesn't just fuel a generator; it acts as an economic domino effect—sparking a dense web of machinists, fabricators, and tech hubs. These businesses create demand for logistics, packaging, machine maintenance, testing and distribution. Over time, the region develops a skilled workforce and a network of suppliers capable of supporting industries beyond petrochemicals.

The real opportunity is therefore not simply to sell natural gas at a higher price. It is to use suitable gas-derived feedstocks to create multiple layers of manufacturing activity. Such development requires reliable infrastructure, competitive prices, technology, investment, environmental safeguards and access to markets. A pipeline alone cannot guarantee industrialization. But when these conditions come together, its influence can reach far beyond the industries that consume gas directly.

The India–Qatar Opportunity

Qatar demonstrates how natural gas can support an industrial ecosystem extending beyond LNG exports into gas processing, petrochemicals and fertilizers. India brings a different set of strengths: a large domestic market, extensive manufacturing capabilities, engineering talent and growing demand for industrial materials.

The relationship between the two countries could therefore be viewed through a wider lens. Beyond LNG trade lie opportunities for petrochemical partnerships, joint manufacturing, engineering services, industrial technology and downstream investment. A molecule extracted in Qatar could travel across the Arabian Sea as LNG, enter India's pipeline network and become part of an industrial process.
The materials produced through such processes could then supply factories, construction projects and consumers across India and beyond. Energy trade could become the starting point for a much larger industrial relationship.

The Invisible River of Tomorrow

Yet, unlocking this potential comes with a heavy shadow: fugitive methane, carbon ledgers, and the global plastic crisis. Future industrial ecosystems will need cleaner production methods, recycling, energy efficiency and increasingly diversified feedstocks.
When we look at a natural gas pipeline, we usually see a means of transporting fuel. Perhaps we should also see the factories that could emerge beside it, the businesses that could supply those factories, and the engineers who might one day build them.
A gas field true wealth isn't pumped from the earth; it is engineered thousands of miles away in the human capital of thriving industrial cities.—in the industries, skills and cities that grow around its supply chain. The future is not built only from energy. It is built from what we learn to create with it.

Technical Webinar 13th December 2025

Topic : Value Engineering Epc Project Cost Optimization Opportunities



Technical Seminar 28th December 2025

Topic : POWERING THE FUTURE RESPONSIBLY



Farewell Party – Er. Dishari Roy

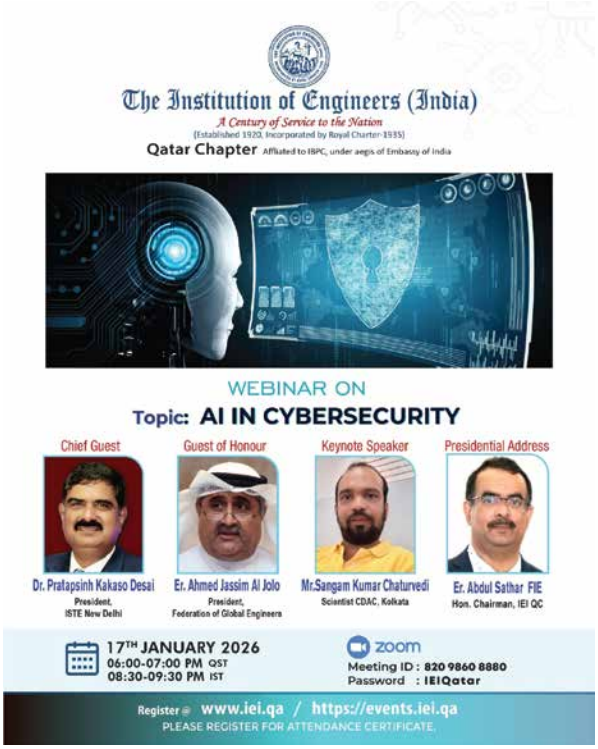
4th January 2026 at Bharat Taste Restaurant, Doha





Technical Webinar 17th January 2026

Topic : AI IN CYBERSECURITY

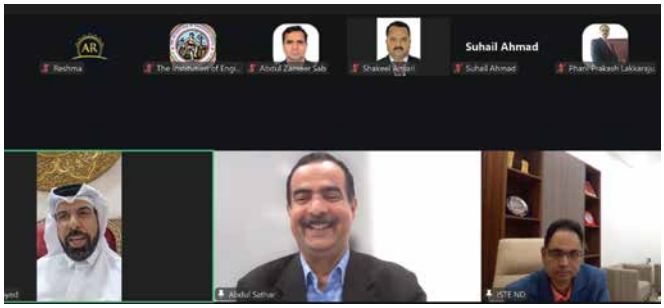


Technical Webinar 15th February 2026

Topic : Data Privacy in the Digital Age: Is Your Information Ever Truly Safe?









Lifting Plans:
The Foundation of Safe Lifting Operations



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Introduction

Lifting operations are essential to construction, engineering, and industrial projects. Cranes, hoists, forklifts, telehandlers, and other equipment are used to move loads in environments that may include restricted access, nearby structures, underground services, or live electrical systems. Because each lift presents different hazards, it must be planned around the specific load, equipment, worksite, and method.

A lifting plan provides a systematic, documented approach to carrying out a lift safely and efficiently. It identifies the load, lifting equipment and accessories, personnel, sequence of work, site conditions, and control measures. The plan should be proportionate to the complexity and risk of the operation—and should reflect actual site conditions rather than rely on assumptions.

Purpose and Importance

The primary purpose of a lifting plan is to establish a safe system of work before the load leaves the ground. It helps confirm that the crane and accessories are suitable, the load's weight and centre of gravity are understood, the crane has sufficient capacity at the required radius, and the ground can support the imposed loads.

The plan also defines responsibilities, communication arrangements, exclusion zones, weather limits, and emergency actions. Thorough planning helps reduce the risk of dropped loads, crane instability or overturning, equipment failure, contact with power lines, collisions, and injury. It can also prevent damage to property, avoid unnecessary delays, and support compliance with project and regulatory requirements.

Supporting Documents

Before a lifting operation begins, the team should have an approved lifting plan supported by the relevant task-specific documents. These may include a risk assessment, method statement or safe work procedure, permit to work, crane load-capacity chart, range diagram, rigging arrangement, inspection and examination records, lifting-accessory certificates, ground-bearing assessment, and engineering drawings.

Complex or critical lifts may require detailed calculations, an engineered lifting arrangement, independent review, and additional client approvals. The required documents and approvals should be determined by the applicable law, project requirements, and site lifting

procedure.

The documents serve different purposes. A risk assessment identifies hazards and defines controls. A method statement explains how the work will be performed in a safe, logical sequence. The lifting plan brings these elements together with lift-specific technical details, equipment selection, capacity checks, drawings, responsibilities, and approvals. None should be treated as a substitute for the others.

What a Lifting Plan Should Include

A comprehensive plan should provide enough information for the lifting team to understand and safely carry out the operation. It should include:

- Load details: Verified weight and its source, dimensions, centre of gravity, lifting points, shape, and any hazardous contents.
- Equipment and accessories: Crane type and model, boom configuration, counterweight, working radius, hook block, slings, shackles, spreader beams, and working load limits (WLL).
- Personnel and competence: The appointed or competent person, lifting supervisor, crane operator, riggers or slingers, and signaller, with their responsibilities and relevant competency records.
- Lifting method and sequence: Instructions for crane positioning, rigging, any required trial lift, load movement, landing, and removal of accessories.
- Site and environmental conditions: Ground capacity, outrigger or track arrangement, access routes, overhead and underground hazards, nearby structures, exclusion zones, wind limits, visibility, lightning, and other relevant weather conditions.
- Communication and emergency arrangements: Agreed radio channel or hand signals, controls for blind lifts, response to loss of communication, emergency contacts, and actions for abnormal conditions.
- Drawings and approvals: Plan and elevation sketches showing crane position, pick-up and set-down locations, lifting radius, swing path, clearances, crew positions, and hazards, along with revision details and required approvals.

Lift Classification and Level of Planning

The level of planning should match the nature and risk of the lift. Routine lifts involving known loads and established conditions may be covered by an approved generic plan, risk assessment, and toolbox talk where the project allows. A standard lift will generally require a job-specific plan based on verified load and crane information.

More complicated lifts—such as those involving restricted clearances, unusual load shapes, or complex movement—require more detailed site checks, drawings, and calculations. Complex or critical lifts, including tandem lifts, personnel lifting, high-capacity utilisation, or lifts where a dropped load could have serious consequences, may require detailed engineering, formal review, and additional approvals. Classification criteria must follow applicable legislation, client requirements, and the project's lifting procedure.

Technical Checks and Site Conditions

Before the lift, the team must confirm the gross load. This includes the item being lifted, rigging accessories, the hook block, and any below-the-hook device. The gross load must be checked against the crane's rated capacity at the actual radius and configuration throughout the entire lift—not only at the pick-up point. Crane configuration, boom length, counterweight, and outrigger arrangement can all affect available capacity.

Rigging must be selected for the load and arrangement, with appropriate consideration of leg loading and sling angles. The ground must be assessed to confirm it can support the crane and outrigger loads. Suitable mats or pads should be used where required.

A site survey should identify power lines, pipe racks, buildings, buried services, trenches, access restrictions, and other obstructions. The plan should also account for the load's route and landing area, and establish exclusion zones to keep people clear of suspended loads. Wind limits must follow the crane manufacturer's instructions and account for the load's size and wind-catching area. Poor visibility, lightning, or other adverse conditions may also require the operation to stop.

Execution, Communication, and Change Control

Before work starts, the lifting supervisor should brief the crew on the approved plan, individual roles, lifting sequence, signals, exclusion zone, hazards, weather limits, and emergency procedures. Equipment identification and certificates should be checked, and permits and approvals confirmed as required.

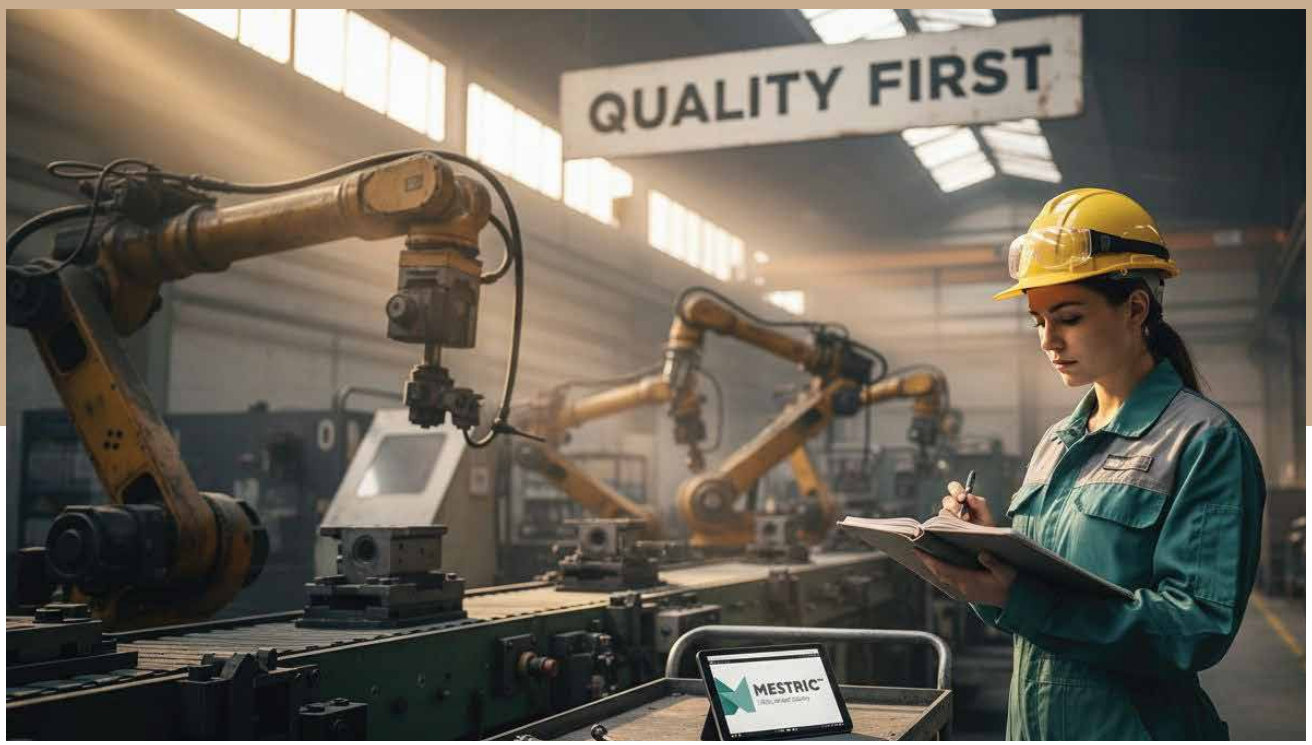
A trial lift and brake test should be carried out when required by applicable rules, site procedures, or the approved plan. Throughout the operation, the load must remain controlled, personnel must stay clear of suspended loads, and communication must be maintained. If communication is lost, conditions become unsafe, or the operation no longer matches the approved method, the lift must stop. The load should be placed in a safe position when practicable.

No one should make unauthorised changes to the approved plan. If the load details, site conditions, crane position, equipment, personnel, or lifting method differ from the approved information, work must stop until the plan has been reviewed, updated, and re-approved by the designated competent authority. All affected personnel must be briefed on the revision before work resumes. After the lift, a short review can record lessons learned, deviations, and near-misses to improve future planning.

Conclusion

A lifting plan is more than a form completed before work begins. It is the practical framework that connects engineering checks, risk controls, competent personnel, and safe execution. A reliable plan uses verified information, suitable equipment, clear responsibilities, accurate drawings, realistic environmental limits, and effective communication.

Everyone involved must understand and follow the plan throughout the operation. If actual conditions do not match the approved plan, the lift must not continue until the discrepancy has been resolved and the required approval obtained. Consistent planning, briefing, supervision, and review are essential to protecting people, equipment, property, and project schedules.



Quality Engineering:
From Finding Defects to Preventing Failure



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Introduction

Engineering is fundamentally about creating solutions that are safe, reliable, efficient and fit for purpose. In today's complex engineering and EPC environment, however, technical excellence alone is not sufficient. Quality must be considered an integral part of every engineering decision.

Traditionally, quality has often been associated with inspection, testing, documentation and correction of defects. While these activities remain essential, modern engineering demands a more proactive approach—***preventing defects rather than simply detecting them.***

This is the essence of **Quality Engineering**.

"***Quality should not be inspected into a product; it should be engineered into the process.***"

From Inspection to Prevention

The evolution of quality can be viewed as:

Inspection → Quality Control → Quality Assurance → Quality Management → Quality Engineering

Inspection asks, "Is the output acceptable?"

Quality Control focuses on whether the process is producing acceptable results, while Quality Assurance establishes systems to consistently achieve the required quality.

Quality Engineering goes further by asking: "How can we design the product and process so that failure is unlikely to occur?"

This change from detection to prevention can have a significant impact on cost, schedule, safety and project performance.

Quality Begins Before Construction

Quality is influenced long before physical work begins at site. Engineering decisions relating to design, specifications, material selection, constructability, procurement, vendor evaluation, risk assessment and inspection planning can determine the quality of the final product.

For example, if repeated welding defects are identified during fabrication, simply increasing inspection or repairing defective welds may not solve the problem.

A Quality Engineering approach looks for the underlying causes:

- Is the welding procedure appropriate?
- Are welders properly qualified and competent?
- Are consumables adequately controlled?
- Is joint preparation satisfactory?
- Are temperature and environmental conditions controlled?
- Is supervision effective?

The objective is not merely to correct the defect, but to eliminate or control its cause.

Quality Engineering in EPC Projects

In an EPC project, quality is influenced throughout the entire lifecycle:

Engineering → Procurement → Fabrication → Construction → Inspection & Testing → Commissioning → Handover

A weakness at one stage can create problems at the next. An inadequate specification may result in inappropriate procurement. Poor procurement controls may lead to material problems. Inadequate construction planning may create installation defects, which may only become evident during testing or commissioning.

Quality Engineering therefore requires cross-functional collaboration between engineering, procurement, construction, QA/QC, HSE, commissioning, vendors and project management.

Most importantly, quality cannot be considered the sole responsibility of the QA/QC department. The QA/QC function provides assurance and oversight, but quality is created by everyone involved in delivering the project.

Risk-Based Thinking

A key principle of Quality Engineering is to identify potential failures before they occur.

Tools such as **FMEA, Root Cause Analysis, 5-Why, Pareto Analysis, trend analysis and risk assessment** enable engineers to understand potential failure mechanisms and establish preventive controls.

For instance, repeated nonconformities should not be treated simply as individual events to be closed. They should be analysed for trends and common causes.

The important question is not only: ***"How do we close this NCR?"***

but also: ***"What must we change so that the same NCR does not occur again?"***

This transforms quality data from a record of past failures into a tool for future improvement.

Prevention is Better Than Rework

The earlier a defect is identified, the lower the potential impact. A design error discovered during a design review may require only a drawing revision. The same error identified after procurement or installation can result in material replacement, dismantling, rework, retesting, schedule delays and additional cost.

Therefore, investment in planning, competency, risk assessment, design review and process control should not be viewed simply as cost of quality. It is an investment in overall project performance.

The Future of Quality Engineering

Digitalization, data analytics and artificial intelligence are creating new opportunities for Quality Engineering. Digital inspection systems, real-time dashboards and data analytics can help organisations identify trends and predict potential failures.

However, technology cannot replace engineering judgement.

The future engineer will need to combine technical competence, quality awareness, data literacy, communication and professional ethics to make sound decisions.

Quality Engineering is therefore not simply another quality tool or methodology. It represents a way of thinking.

From Compliance to Excellence

Compliance with standards, specifications and contractual requirements is essential, but quality should go beyond minimum compliance.

A mature quality culture exists when engineers identify risks before they become problems, supervisors stop work when something is unsafe or incorrect, workers understand why requirements are important, and lessons learned from one project are applied to the next.

Ultimately, Quality Engineering is about creating processes where doing the right thing becomes the natural way of working.

Conclusion

Engineering excellence and quality excellence are inseparable. The engineer of today must look beyond drawings, calculations and specifications. Engineers must understand processes, identify risks, analyse failures, learn from data and continuously improve the way work is performed. The question should no longer be simply:

"Did we achieve the required quality?"

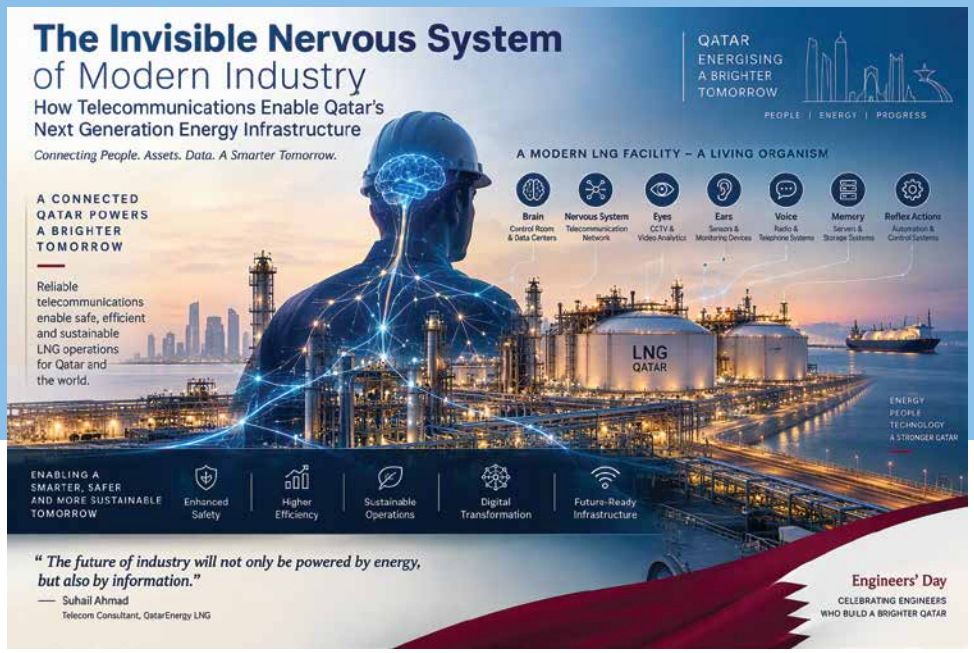
Instead, we should ask:

"Did we engineer the process in such a way that quality was built in from the beginning?"

That is the true essence of Quality Engineering.

As we celebrate Engineers Day, let us recognize that our responsibility extends beyond designing and building. We are responsible for creating **safe, reliable, sustainable and high-quality solutions that stand the test of time.**

Quality is not the final checkpoint in engineering.
Quality is an engineering decision made at every step.



The Invisible Nervous System of Modern Industry

How Telecommunications Enable Qatar's Next Generation Energy Infrastructure



Er. SUHAIL AHMAD SA
MIE, Telecom Consultant, Qatar Energy-LNG.

When we think of modern industrial facilities, we often picture long LNG trains, large storage tanks, pipelines, power systems, and process equipment. These visible assets showcase engineering excellence and operational capability. Yet behind this physical infrastructure lies a less visible but equally critical system that enables every operation, decision, and safety response, "the telecommunications network".

Much like the human body relies on its nervous system to transmit information between the brain and vital organs, modern industries depend on telecommunications systems to connect people, equipment, applications, and control systems. These networks form the invisible nervous system of today's industrial world.

In Qatar, one of the world's leading LNG producers, reliable telecommunications infrastructure is fundamental to safe and efficient operations. As the energy sector embraces digital transformation, communication systems have evolved from supporting operations to becoming a strategic enabler of business and industrial performance.

The journey has been remarkable. Industrial communications once relied on analogue telephones, radio systems, copper cabling, and standalone monitoring solutions. While effective for basic communication, these systems offered limited capacity and integration. The adoption of fiber optics, industrial Ethernet, and high-speed digital networks has revolutionized industrial connectivity.

Today, extensive fiber-optic backbones connect control rooms, substations, security systems, data centers, and field installations across large energy complexes. These networks support operational communications, CCTV surveillance, access control, emergency response systems, automation platforms, and business-critical applications.

A modern LNG facility can be compared to a living organism. The control room acts as the brain, while the telecommunications network serves as the nervous system. CCTV cameras become the eye, sensors act as the sensory receptors, radio and telephone systems provide the voice, and data centers function as memory. Together, they enable the facility to monitor, communicate, respond, and adapt in real time.

Every second, thousands of operational signals travel across these networks. Process parameters, equipment status, security alerts, video streams, and maintenance information are continuously exchanged to support safe and efficient operations. Without reliable communication, the flow of information would be interrupted, affecting productivity, safety, and decision-making.

The role of telecommunications is becoming even more significant as industries adopt technologies such as Artificial Intelligence (AI), Industrial Internet of Things (IIoT), predictive maintenance, and digital twins. These innovations depend on secure, resilient, and high-capacity communication networks.

Consider a digital twin of an LNG facility. To accurately represent plant operations, it requires continuous real-time data from thousands of sensors and devices. Similarly, AI-powered video analytics can automatically detect unusual events, enhance security monitoring, and improve operational awareness. Predictive maintenance platforms can analyze equipment behavior and identify potential failures before they occur. None of these capabilities are possible without a robust telecommunications backbone.

As Qatar continues its journey toward digitalization and industrial excellence, communication networks will play an increasingly important role in supporting safety, sustainability, reliability, and innovation. Emerging technologies such as private 5G networks, edge computing, intelligent monitoring systems, and autonomous inspections will further increase the demand for advanced telecommunications infrastructure.

At the same time, cybersecurity, network resilience, and the convergence of Information Technology (IT) and Operational Technology (OT) present new engineering challenges. Telecommunications engineers are no longer responsible only for connectivity; they are becoming key contributors to digital transformation and the future of industrial operations.

While often hidden behind walls, beneath cable trays, and inside data centers, telecommunications infrastructure remains one of the most critical foundations of modern industry. As engineers celebrate innovation and progress, it is worth recognizing that the future of industry will not only be powered by energy, but also by information. Telecommunications is the pathway through which that information flows, quietly connecting every system into a single intelligent and efficient whole.

Engineers' Day Message: *The most powerful engineering achievements are not always the ones we can see. Often, they are the invisible connections that enable industries, communities, and nations to thrive.*

Technical Webinar 31st March 2026

Topic : Green Energy Movement : Eco-friendly Lighting





IEI Qatar chapter hosts insightful webinar on green energy and eco-friendly lighting

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DOHA

THE Institution of Engineers (India) Qatar Chapter (IEI QC), a leading professional body committed to advancing engineering practices and fostering innovation within Qatar's engineering community, successfully organised a highly engaging and thought-provoking webinar on the theme 'Green Energy Movement & Eco-Friendly Lighting' on March 31, 2026.

The webinar brought together distinguished speakers, industry experts, and members of the engineering fraternity to deliberate on sustainable energy solutions and the critical role of eco-friendly lighting in shaping a greener future. The event underscored IEI QC's continued commitment to promoting technical excellence and environmental responsibility among professionals.

The session commenced with the presidential address delivered by Akhil Asthur, Hon. Chairman of IEI Qatar Chapter. In his address, he emphasised that the Green Energy Movement transcends technological advancements and is fundamentally about responsibility. He highlighted that achieving sustainability requires collective awareness, strong commitment, and proactive action from individuals, industries, and governments alike.

The chief guest, Thaha Abdul Kareem, president of the Indian Business and Professionals Council, commended IEI QC for its significant contributions to the professional community in Qatar across various engineering disciplines. He also reflected on the enduring and robust bilateral relations between India and Qatar, now spanning over five decades.

In his address, he elaborated on the importance of green energy, explaining that renewable sources such as solar, wind, and hydro power are clean, sustainable, and vital in reducing carbon emissions. He noted that nations worldwide are increasingly transitioning towards greener alternatives to safeguard the planet for future generations.

The event was formally inaugurated by Unais, Secretary and Director General, who delivered an insightful address on the environmental impact of conventional lighting systems. He highlighted that lighting constitutes a significant share of global electricity consumption, with traditional incandescent and fluorescent lighting being energy-intensive and environmentally harmful.

In contrast, he emphasised the benefits of modern LED lighting solutions, which are energy-efficient, durable, and eco-friendly. He further elaborated on the advantages of smart lighting systems, including automation, motion sensing, and daylight integration, which optimise energy usage and contribute to sustainability.

The keynote session was led by Harsha Joshi, President of the Indian Society of Lighting Engineers, along with Prakash. The speakers stressed that eco-friendly lighting solutions are no longer optional but essential for achieving a sustainable future. They highlighted the urgent need to adopt advanced technologies such as LED lighting, smart control systems, and integration with renewable energy sources to significantly reduce energy consumption and carbon emissions.

The keynote speakers also drew attention to the importance of maintaining light pollution, enhancing energy management practices, and adhering to national and international lighting standards. They encouraged engineers and industry professionals to embrace innovation, adopt green practices, and actively contribute to environmental protection and sustainable development.

The session offered valuable insights into how modern lighting technologies can play a transformative role in building smarter, greener, and more energy-efficient ecosystems, aligning with global sustainability goals. The event concluded with closing remarks by Ashik, Hon. Treasurer, who also efficiently coordinated the proceedings and ensured the smooth conduct of the webinar.

Reaffirming its mission, the Institution of Engineers (India) highlighted its commitment to organising such knowledge-driven initiatives that empower engineers and future generations with the skills and awareness needed to excel while contributing to a secure, sustainable, and technologically advanced future.

Since its inception, the Qatar Chapter of the Institution of Engineers (India) has been rendering exemplary professional services to the engineering community in Qatar for over 36 years. The chapter has consistently aligned with the institution's objectives by conducting regular technical seminars, workshops, and knowledge-sharing sessions. These initiatives not only promote the advancement of engineering and technology but also provide a vital platform for professional interaction and continuous development within Qatar's engineering community.

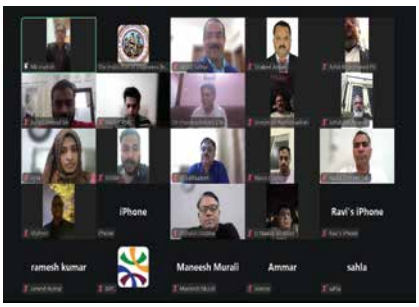




Technical Webinar 15th February 2026

Topic : Data Privacy in the Digital Age: Is Your Information Ever Truly Safe?







IEI Qatar hosts webinar on 'AI Transforming IoT Ecosystem'

TRIBUNE NEWS NETWORK
DOHA

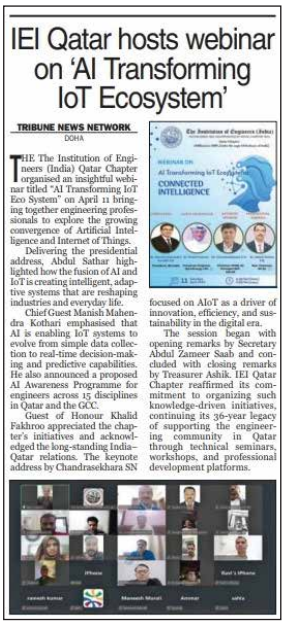
THE The Institution of Engineers (India) Qatar Chapter organised an insightful webinar titled "AI Transforming IoT Eco System" on April 11 bringing together engineering professionals to explore the growing convergence of Artificial Intelligence and Internet of Things.

Delivering the presidential address, Abdul Sathar highlighted how the fusion of AI and IoT is creating intelligent, adaptive systems that are reshaping industries and everyday life.

Chief Guest Manish Mahendra Kothari emphasised that AI is enabling IoT systems to evolve from simple data collection to real-time decision-making and predictive capabilities. He also announced a proposed AI Awareness Programme for engineers across 15 disciplines in Qatar and the GCC.

Guest of Honour Khalid Fakhroo appreciated the chapter's initiatives and acknowledged the long-standing India–Qatar relations. The keynote address by Chandrasekhara SN focused on AIoT as a driver of innovation, efficiency, and sustainability in the digital era.

The session began with opening remarks by Secretary Abdul Zameer Saab and concluded with closing remarks by Treasurer Ashik. IEI Qatar Chapter reaffirmed its commitment to organizing such knowledge-driven initiatives, continuing its 36-year legacy of supporting the engineering community in Qatar through technical seminars, workshops, and professional development platforms.





Human-in-the-Loop is becoming the new Security Theater.

Pressing "Yes" Is Not Oversight



Er. Samir Pawaskar
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Advisor to Boards & Regulators
Leading Cyber Resilience
Risk Governance & Emerging Tech Strategy

Everyone says the answer to AI risk is to keep a human in the loop. But what if the loop has quietly stopped working?

How Human-in-the-Loop Is Becoming the New Security Theater

Recently, advertisements for AI-powered stockbroking applications have started appearing on my YouTube feed. The promise is remarkably simple.

Deposit a small amount of money. Let the AI conduct the research and analysis. Then simply say "yes" or "no."

At first glance, this looks like a convenient use of artificial intelligence. The system does the difficult work of researching companies, analyzing markets and generating recommendations. The human supposedly retains control by making the final decision.

But does pressing "yes" or "no" constitute meaningful human oversight?

Or is the human simply being placed at the end of an automated workflow so that the provider can claim a person remains "in the loop"?

That question connects to a much larger one.

The Slogan

Everyone says the answer to AI risk is simple: keep a human in the loop.

It sounds reassuring. It satisfies regulators. It comforts boards. It appears to provide accountability.

But what if Human-in-the-Loop (HITL) is quietly becoming what compliance became over the past decade? A control that exists on paper, but increasingly fails under real operating conditions.

The uncomfortable truth is that the presence of a human does not guarantee the presence of human judgment.

And history is beginning to prove it.

The Myth

The assumption behind HITL is elegant. AI makes recommendations. Humans supervise. Humans catch mistakes. Therefore, AI becomes trustworthy.

Reality is far messier!

Modern AI is no longer making obvious mistakes. It is making plausible mistakes. And that changes everything.

Humans are surprisingly poor at supervising systems that are right 98% of the time. Psychologists have known this for decades.

We stop paying attention. We trust. We skim.

Eventually, we become nothing more than the approval button.

Automation doesn't remove humans. It slowly anesthetizes them.

We Have Seen This Movie Before

Consider Air France Flight 447.

On 1 June 2009, an Airbus A330 flying from Rio de Janeiro to Paris was cruising over the Atlantic when its autopilot disengaged after faulty airspeed readings. The pilots were suddenly back "in the loop."

It is important to describe this accurately. The pilots were not incapable of flying the aircraft. But the handover came amid unreliable information, confusion and a rapidly developing emergency, after years of operating highly automated aircraft in which manual intervention was rare. The aircraft entered an aerodynamic stall that lasted more than four minutes before it crashed into the ocean.

All 228 people on board lost their lives.

The tragedy wasn't caused by automation alone. It was caused by the fragile transition between machine control and human control.

The humans were technically "in the loop." They simply weren't ready for the loop to suddenly depend on them.

The Boeing 737 MAX exposed another uncomfortable truth. MCAS repeatedly pushed the aircraft's nose downward based on erroneous sensor data. On paper, pilots retained ultimate authority. In reality, many had neither sufficient visibility into the software's behavior nor enough time to understand what was happening before it became unrecoverable.

Being "in control" means very little if:

- you cannot understand the system,
- you cannot interpret its reasoning, or
- you cannot react within the available time.

Human oversight without explainability is not governance. It is ceremony.

The same pattern now applies to autonomous vehicles. A driver who is told to "remain attentive" while the car does the driving for hours is not an active operator. When the system reaches its limits, it expects that driver to recover the situation instantly. That is not a robust control transfer. It is an emergency handover.

Now replace the aircraft with an AI system approving loans, reviewing CT scans, detecting cyber threats or recommending military targets. The pattern doesn't change.

When the Safety Net Has Holes

Healthcare offers perhaps the most sobering lesson. For years, the promise was that AI would augment clinicians, not replace them. AI identifies high-risk patients. Doctors validate the recommendation. Human judgment remains the safety net.

Then researchers independently evaluated one of the most widely deployed AI systems in American healthcare: Epic Systems' Sepsis Prediction Model, already in use across hundreds of hospitals to flag patients at risk of a condition where minutes can determine survival.

The evaluation, published in JAMA Internal Medicine, found that the model failed to identify the majority of patients who ultimately developed sepsis, while generating a significant number of false alerts.

But the algorithm wasn't the only problem. Clinicians were already drowning in alerts from multiple systems. As alert fatigue grew, trust became inconsistent. Some warnings were ignored because there were simply too many. Others were accepted because "the AI must know something."

The human remained in the loop. The judgment did not.

The failure wasn't the doctors. It wasn't the AI. It was the interaction between the two.

A human reviewing thousands of AI recommendations every shift is no longer exercising critical judgment. They are managing cognitive overload. That is not oversight. It is survival.

The Same Story in the SOC

Cybersecurity isn't immune either.

Security Operations Centers increasingly deploy AI to triage thousands, even millions, of events every day. Initially, this looks like the perfect HITL model. AI filters the noise. Analysts investigate what matters.

Then something subtle happens. As the AI becomes more accurate, analysts naturally trust it more. Novel attacks that don't match previous patterns receive less scrutiny because "the system would have flagged it." False negatives become harder to detect precisely because confidence in automation has increased.

Anyone who has spent time inside a mature SOC has seen versions of this. Alert fatigue is evolving into AI fatigue. It becomes security theater when the analyst receives only a high-priority alert and a button marked "Block" or "Allow." The human remains in the workflow, but the system has captured the judgment.

Even AI developers face the same problem. Modern foundation models rely heavily on Reinforcement Learning from Human Feedback (RLHF). Human reviewers evaluate outputs and the model learns what humans prefer. But humans are remarkably inconsistent. They disagree. They become tired. Their decisions drift. Their biases become embedded in the model.

Human feedback improves AI. It does not eliminate risk.

What the Research Says

Recent systematic reviews point somewhere uncomfortable. Human-in-the-Loop performs exceptionally well when humans contribute expertise. It performs poorly when humans merely approve AI recommendations.

That distinction matters.

The highest-performing organizations are no longer asking, "Where can we insert a human?" They are asking, "Where does human judgment genuinely improve the outcome?"

That is a fundamentally different design philosophy.

Back to the Button

Now return to the stockbroking advertisement.

For human oversight to be meaningful, the person must be able to understand the recommendation, assess the evidence, identify uncertainty, challenge the conclusion, consider alternatives, and delay, reject or stop the system before harm occurs.

A binary "yes" or "no" button may satisfy the formal requirement that a human makes the final decision. It does not demonstrate that the human had the knowledge, information or time to exercise independent judgment.

By the time the user sees the recommendation, the system may already have decided which companies to consider, which data sources matter, what time horizon applies, which risks deserve attention, which alternatives to exclude and how much confidence to assign.

The user is not being invited to conduct an analysis. The user is being invited to endorse an analysis conducted elsewhere. The user retains a button, but not necessarily the judgment. The low entry amount is psychologically powerful too. It makes the product appear harmless. But a small deposit does not make the underlying system safe. It may simply make the user less cautious. The user experiments, approves a few recommendations and observes the results. If it appears to work, comfort grows, and so do the deposits and the reliance. The initial amount may be limited, but the behavioral pattern is scalable. The $20 is not a risk boundary. It may be an onboarding mechanism for trust.

This is accountability without agency. The AI performs the analysis. The customer presses the button. The platform can later say that the user made the final decision.

The same structure appears across industries. In recruitment, a recruiter may technically make the final call, but cannot challenge a candidate the system never presents. In every case, the AI analyses, the human receives a simplified recommendation, the human approves, and the provider points to that approval as proof of control.

That is not accountability distributed across the system. It is accountability pushed onto the human at the final stage.

The Contradiction at the Frontier

This brings us to the wider debate.

At the frontier, AI leaders are calling for the industry to "pace" capability development until safety and assurance mechanisms catch up. The argument is not that AI development should stop. It is that capability growth must not outrun our ability to evaluate, contain and supervise increasingly autonomous systems.

The governing principle is straightforward:

Capability Growth ≤ Assurance, Containment and Oversight Capacity

At the consumer level, however, the message is the opposite: "The AI does all the hard work. You only need to press yes."

The contradiction is becoming difficult to ignore.

If the principle is right, it cannot apply only to frontier models. It must apply to any product that places AI between people and consequential decisions, including a small investing app.

Scale does not eliminate the need for assurance. A disclaimer that investments can go down as well as up is not assurance. A human approval button is not assurance either.

At the frontier, safety theater may mean publishing principles or issuing voluntary commitments without independent verification. At the retail edge, trust theater means placing a human finger over an approval button and calling the system "human-controlled."

Both are the same mistake: mistaking the appearance of oversight for the presence of oversight.

The Questions Boards Should Ask

Today the boardroom asks: *"Do we have a human in the loop?"*

It should be asking:

- When does the human intervene?
- When does the AI defer?
- Can the human meaningfully challenge the AI?
- Can we measure whether human intervention changes the outcome?

One useful measure is the override rate, meaning how often a human actually changes the AI's recommendation. But it must be read carefully. **A zero-override rate could mean the AI is remarkably accurate. It could also mean humans are approving everything.**

Because if a human approves 99.8% of AI recommendations, the human is no longer a control. The human has become another workflow stage.

The illusion of oversight is often more dangerous than the absence of oversight.

From Human-in-the-Loop to Human-in-Control

Perhaps the next maturity model isn't Human-in-the-Loop. It is Human-in-Control.

Not physically present, but:

- cognitively engaged,
- properly trained,
- able to override,
- able to challenge,
- able to understand, and
- able to say, "The AI is wrong,"

without first needing permission from the AI itself.

That is a very different operating model, and it is the one regulator, boards, CISOs and AI governance leaders should now be designing for.

AI can be genuinely useful, in investing and elsewhere. But the phrase "the AI does all the hard work" should be treated as a warning, not a benefit. The hard work is not collecting information. It is deciding what matters, understanding what is missing, weighing conflicting evidence, sizing risk and accepting uncertainty. That is precisely the work the advertisement asks the customer not to do.

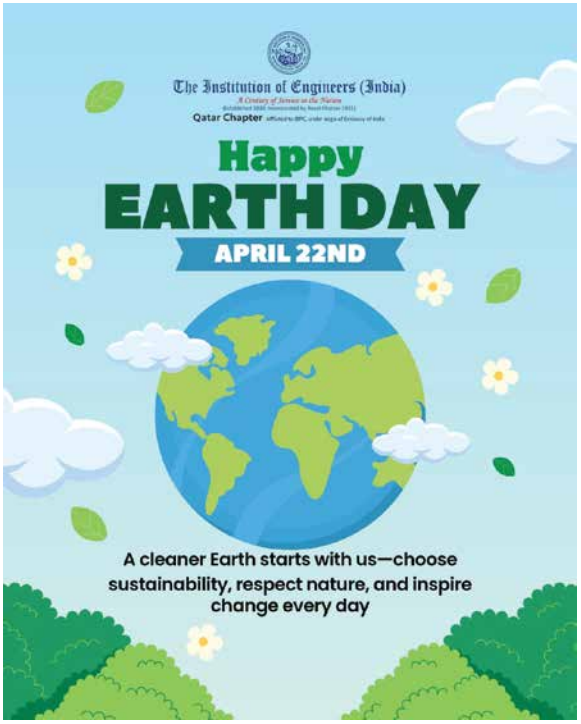
The lesson of Flight 447 is not that humans should never trust automation. It is that automation must never assume that a human who is present is automatically ready to take control.

Because the greatest risk posed by AI may not be autonomous machines. **It may be autonomous trust.**

We've seen that story before. We already know how it ends.

Happy Earthday Celebration

22nd April 2026

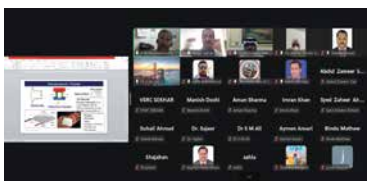


Technical Webinar 25th April 2026

Topic : Next-Generation Thermoelectric Materials For Energy Conversion











IEI Qatar hosts webinar on thermoelectric materials

TRIBUNE NEWS NETWORK
DOHA

THE Institution of Engineers (India) Qatar Chapter (IEI QC) organised a webinar on "Next Generation Thermoelectric Materials for Energy Conversion" on April 25, 2026, focusing on advancements in sustainable energy technologies.

Abdul Zameer Saab, Hon. Secretary, welcomed the gathering, while Abdul Sathar, Hon. Chairman, highlighted IEI's role in professional development and the relevance of the topic. Chief Guest Dr. Abdulla Mohsin Al Wahedi, Director Shared Services at KAHRAMAA, spoke on the growing applications of thermoelectric materials and appreciated IEI QC's 36-year service to the engineering community.

Guest of Honour Dr. SM Ali, Executive Secretary, Indian Society of Technical Education, also commended IEI QC and its collaboration with ISTE.

Dr. Eswaramoorthy Muthuswamy, Professor at Shri Mata Vaishno Devi University, delivered the keynote, discussing recent advances, applications, and challenges in thermoelectric materials. Ashik, Hon. Treasurer, proposed the closing remarks. IEI QC reaffirmed its commitment to knowledge-sharing initiatives, continuing its long-standing service to engineers in Qatar.



Modern Construction Materials

Improving Building Strength Durability and Sustainability



Er. Amina Azeem
Civil Engineer

Introduction

The construction industry is changing rapidly as buildings are expected to be stronger, safer, longer-lasting and more environmentally responsible. Traditional materials such as concrete, steel, bricks and timber remain essential, but modern products and improved manufacturing methods are helping engineers and builders achieve better performance. Modern construction materials can reduce maintenance, improve energy efficiency, make construction faster and lower the environmental impact of buildings when they are selected and used correctly.

1. High-Performance Concrete

Concrete is widely used in foundations, columns, beams, slabs and other structural elements. High-performance concrete is designed to provide improved strength, workability and resistance to water penetration and aggressive environmental conditions. Carefully controlled mix proportions, suitable cementitious materials, quality aggregates and the correct use of admixtures can help reduce cracking and improve durability. Self-compacting concrete can flow around reinforcement with less vibration, making it useful in congested or complex sections. Fibre-reinforced concrete contains steel, synthetic or other fibres that can help control cracking and improve toughness. However, correct design, curing, placement and quality control are essential; a high-strength mix alone does not guarantee a durable structure.

2. Advanced Steel and Reinforcement

Steel provides high tensile strength and is commonly used with concrete to resist structural loads. Modern high-strength reinforcement and structural steel can allow efficient designs and, in some cases, reduce the quantity of material required. Corrosion-resistant options, such as stainless-steel reinforcement or appropriately protected steel, can be valuable in aggressive environments. Galvanizing, protective coatings, adequate concrete cover and good drainage can also help limit corrosion. Engineers must consider the building's loads, fire performance, connections, fabrication quality and local codes when selecting steel products. Proper inspection and maintenance remain important throughout the building's service life.

3. Sustainable and Low-Carbon Materials

Sustainability is a major priority in modern construction. Supplementary cementitious materials, including fly ash, ground-granulated blast-furnace slag and calcined clay, can replace part of the Portland cement in suitable concrete mixes and may reduce embodied carbon. Recycled steel, reclaimed timber and recycled aggregates can help conserve natural resources and reduce waste, provided they meet the required technical standards. Engineered timber products, such as cross-laminated timber and laminated veneer lumber, can provide structural solutions for suitable projects and may store carbon during their service life. The overall environmental benefit depends on sourcing, transport, manufacturing, durability and end-of-life options, so materials should be assessed across their life cycle rather than by one feature alone.

4. Insulation, Glazing and Energy-Efficient Materials

A building's performance depends not only on its structure but also on its ability to manage heat, air and moisture. Modern insulation materials, including mineral wool, rigid foam boards and other tested systems, can reduce unwanted heat transfer. High-performance windows, double glazing, low-emissivity coatings and thermally broken frames can improve indoor comfort and reduce cooling or heating demand. Reflective roof finishes, cool-roof systems and well-designed shading are especially useful in hot climates, where solar heat gain can increase air-conditioning loads. Materials must be installed as a complete system with appropriate vapour control, weatherproofing and fire-safety measures to prevent condensation, leaks or other failures.

5. Digital Construction and Quality Control

New materials deliver their intended benefits only when they are specified, installed and maintained properly. Building Information Modelling (BIM), digital material tracking, prefabrication and modular construction can help coordinate design and reduce errors and waste. Factory-produced components can offer consistent quality and faster installation, while sensors and structural-health monitoring systems can help identify changes in performance in selected buildings. On site, good storage, approved material certificates, inspection and testing plans, correct installation procedures and competent supervision are vital. Workers should follow manufacturer instructions and relevant safety requirements when handling chemicals, cement, insulation and other construction products.

Challenges and Good Practice

Modern materials may have higher initial costs, limited local availability or specialist installation requirements. Some products also need particular skills, equipment or maintenance procedures. A material should therefore not be chosen on purchase price alone. Project teams should compare whole-life cost, expected service life, repair needs, local climate, fire and structural performance, environmental impacts and compliance with applicable standards. Designers, contractors, suppliers and clients should work together early to ensure that material choices suit the project and that substitutions are reviewed by qualified professionals.

Conclusion

Modern construction materials provide important opportunities to improve building strength, durability, comfort and sustainability. High-performance concrete, advanced steel, lower-carbon alternatives, efficient insulation and modern glazing can all contribute to better buildings when appropriately designed and installed. The best results come from combining suitable materials with sound engineering, reliable workmanship, effective quality control and regular maintenance. By considering safety, performance, cost and environmental impact together, the construction industry can deliver buildings that serve people and communities more effectively over the long term.

QATAR SUSTAINABILITY FELICITATION AT QATAR FOUNDATION EARTHNA OFFICE

26th April 2026







INTERNATIONAL LABOUR DAY HEALTH AWARENESS SESSION

30th April 2025 at Olive International School











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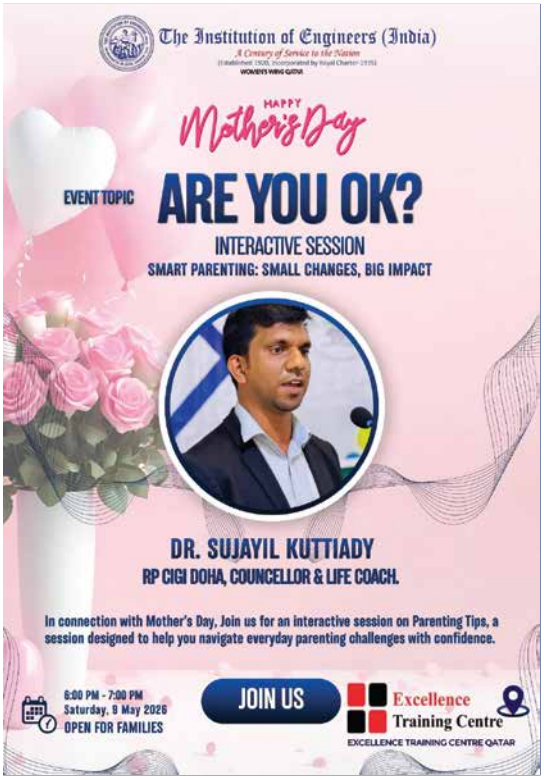
HAPPY MOTHERS DAY
WOMEN'S WING - INTERACTIVE SESSION

9th May 2026 at Excellence Training Center









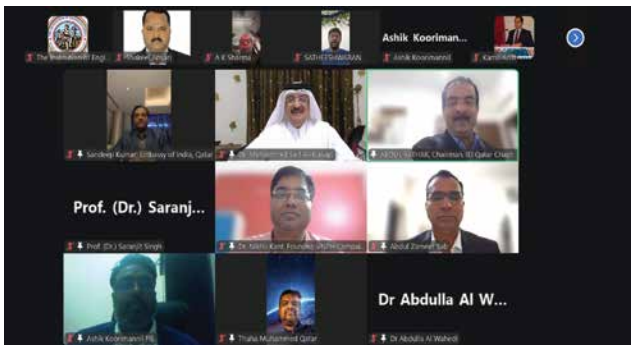




Technical Webinar 5th June 2026

Topic : World Environment Day

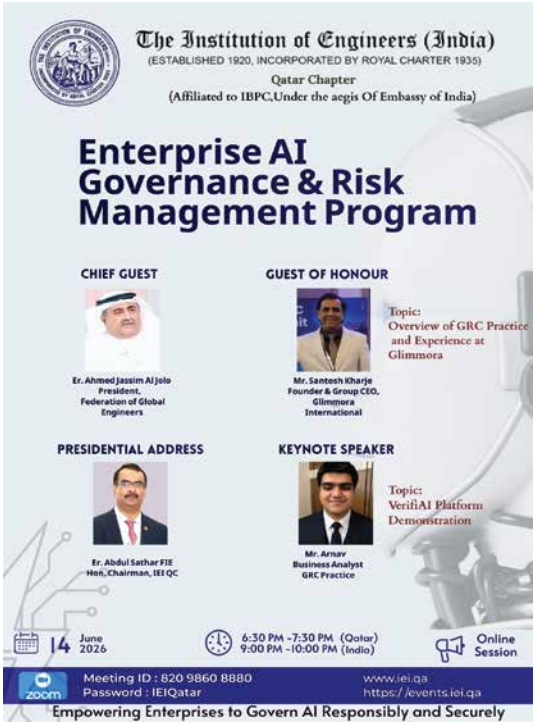


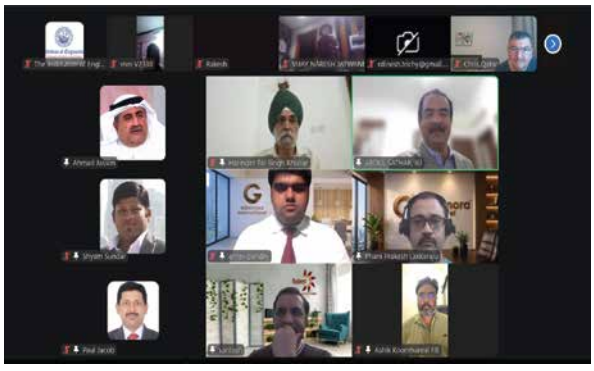


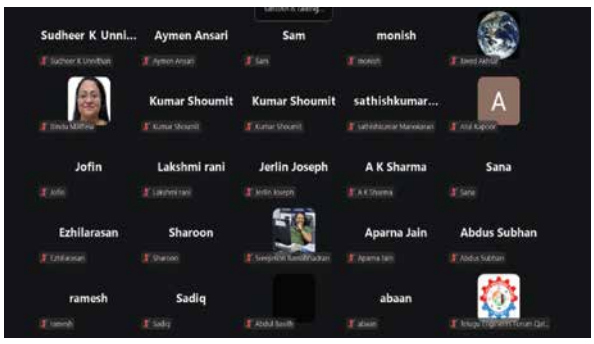


Technical Webinar 14th June 2026

Topic : Enterprise AI Governance & Risk Managent Program









ENGINEERING THE FUTURE

The Human Skills Behind Technology and Innovation



Er. SHABANA SHAFI
Senior Recruitment Specialist
B.Tech in Computer Science Engineering
MBA in Human Resources | Doctorate in HRM(DBA)

Engineering Is Ultimately About People

Engineering has always been a powerful force behind human progress. From the infrastructure that connects cities to the digital systems that connect people across continents, engineers have transformed ideas into solutions that shape the way we live and work.

Today, engineering is entering another period of significant transformation. Artificial intelligence, automation, data analytics, cloud technologies, robotics, and digital platforms are changing not only what engineers create, but also how they work.

Yet, in the midst of this technological advancement, one fundamental truth remains: technology is created by people, for people. The future of engineering will therefore depend not only on technical expertise, but also on the human capabilities that allow engineers to understand problems, communicate ideas, work with diverse teams, adapt to change, make responsible decisions, and continue learning throughout their careers.

The Changing Definition of a Successful Engineer

Traditionally, engineering excellence has been closely associated with technical knowledge, accuracy, analytical ability, and problem-solving. These qualities remain essential and will continue to form the foundation of the profession. However, today's engineer operates in a much more interconnected environment.

A technical decision may involve multiple departments, clients, suppliers, regulators, project managers, and professionals from different cultural and educational backgrounds. An engineer may be required to explain a complex problem to someone without a technical background, collaborate with a multidisciplinary team, manage changing priorities, or quickly learn a new technology.

This means that communication, collaboration, adaptability, creativity, critical thinking, and emotional intelligence are increasingly important companions to technical expertise. The successful engineer of the future will not simply be the person who knows the most. It will be the person who knows how to apply knowledge, work with others, learn continuously, and convert ideas into meaningful outcomes.

AI: From Competition to Collaboration

The rapid development of Artificial Intelligence has generated considerable discussion about the future of work.

For engineers, however, AI should not simply be viewed as a competitor. It can be an extraordinarily powerful tool.

AI can assist professionals with analysing information, identifying patterns, automating repetitive activities, improving productivity, supporting design processes, and accelerating problem-solving. As these capabilities advance, engineers have an opportunity to concentrate more of their attention on higher-value activities such as innovation, judgement, creativity, strategy, and complex decision-making.

This transformation also creates an important responsibility. Engineers must develop the ability to work with technology without becoming completely dependent on it. An AI-generated recommendation still requires human evaluation. Data still requires interpretation. Automated processes still require oversight. Technological possibilities must still be considered in relation to safety, ethics, sustainability, and human needs.

A Talent Perspective: What Makes an Engineer Stand Out?

Working in Talent Acquisition provides an interesting perspective on engineering careers. A qualification tells us what an individual has studied. A resume tells us where a person has worked. Technical assessments may demonstrate knowledge and competence. But recruitment conversations frequently reveal another dimension: how an individual thinks, communicates, approaches challenges, responds to change, and works with other people.

Candidates with similar qualifications and years of experience can create very different impressions. The professionals who stand out are often those who can clearly explain what they have accomplished, describe the problems they have solved, demonstrate ownership of their work, and show genuine curiosity about what comes next.

For young engineers especially, this carries an important message: do not build only your resume. Build your capability. Learn the fundamentals of your profession deeply, but also learn how to communicate. Ask questions. Develop confidence without losing humility. Become comfortable receiving feedback. Understand the purpose behind your work rather than simply completing assigned tasks.

The Power of Continuous Learning

Engineering education provides a foundation, but graduation should never represent the end of learning. A career may span several decades, while technology can transform considerably within just a few years. Engineers who remain curious and continuously develop themselves will be better equipped to adapt to new tools, industries, responsibilities, and opportunities.

Continuous learning does not always mean obtaining another formal qualification. It can happen through professional certifications, technical workshops, research, industry events, professional associations, mentoring, reading, project experience, or meaningful conversations with professionals from different disciplines.

The strongest careers are rarely built around one skill alone. They develop through a combination of technical depth, business understanding, human skills, practical experience, and continuous curiosity.

Engineering With Purpose

As technology becomes more powerful, engineers must also consider the purpose and consequences of what they create. Efficiency and innovation are important, but so are safety, accessibility, sustainability, ethics, and social impact.

Engineering decisions can influence communities, workplaces, economies, and the environment. The ability to ask, "Can we build this?" must therefore be accompanied by another question: "How should we build it responsibly?" The future needs engineers who can balance innovation with responsibility, speed with quality, intelligence with empathy, and ambition with integrity.

Building the Future-Ready Engineer

Preparing for the future does not mean predicting exactly what technology will look like ten or twenty years from now. Instead, it means developing the qualities that make us capable of responding to change.

For engineers, this means maintaining strong technical foundations while developing communication, leadership, creativity, adaptability, collaboration, ethical judgement, and lifelong learning. For organisations, it means recognising that talent cannot be measured solely through qualifications and years of experience. Organisations must create environments where engineers can experiment, learn, collaborate, share ideas, and develop professionally.

Curiosity encourages us to ask why. Engineering enables us to discover how. Human understanding helps us determine what is worth creating.

Conclusion: Engineering Tomorrow

The future of engineering will be shaped not only by how advanced our technologies become, but by how effectively we use them to solve meaningful problems. As artificial intelligence, automation and digital technologies continue to evolve, the role of the engineer will evolve alongside them.

Technical expertise will always remain at the heart of engineering. However, the ability to adapt, communicate, collaborate, think critically and make responsible decisions will increasingly distinguish exceptional engineers. Technology can process information and accelerate solutions, but human judgement is essential for understanding context, recognising consequences and determining the right direction.

Future-ready engineers will therefore need to be lifelong learners. They must remain curious enough to explore emerging technologies, confident enough to challenge existing approaches, and adaptable enough to develop new skills as industries change. At the same time, they must retain the integrity and sense of responsibility that give engineering its value to society.

The strongest engineers will not necessarily be those who compete with technology, but those who understand how to work intelligently with it while contributing distinctly human strengths such as creativity, empathy, leadership and ethical judgement.

The opportunities ahead are enormous. By combining technical excellence with human capability and continuous learning, engineers can transform technological advancement into solutions that are practical, responsible and meaningful.

Ultimately, technology may change the tools of engineering, but people will continue to define its purpose and direction.



Where Small Details Meet Big Responsibility

An engineer's duty in the age of cloud and artificial intelligence



Er. KAMASHWARA D K

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Every engineer remembers the first time a design they were proud of refused to behave the way the calculations promised. For a mechanical student it may be a model that buckles in the laboratory; for a software student it is a program that runs perfectly on a laptop and collapses the moment real users arrive. These moments are uncomfortable, but they teach what no textbook can: engineering is not only about making things work. It is about making them work reliably, safely and for the people who depend on them. As we mark the 59th Engineers Day, I would like to reflect on that responsibility, drawing on lessons from the field and from my own early steps in the profession.

When small details carry a heavy price

In 1999, NASA lost its Mars Climate Orbiter, a mission costing roughly 125 million US dollars, as it approached the planet. The cause was not a failure of rocket science. One team supplied thruster data in imperial units (pound-force seconds) while the navigation team expected metric units (newton-seconds). Each team's work was correct on its own; the failure lay in the gap between them.

Almost two decades later, the same lesson appeared in the cloud. In February 2017, Amazon's S3 storage service in its US-East region suffered a major outage that disrupted websites and applications around the world. Amazon's own post-incident summary explained that an engineer carrying out a routine task entered one command input incorrectly, and far more servers were removed than intended. Afterwards, the tooling was changed so that capacity is removed more slowly and cannot be taken below a safe minimum.

The technology changed between 1999 and 2017; the lesson did not. Clear interfaces, questioning our assumptions and building safeguards against ordinary human error are not bureaucratic extras. They are the heart of the profession.

Designing for tomorrow, not just today

Qatar offers some of the most instructive examples of engineering that thinks ahead. Stadium 974, built on the Doha waterfront for the 2022 FIFA World Cup, was constructed from shipping containers and modular steel so that it could be dismantled and reused after the tournament instead of being left as a costly, under-used structure. Its name is Qatar's international dialling code, a small reminder that good engineering can also carry identity.

The Doha Metro, which opened in 2019, tells a similar story. Civil, electrical, mechanical, signalling and

software teams had to work as one to deliver a modern, driverless network that residents and visitors now rely on every day. No single discipline could have built it alone. Projects like these show that the most valuable engineers are those who ask a simple question before the ribbon is cut: what happens next, for the people who will use this and the teams who will maintain it?

A student's view from the cloud

As a final-year Computer Science student specialising in Cloud Computing, I see this responsibility from the software side. During my internship with the IEI Qatar Chapter, I worked on an AI-powered customer support chatbot built with Python and Dialogflow. On paper it looked straightforward. In practice it taught me that users rarely ask a question the way a developer expects. The same request can arrive in a dozen different phrasings, and a system tested only on tidy examples will fail in its first real conversation. Testing with realistic inputs, deciding what the system should do when it is unsure, and keeping a human in the loop turned out to be as important as the code itself.

Today, cloud platforms allow a student to deploy in an afternoon what once required a dedicated data centre. That power is exciting, but it also means that a mistake can reach thousands of users just as quickly. Young engineers must therefore learn not only how to build fast, but how to build responsibly. Three habits have guided me so far:

• Verify every interface. Most failures hide where one component, team or unit of measurement meets another.

• Design for failure. Assume something will go wrong, and decide in advance how the system will protect its users when it does.

• Never stop learning. Tools will change every few years; curiosity and discipline are what carry an engineer through each change.

Engineers beyond the code

Technical skill alone is never enough. The best engineers I have met, whether in classrooms, internships or professional forums, share one quality: they can explain a complex idea simply to someone who is not an engineer. A client, a manager or a member of the public rarely needs to hear about algorithms or load calculations. They need to know whether the system is safe, what it will cost and what could go wrong. Learning to communicate honestly, including saying "I am not sure yet" or "this needs more testing", builds the trust on which every successful project depends.

For Indian engineers working and studying in the Gulf, this carries a double meaning. Each of us represents not only our own work but also the standing of our profession and our country. Professional bodies such as the IEI Qatar Chapter play a valuable role in keeping that standard high by connecting students with experienced engineers who are generous with their time and their lessons.

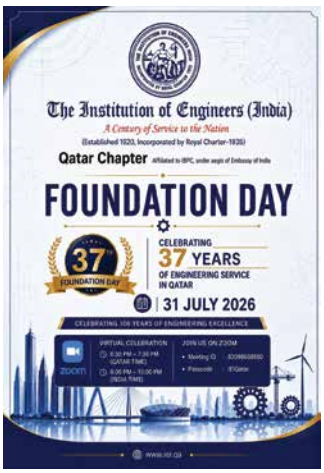
A word of thanks

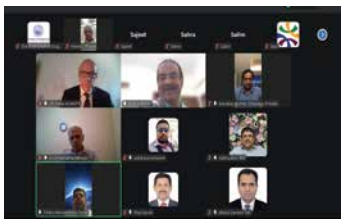
On this Engineers Day, I am grateful to the Institution of Engineers (India) Qatar Chapter and its senior members, whose guidance and platform give young engineers the chance to learn from experience and to contribute in return. May we all continue to build things that work, that last, and that serve people well.

Technical Webinar 31st July 2026

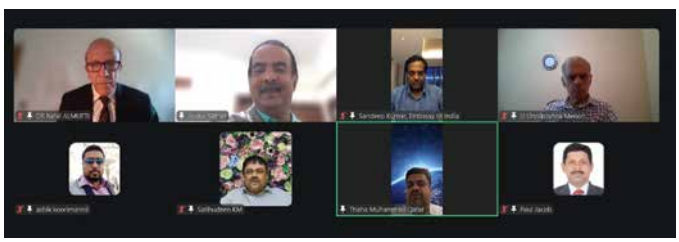
Topic : IEI QC 37th Foundation Day

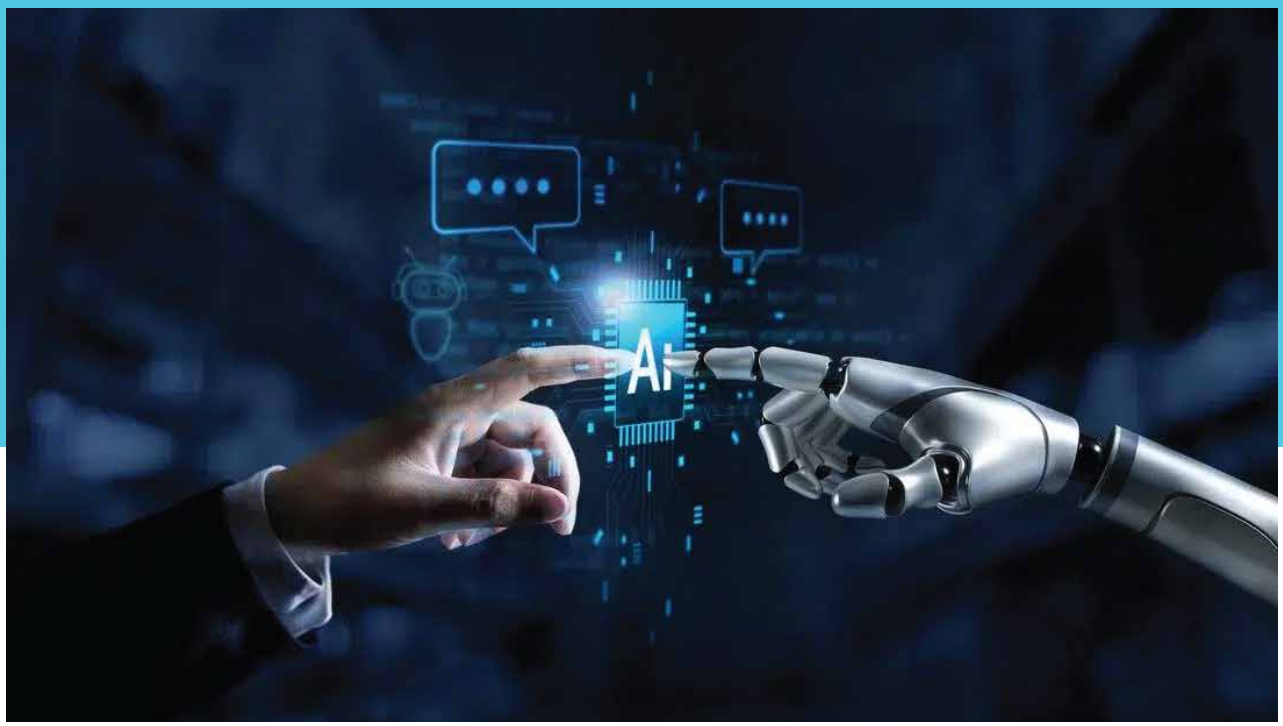












AI as a Working Tool



Er. RAHUL GEORGE
ENGINEER

At a company gathering to introduce our new president, I had the opportunity to hear him speak. Something he said stuck with me. Investing in a personal AI tool is just as important as investing in a good suit.

I have thought a lot about it since then. A suit helps make an impression. So does the work we do, and AI can help us get that work done faster. But just like any tool, what you get out of it depends on how you use it.

I work on the software side, so my examples come from there. But I think the lessons I have learned can be applied to any discipline, be it mechanical, civil, or electrical engineering.

Where it helped me the most

In the initial phase of my career, when handed a big piece of unfamiliar work, I would spend a couple of weeks just trying to understand what had been done, where everything fits together and why it was done that way.

But with the help of AI, I could reach the same understanding in 2-3 days. This includes the time that I spent checking my understanding and verifying it with colleagues.

Imagine you join a project mid-way. Years of drawings, reports and specifications. People are expecting you to get up to speed fast. We cannot be Chitti, the robot from the film Enthiran who scans books and absorbs information in seconds, but AI tools can help us here. They read fast, summarise well and, most importantly, are patient, especially with the questions you would feel awkward asking a colleague for the 5th time.

Where I noticed it struggle

My AI assistant had access to my whole codebase (a folder of files and subfolders), including tested functions the team already trusted. But when I asked it to build something those functions could handle, it wrote its own version instead. It worked, but it was redundant.

It's like asking someone to cook dinner. They go out and buy all the ingredients and prepare the meal, but your fridge already had what you needed. The meal is tasty, but time and money were wasted. The fix cost me almost nothing. I added a couple of sentences to my request, telling it what we already had and to use that first. After that, the results were ones I could actually use.

Another thing I noticed: when I asked AI to start the work and then guided it step by step, two things happened:

1. The work became more complicated than it needed to be.
2. The conversation got longer, and the quality of the answers started to drop.

But when I started the task myself and then brought in AI, the results were considerably better. I still had to guide it, but for a much shorter time.

One more thing to keep in mind: AI sounds just as confident when it is wrong as when it is right. It won't stop and say "I'm not sure." That's why you can't treat its answers like those of a colleague you've trusted for years.

How to make effective use of AI

The internet is full of tips regarding this topic and it can easily become a rabbit hole. I have experimented with

different approaches and this is one that has worked for me the best.

The 20-60-20 rule

The first 20%: you. Before asking AI anything, we need to decide what we want. What is the goal we are trying to achieve? What are the resources available? What are the steps it should follow? What should it avoid? Any examples you can provide? This is the thinking part and it's all on you.

The middle 60%: AI. Now let it do the heavy lifting. The first draft, the summary, the repetitive work, the first pass at organizing the information. This is where the time savings are.

The last 20%: you again. Check everything. Does it match the standards? Do the numbers hold up? Is it what you asked for, or just something that looks right? This part is also yours.

When I skipped the first 20%, I got the fridge problem and the long conversations where results got worse. When I skipped the last 20%, I risked confident mistakes slipping through. The tool did its 60% well in both cases. The difference was whether I did my part.

AI can do the work. Only you can stand behind it.

When an engineer signs a drawing or approves a report, our name is on it. Nobody will accept "the AI got it wrong" as an excuse, and they shouldn't. The responsibility has always been ours, and it still is.

One practical point: be careful with confidential information. Client details, project data and company documents shouldn't go into any AI tool unless you know how that tool handles them.

If you want to start

You don't need to change everything about how you work. Here's what I'd suggest:

1. Pick one tool. Don't try several at once. Learn one properly.
2. Pick one regular task. Something you do again and again, like a weekly report, a summary of a long document, or organizing data.
3. Give it your own previous work as a starting point, not a blank page.
4. Always do the last 20%. Check the result before it goes anywhere.

Do this for a month and you'll know quickly where it saves you time and where it doesn't.

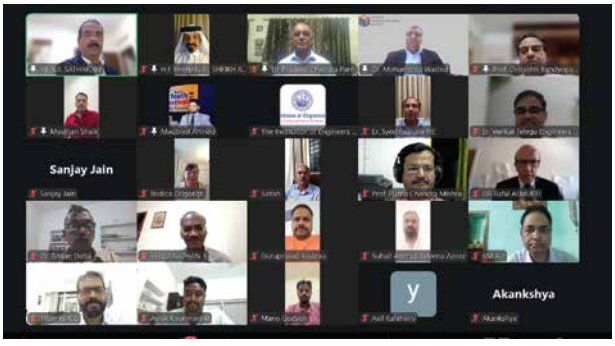
Our president's comparison was a good one, but I'd add to it. A good suit makes you look prepared. A good tool, used well, actually makes you prepared. And just like with any tool we've used in our careers, the engineer is the one who answers for the result.

Technical Webinar 2nd August 2026

Topic : Engineering Excellence for a sustainable and Technologically Sovereign India









From Primavera to Predictive Planning:

How AI Will Transform Infrastructure Project Delivery in Qatar



Er. JOICE KURIAN
B.Tech (Civil), MBA

Abstract. Over decades, construction planning has moved from hand-drawn bar charts to Primavera scheduling, integrated project controls, BIM, 4D simulation and, increasingly, digital twins. Each step improved how we record and forecast progress; none reliably told us what is likely to happen next, or what to do about it. Writing from the seat of a planner with 22 years in highway and infrastructure delivery, this article argues that artificial intelligence marks the next shift: from recording and forecasting to predicting and recommending. It traces the evolution, offers a four-level maturity model, relates it to Qatar's digital-twin direction, and proposes practical steps and cautions.

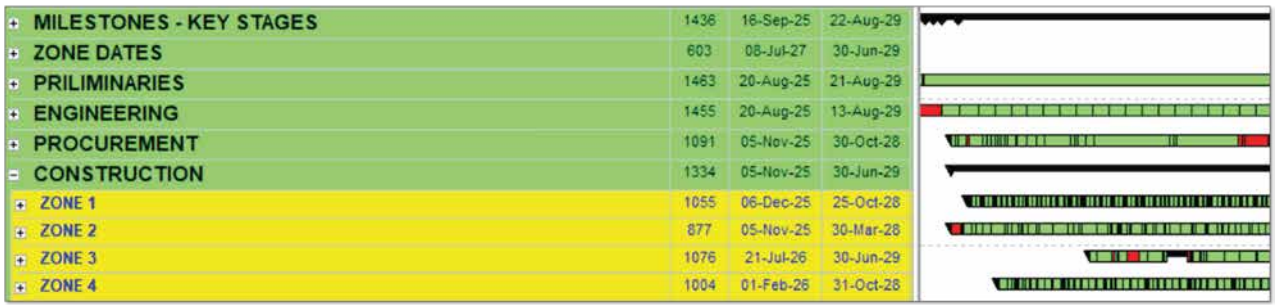
1. Introduction

I began my career when a master programme was a bar chart pinned to a site-office wall, redrawn whenever the project manager lost patience with it. Twenty-two years later, I lead planning for infrastructure work in a country building a national digital twin. The tools have changed beyond recognition. The planner's central question has not: will we finish on time, and what must we do differently if we will not? What has changed is our ability to answer. My argument is that planning has moved through four stages: recording what happened, forecasting what may happen, predicting what is likely to happen, and recommending what should be done. The first two are mature. The last two are now technically feasible, and Qatar's infrastructure sector is unusually well placed to adopt them. In June 2026, Ashghal used a Project Qatar session to present BIM and GIS integration as the route towards Qatar's National Digital Twin, with benefits for planning, project delivery and asset management [1].

2. The Recording Era: From Bar Charts to Primavera

Critical path thinking dates from the late 1950s, yet for much of my early career its practice depended on whoever held the pencil. Bar charts showed dates, not logic; a delay to one activity said little about its effect on completion.

Primavera P3, followed by Primavera P6, transformed and modernized the construction planning and scheduling discipline.. Logic-driven networks, calendars, constraints and resource assignment turned the programme into a model that could be recalculated. We could baseline, update, and watch float erode. On highway work, where long linear sequences, utility diversions, structures and drainage compete for the same corridor, the critical path method gave contractors, consultants and clients a common language in which to argue.



MILESTONES - KEY STAGES	1436	16-Sep-25	22-Aug-29
ZONE DATES	603	08-Jul-27	30-Jun-29
PRILIMINARIES	1463	20-Aug-25	21-Aug-29
ENGINEERING	1455	20-Aug-25	13-Aug-29
PROCUREMENT	1091	05-Nov-25	30-Oct-28
CONSTRUCTION	1334	05-Nov-25	30-Jun-29
ZONE 1	1055	06-Dec-25	25-Oct-28
ZONE 2	877	05-Nov-25	30-Mar-28
ZONE 3	1076	21-Jul-26	30-Jun-29
ZONE 4	1004	01-Feb-26	31-Oct-28

Figure 1. A Primavera P6 programme for a highway project: the core instrument of planners.

But P6, used conventionally, is a record-keeping system. The programme reflects what the planner believes and what site teams report. A well-built schedule tells you the contractual completion date; it tells you very little about the probability of achieving it.

3. Integrated Project Controls: The Forecasting Era

Integration came next. Cost-loaded schedules, earned value, resource histograms and risk registers began to be read together rather than in separate reports. Schedule risk analysis introduced probabilistic thinking: instead of one completion date we saw a distribution, and instead of one critical path we saw criticality indexes. The S-curve became an early-warning instrument, and SPI and CPI became a project's vital signs.

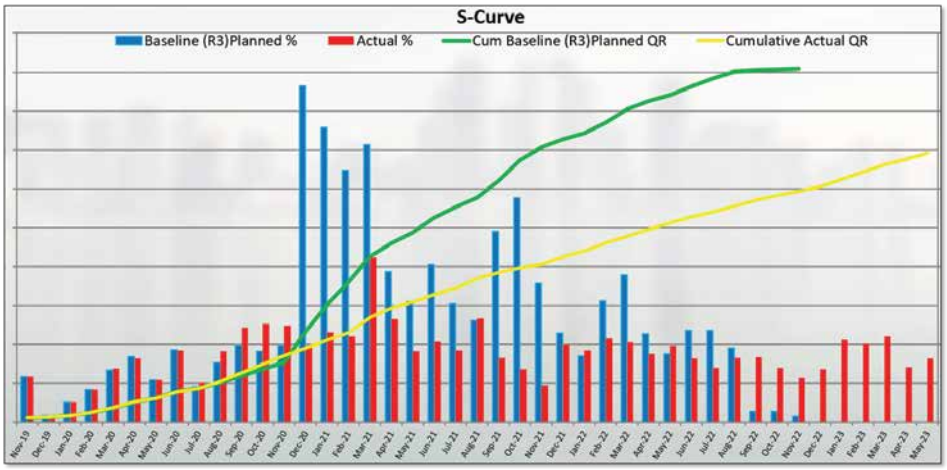


Figure 2. Cost loaded progress curve against baseline: the forecasting era's early-warning tool.

This was real progress, yet forecasts were still extrapolations. Earned value assumes future performance resembles past performance. Risk models rely on three-point estimates supplied by people who, as the planning fallacy shows, tend towards optimism. Studies of public works worldwide document persistent cost underestimation. Our forecasts were better organised, but not necessarily better informed.

4. BIM and 4D Planning: Seeing the Programme

BIM gave planners what we had long lacked: the geometry of the work. Linking model elements to schedule activities produced 4D simulations in which sequencing conflicts became visible: a crane swing over a live carriageway, a concrete pour blocked by a utility diversion, temporary works occupying space the next crew needed. In coordination meetings, a 4D animation settled arguments that a Gantt chart could only prolong.

In Qatar, Ashghal's BIM standards, aligned with ISO 19650 [2], created a common information environment. For planners, the lesson was that quantity, location and sequence could finally hang from one data structure.

Even so, 4D remained largely a visualisation of the plan, not a test of it. The model showed how we intended to build, not how likely that was.

Activity ID	Activity Name	Original Duration	2 ZONE	3 SUBZONE	4 ROAD SECTION	5 DISCIPLINE
SURFACE WATER DRAINAGE OPEN CUT		152				
MANHOLE CONSTRUCTION		39				
CZ11A1BSWM1210	Excavation for Manholes(11-No.s)	6	Z1	1	A1B	SWM
CZ11A1BSWM1250	Manhole Base Slab concrete works(11-No.s)	6	Z1	1	A1B	SWM
CZ11A1BSWM1270	Formwork and wall concrete works(11-No.s)	6	Z1	1	A1B	SWM
CZ11A1BSWM1280	Top Slab concrete works(11-No.s)	6	Z1	1	A1B	SWM
CZ11A1BSWM1300	Backfilling as per requirements(11-No.s)	6	Z1	1	A1B	SWM
PIPE WORK IN TRENCHES		32				
CZ11A1BSWT1210	Excavation for Trenches(526-lm)	19	Z1	1	A1B	SWT
CZ11A1BSWT1240	Pipe laying in Trenches(526-lm)	11	Z1	1	A1B	SWT
CZ11A1BSWT1300	Backfilling as per requirements(526-lm)	11	Z1	1	A1B	SWT

Figure 3. A location-based WBS and activity-code structure in P6: the data discipline that makes 4D linking possible.

5. Digital Twins: Connecting Plan to Reality

A digital twin goes beyond a model by staying connected to the physical asset and updating as conditions change. Data from drones, LiDAR, survey, sensors, site diaries and progress reports can feed one environment where planned and actual are compared continuously. Ashghal has presented BIM–GIS integration as the foundation of Qatar's National Digital Twin [1], and its recent drainage operation and maintenance contracts anticipate digital twins, automation and analytics to predict faults. The QATAR BIM 2026 conference also recommended deeper integration of BIM with AI and digital twins, including in project management, risk assessment and cost management .

For the planner, a delivery-phase twin matters because it produces what predictive models need: large, structured, time-stamped data on progress, resources, constraints and conditions. The twin is the data engine; AI is what puts it to work.

6. Predictive Planning: What AI Actually Changes

Table 1 sets out four levels of planning maturity. Most contractors, my own organisation at various points included, operate at levels one and two.

Table 1. *The planning maturity ladder*

Level	Question	Typical tools	Output
1. Recording	What happened?	P6 updates, site progress reports	Status and variance
2. Forecasting	What may happen?	Earned value, schedule risk analysis	Ranges and trends
3. Predicting	What is likely to happen?	Machine learning on historical and live project data	Probability of delay by package or activity
4. Recommending	What should we do?	Simulation, optimisation, AI agents	Ranked, costed recovery options

Level three is where machine learning enters. Models trained on past schedules, daily progress records, resource logs, weather and approval histories can learn what actually drives delay in a given type of work. Instead of relying on the optimism of an assigned duration, a model could estimate that a drainage package, with a given crew, in a given month, with a given degree of utility interface, has a certain probability of slipping, and which activity is driving it. Language models can read daily reports, minutes and correspondence, surfacing early signals such as repeated references to access or approvals before they become delay events. Computer vision on drone and site imagery can validate progress independently of reported percentages.

Level four is the real shift. Given a predicted delay, a recommending system could simulate alternatives, such as resequencing, adding a shift, levelling resources, rephasing traffic management or advancing procurement, and rank them by schedule recovery, cost and risk. The planner no longer only reports that the project is late; the planner arrives at the meeting with options.

Qatar's conditions suit this approach. Summer work-hour restrictions, shamal winds and rain events, utility congestion in dense corridors, multi-contractor interfaces and approval cycles are recurring, data-rich patterns, exactly where models learn well.

7. Realistic Challenges

Having lived through earlier waves of digital enthusiasm, I would caution against assuming that technology alone delivers.

- Data quality. Models learn what we feed them. Programmes with open ends, excessive constraints and unreliable progress teach nothing useful.
- Fragmented data. Contractor, consultant and client each hold part of the picture. A common data environment and agreed sharing rules are prerequisites.
- Explainability. A black-box prediction will not survive a claims environment. Forecasts must show their drivers.
- Contractual reality. Extension-of-time analysis demands contemporaneous, defensible records. Predictions inform decisions; they do not replace the record.
- Skills and accountability. Planners must become data-literate, and accountability stays human: AI recommends, engineers decide.

8. A Practical Roadmap

1. Fix the foundation: schedule quality checks, standard WBS and activity codes, consistent progress measurement.
2. Capture structured data: delays, productivity and constraints recorded daily in consistent categories.
3. Connect systems: link schedule, cost, BIM and GIS data in a common data environment.
4. Pilot on one package: run predictive models alongside conventional forecasts and compare with actual outcomes.
5. Scale with governance: introduce recommendations under human review, with clear ownership of decisions.

9. Conclusion

Primavera is not obsolete; it becomes the structural backbone around which intelligence is built. The logic of a critical path still matters, and AI trained on poor logic will simply be wrong faster. What changes is the planner's role: from reporter of the past, to forecaster, to adviser who can say what is likely to happen and what to do about it. Planners who understand both the discipline of the critical path and the behaviour of data will lead the next phase of infrastructure delivery in Qatar. The destination is not a better record of the project; it is a better project.

References

[1] Ashghal showcases BIM and GIS in advancing Digital Twin at Project Qatar 2026. The Peninsula, Doha, June 2026; see also Qatar News Agency, 10 June 2026.

[2] Global BIM Network. Qatar: Ashghal BIM Standard. globalbim.org.

Technical Special Webinar 5th Sep 2026

Topic : Modern Engineering & AI Blind Spots







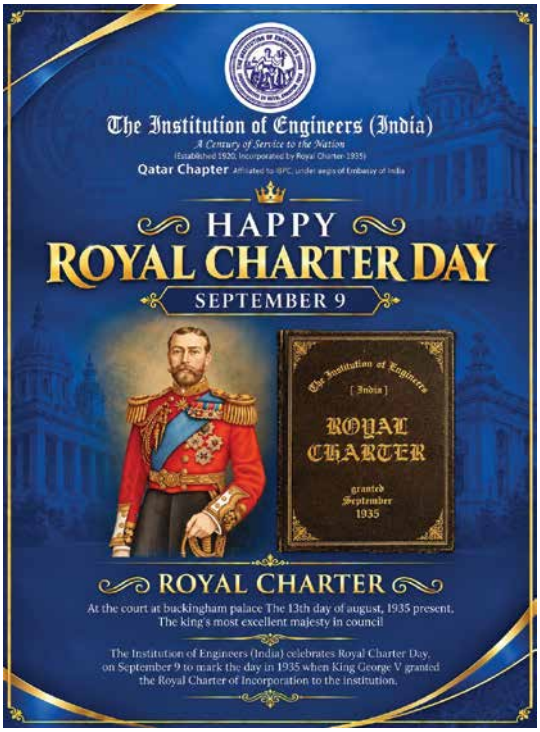


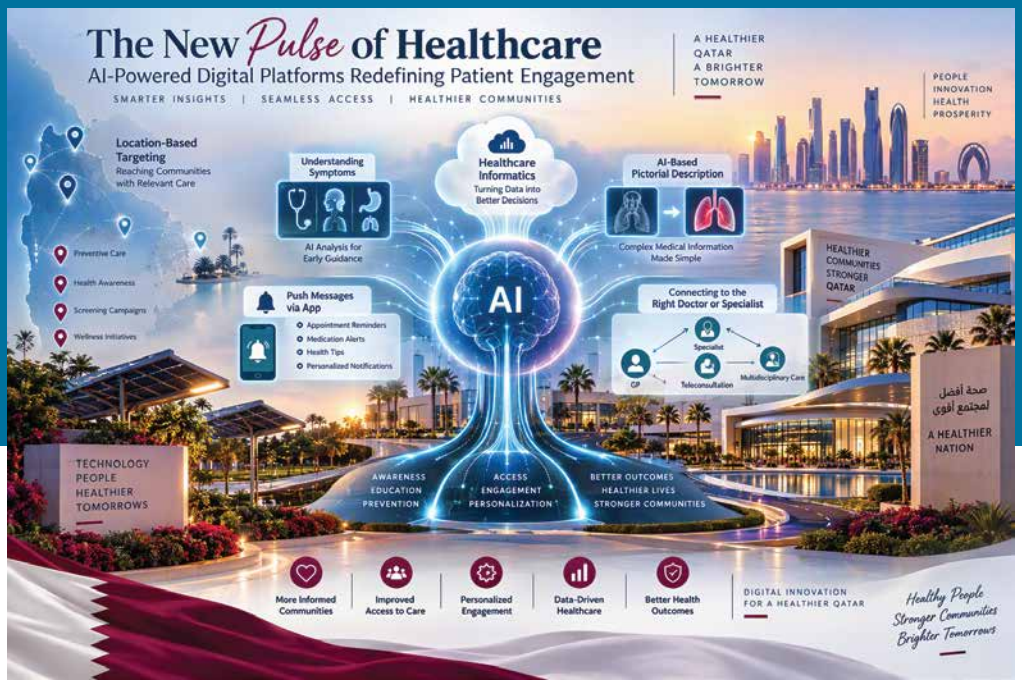




Happy Royal Charter Day

9th September 2026





The New Pulse of Healthcare

How AI-Powered Digital Platforms Are Redefining Patient Engagement and Shaping the Future of Healthcare in Qatar



Er. SHAHANA BEEGUM
AI-Driven Digital Engagement Strategist
Former Sr. Digital Marketing Specialist,
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Throughout my career in healthcare digital marketing, I have witnessed a remarkable transformation in the way patients interact with healthcare providers. Traditionally, healthcare engagement began when a patient walked into a clinic or hospital. Today, that journey often starts much earlier through a mobile phone, search engine, healthcare application, or social media platform.

As technology continues to reshape industries across the world, healthcare is evolving beyond its traditional boundaries. Artificial Intelligence (AI), digital platforms, and data-driven engagement strategies are creating new opportunities to improve accessibility, patient awareness, and healthcare outcomes. In many ways, these technologies are becoming the new pulse of modern healthcare.

Patients are no longer passive recipients of healthcare services. They actively seek information, compare treatment options, read reviews, explore healthcare providers, and engage with digital channels before making decisions about their care. This shift presents healthcare organizations with an opportunity to connect with patients more effectively and support them throughout their healthcare journey.

One of the most powerful applications of digital transformation is location-based targeting. By leveraging geographic data and intelligent audience segmentation, healthcare organizations can deliver relevant health awareness campaigns and healthcare information to communities where it is needed most. Whether promoting preventive screenings, wellness initiatives, vaccination programs, or specialist services, location-based engagement enables healthcare providers to communicate with greater relevance and impact. Mobile healthcare applications also play an increasingly important role in patient engagement. Through push notifications and personalized app messages, healthcare providers can remind patients about appointments, medication schedules, health checkups, vaccination programs, and wellness initiatives. These seemingly small interactions help strengthen patient compliance, improve healthcare accessibility, and encourage preventive care.

Artificial Intelligence is further transforming the patient experience by making healthcare information easier to understand. One emerging capability is the use of AI-based pictorial descriptions, where complex medical concepts, conditions, and treatment journeys can be presented through intelligent visual representations. For many patients, visual information is easier to understand than medical terminology, helping bridge communication gaps and support informed decision-making.

Another significant advancement is the use of detailed healthcare informatics and data analytics. By analyzing large volumes of healthcare and engagement data, organizations can gain deeper insights into patient behavior, public health trends, and evolving community needs. These insights support strategic planning, healthcare awareness initiatives, and more personalized patient engagement programs.

Perhaps one of the most exciting developments is AI's growing ability to support patients in understanding their health concerns. Modern AI-powered platforms can assist individuals in the understanding of symptoms and intelligently connect patients with the most appropriate doctors, specialists, or healthcare services. While these technologies do not replace medical professionals, they can help patients make more informed choices and access the right care faster.

Having worked within the healthcare sector, I believe the greatest value of digital transformation lies not in technology itself, but in its ability to improve the patient experience. Effective healthcare communication is no longer limited to promoting services. It is about building trust, educating communities, guiding patients, and making healthcare more accessible to everyone.

For Qatar, the opportunities are particularly exciting. As the country continues to invest in world-class healthcare infrastructure and digital innovation, AI-powered patient engagement can contribute significantly to national healthcare objectives. A diverse and multicultural population requires communication solutions that are accessible, personalized, and available across multiple languages and platforms. Imagine a future where residents receive personalized wellness recommendations through mobile applications, where AI-powered assistants help patients navigate healthcare services, where healthcare campaigns automatically reach communities based on regional health trends, and where digital platforms guide individuals from symptom awareness to specialist consultation seamlessly. Such capabilities have the potential to improve patient outcomes while enhancing the efficiency of healthcare systems.

At the same time, innovation must be balanced with responsibility. Patient privacy, cybersecurity, ethical AI implementation, and data protection must remain at the center of all digital healthcare initiatives. Technology should strengthen trust between patients and healthcare providers, not compromise it.

As healthcare continues its digital evolution, the organizations that succeed will be those that place people at the center of innovation. Artificial Intelligence, digital engagement, healthcare informatics, and patient-centric communication will increasingly work together to create smarter, more connected healthcare ecosystems.

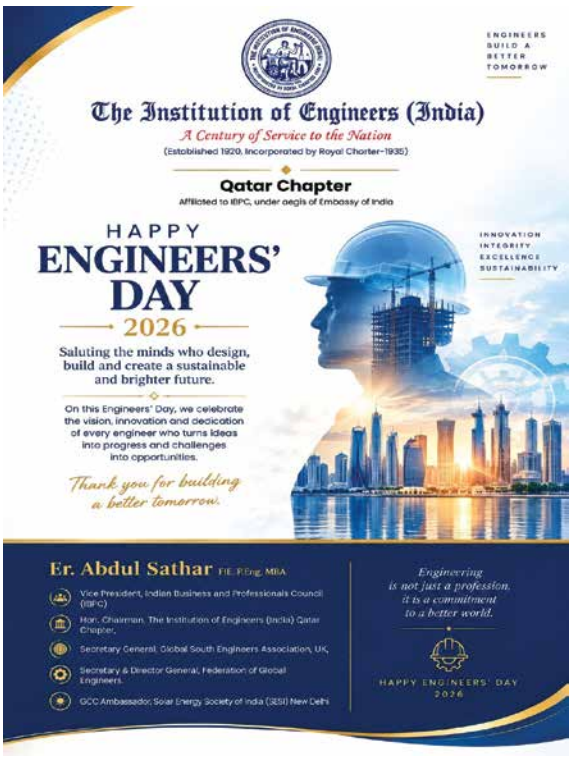
The future of healthcare will always depend on the expertise and compassion of healthcare professionals. However, AI-powered digital engagement is emerging as a powerful enabler, helping people access the right information, the right services, and the right care at the right time.

In this new era, technology is not replacing the human touch in healthcare. Instead, it is strengthening the connection between patients, providers, and communities, creating a healthier, more informed, and more accessible future for Qatar and beyond.

Engineers' Day Message: Innovation creates its greatest impact when it improves lives. By combining Artificial Intelligence, digital engagement, healthcare informatics, and patient-centric communication, we have an opportunity to build smarter healthcare systems that empower individuals and strengthen communities across Qatar and the region.

Happy Engineers' Day

15th September 2026





THE YOUNG ENGINEER IN THE AGE OF AI: SAME RESPONSIBILITY, NEW TOOLS



Er. NASEEF MOHAMMED
Civil Structural Engineer
Chiyoda Almana Engineering LLC

The dhows that carried Qatar's pearl divers were built without any blueprints, purely relying on knowledge inherited from craftsmen. The Pantheon in Rome, the largest unreinforced concrete dome ever built, had no software behind it, and has stood the test of time since 126 AD.

Imagine being a young engineer on those builds. They learned by sight and touch. They felt the grain of the timber, studied the stone to guess where it would crack, and used simple tools like levelling rods and rope triangles. They witnessed the quarrying, transportation and tool sharpening with their own eyes. And when a block arrived with a hidden fault, they had to decide: whether to use it as an interior column, or to waste three weeks hauling a new one?

Today's young engineer faces the same kind of decisions in a modern city, albeit with far more powerful tools. These tools solve problems faster and let him handle more work. But do they take away the basics he should learn early in his career? Or should he drop all modern help and become an "ancient" engineer instead?

FROM DRAWING BOARDS TO DIGITAL SCREENS

Twenty or thirty years ago, engineers worked with hand calculations, drawing boards and heavy code books. Knowing the principles, doing the mathematics, drawing by hand and patiently reading thousands of pages were not options. These were necessary tasks.

Today we have software, AI and CAD. Code books are available as PDFs, and answers are a web search away. The benefits are real: faster work, fewer routine errors and more standardisation. But there is a cost too. The engineer now stands further away from the calculation itself, and from the skills that hand work used to build.

SKILLS NO SOFTWARE CAN GIVE

Software can do in seconds what once took hours. So now, the skills that matter most are the ones software cannot give us.

1. The first is a strong conceptual understanding of the basics. An engineer who knows why a result is right can quickly spot a wrong one. A rough estimate or a unit check is still the best defence against mistakes, and every tool works only within certain limits.
2. The second is familiarity with data and digital tools. Read data carefully, clean it and question it before you trust it. A little scripting can save hours of repeated work. AI can help too, if we ask clear questions and always check the answers.
3. The third is clear thinking. Make sure you are solving the right problem, and see how your work affects other teams and

the whole project.

4. The fourth is working well with people. An engineer who can explain a decision simply, listen to others and disagree politely is valuable to any team.
5. Finally, good habits: honesty, safety first, clear records and learning every day.

A GOOD HELPER, NOT THE FINAL JUDGE

Software and AI are very good helpers. They are fast and can handle complex analyses that would take days by hand. But they are still only tools. They do not understand our project, and they do not know what happens if a number is wrong.

A program will give an answer even when the input is wrong. AI tools are built to always give a response, and they can sound very confident even when they are mistaken ('AI Hallucination'). A neat result on the screen is never proof that it is correct.

Often, a simple cross-check is enough to catch an error, such as an impractical member size in a spreadsheet. Cross-checking also increases our confidence in the results from AI. A few habits can help young engineers:

- Check every important result using an alternative method, such as a quick hand calculation.
- Ask whether the answer makes sense, before asking whether the software works.
- Know what facts the tool assumes and where it stops being valid.
- Never use AI output in a design without understanding it yourself.
- Keep clear records of what was checked, and how.

In the end, the software does the calculation, but the engineer signs the document. So the responsibility lies with us.

LEARNING FROM THOSE WHO HAVE BEEN THERE

The gap that software leaves can be filled by a good mentor. A mentor shares what no textbook can: lessons from site, from past mistakes and from years of experience. Senior engineers know why a clause exists, not just what it says, and they can feel when something looks wrong, before the numbers show it. A young engineer who learns this early, grows faster and makes fewer costly errors.

This works both ways. Young engineers bring fresh ideas and new digital skills. Regular design reviews, site visits with seniors, and chances for juniors to present their work builds confidence and makes the whole team stronger.

Mentoring also reaches beyond the workplace. The Institution of Engineers (India), through its talks and conferences, helps both young and senior engineers learn and grow in their careers.

SAME FUNDAMENTALS, NEW FRONTIERS

The role of the young engineer has changed a lot in three decades, and so has the skill set. But the heart of the job remains the same: to close the gap between what is on paper and what works in practice. Embracing new software and AI is now essential for the complex problems that lie ahead. Strengthening the fundamentals is just as essential.

The young engineers of the dhow yards and the Roman domes also faced new challenges and tried new techniques. Some of those techniques later became ordinary tools. Exploring new ways while keeping the fundamentals strong is how engineering has always moved forward.



GANDHI JAYANTHI CELEBRATION
BEACH CLEANING- AL WAKRA PUBLIC BEACH
2nd October 2026









Round Table Discussion 9th October 2026

Topic : Engineering Tomorrow: Advancing a Smart and Sustainable Future through Innovation and Digitalization







IEI Women's Wing Qatar Hosts Round Table on AI, Digitalisation and Sustainable Engineering

Doha, Qatar: The Institution of Engineers (India), Qatar Chapter – Women's Wing organised a Round Table Discussion titled "Engineering Tomorrow: Advancing a Smart and Sustainable Future through Innovation and Digitalization" in connection with the Engineers' Day Celebration 2026.

The programme was inaugurated by Er. Abdul Sathar, Hon. Chairman, IEI Qatar Chapter. Dr. Naheeda Akhtar served as the Master of Ceremonies, guiding the proceedings. The welcome address was delivered by Er. Lulu, followed by a presentation on IEI membership and activities by Er. Sufiya. Executive Committee members Er. Lansha and Er. Krittika supported the programme, while the vote of thanks was proposed by Er. Bindu.

The Round Table was moderated by Er. Dilba Midlaj, President, IEI Women's Wing – Qatar Chapter, and brought together women engineers and professionals from a wide range of sectors including structural engineering, architecture, healthcare engineering, chemical engineering, ELV systems, procurement, project management, IT, HR, academia and consultancy.

The discussion centred on two practical questions: how artificial intelligence has changed professional engineering workflows, and how AI and digital technologies can support more sustainable engineering practice.

Participants shared sector-specific experiences of rapid digital transformation. Er. Greeshma Ravindran highlighted the growing role of digital twins in offshore structural engineering, while Er. Asma Moosan reflected on the move from traditional architectural drawing to advanced CAD, virtual reality and intelligent design tools.

From the healthcare engineering sector, Er. Jisha Naveen discussed the use of Building Management Systems, Computerized Maintenance Management Systems, IoT monitoring and predictive maintenance to improve reliability and support smarter operation of existing healthcare facilities.

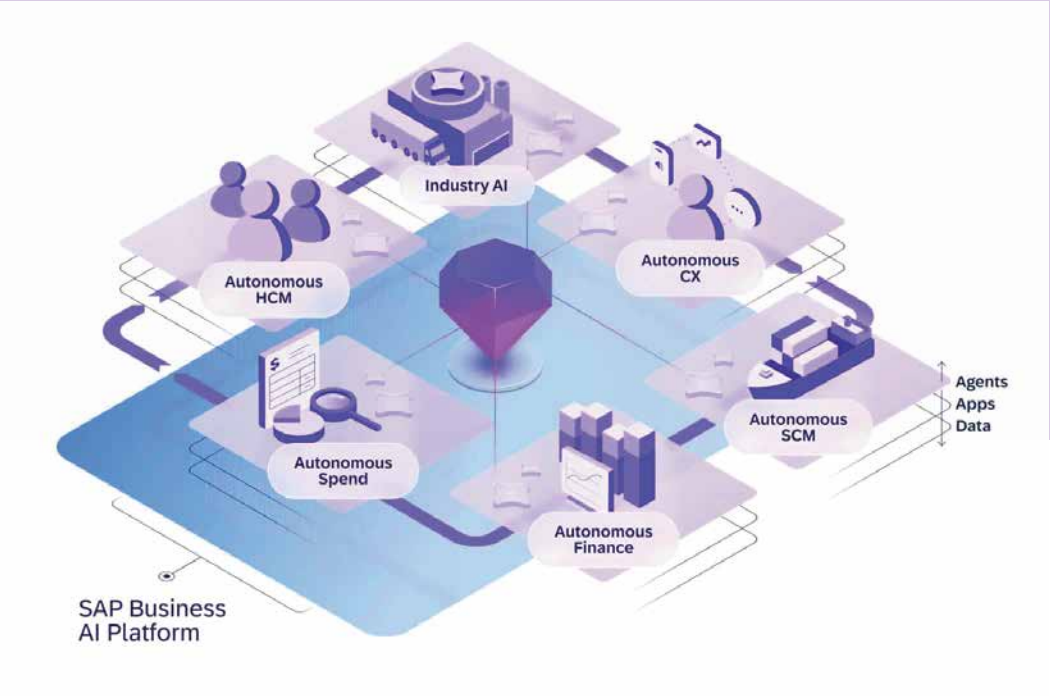
Er. Jumana Thabsu spoke about the increasing integration of ELV and security systems and the benefits of improved data collection and connectivity. Er. Shabana Shafi shared perspectives on AI-driven recruitment tools, Applicant Tracking Systems and automated CV screening, while Er. Shamna Mubashir discussed the impact of AI on engineering education and student learning.

Sustainability formed an important part of the discussion. Er. Muth Mary Abraham emphasised intelligent resource management, better demand forecasting, optimal inventory and waste reduction as practical ways in which AI can support more sustainable operations.Er. Tabassum Yasin highlighted the importance of operational sustainability through digital systems, data analysis, standardised processes, reporting and knowledge sharing.Er. Sina Jayan drew attention to environmental engineering, resilience and the role of technology in disaster monitoring and early-warning systems. Er. Noor Afza highlighted continuous knowledge upgrading, evolution, transformation and adaptability as key elements of long-term sustainability.

The session also included valuable contributions from Er. Anisha Asharuff, Er. Shamna Abdulla and Dr. Sajitha, reinforcing the importance of responsible innovation, adaptability, interdisciplinary learning and continuous professional development.

The Round Table concluded with a shared message that AI and digitalisation should strengthen engineering judgement rather than replace it. Participants highlighted the importance of combining technology with professional expertise, sustainability awareness, continuous learning and responsible decision-making.

The event also provided a valuable networking platform for women engineers from different professional backgrounds in Qatar and strengthened connections between the IEI Women's Wing, industry, academia and professional networks.



SAP's Autonomous Enterprise: Engineering the Future with Joule and AI Agents

From intelligent assistance to governed business-process execution An engineering perspective



Er. ARJUN RAJ
SAP BTP Lead Consultant and Project Manager @ Altivate

A new chapter in enterprise engineering

For decades, enterprise software has brought discipline to business operations: transactions follow rules, data is recorded, and responsibilities are assigned. Yet many processes still rely on people to detect problems, gather information from several systems, decide what should happen next, and coordinate execution. The latest advance in enterprise AI targets this gap—not simply by answering questions, but by helping turn business intent into controlled action.

At SAP Sapphire in May 2026, SAP introduced its Autonomous Enterprise vision. At SAP Connect in October, SAP demonstrated how Joule Work, Joule Assistants and Joule Agents fit into that direction. The engineering significance is substantial: AI reasoning is being connected to the operational systems, business semantics, authorizations and audit trails on which an enterprise depends.

What SAP means by an autonomous enterprise

An autonomous enterprise is not a business in which algorithms are granted unrestricted control. It is an operating model in which people set objectives and boundaries while software can identify situations, coordinate specialized capabilities, and undertake approved steps within governed processes. The degree of autonomy should depend on the task, risk and available controls.

Consider an industrial maintenance scenario. A sensor or inspection report indicates unusual equipment behavior. A conventional system might issue an alert and leave the rest to several teams. In an agent-assisted process, software could correlate the alert with maintenance history, propose probable causes, identify spares and prepare a work order for review. SAP has described an Autonomous Asset Management scenario with RWE relating to offshore wind turbines; this is a useful illustration of the direction, not proof that all maintenance processes already run autonomously.

Understanding SAP's agentic architecture

SAP's announcement is best understood as several complementary layers rather than one all-purpose chatbot.

Joule Work is the intended interaction experience: a user describes a desired business outcome rather than navigating every application screen. Joule Assistants organize work around roles or business processes. Specialized Joule Agents perform narrower activities—such as finding information, assessing a case or initiating an authorized workflow—using the tools made available to them. SAP Autonomous Suite is the application-side vision for embedding such capabilities across core functions including finance, supply chain, procurement, human resources and customer experience.

The foundational element is SAP Business AI Platform, which SAP describes as bringing together business technology, data and AI capabilities. SAP Business Data Cloud supports governed business data; SAP Knowledge Graph is intended to express relationships among business entities and processes; and Joule Studio supports the development of tailored agents and workflows. These building blocks matter because language-model fluency is not the same as understanding a purchase order, employee record, asset, approval hierarchy or accounting period.



From a prompt to a controlled transaction

Imagine a plant manager asks: "Which supplier delays threaten next week's production, and what can we do?" An effective enterprise agent must do far more than generate persuasive text. It must read trustworthy purchase-order and inventory information, respect the user's access rights, evaluate material impact, identify feasible alternatives, and distinguish recommendations from executable actions. If a replacement order or schedule change is needed, the relevant SAP application, APIs, workflow rules and approvals still matter.

A practical architectural principle follows: use AI for interpretation, investigation and flexible orchestration; use deterministic enterprise services for validations, posting, approvals and irreversible changes. This separation reduces the risk of allowing an uncertain model output to become an uncontrolled business transaction.

Why engineering discipline is indispensable

Engineering an agentic enterprise requires rigorous design choices. Data lineage and semantic consistency determine whether an agent is working with the right records. Identity and access management determine what it may see and do. API reliability, idempotency and exception handling determine whether actions are safely executed. Logging and traceability establish who or what initiated each step, which information informed it, and how an outcome can be investigated. Human oversight is particularly important for safety-critical, high-value or regulated decisions.

Such requirements are especially relevant in environments integrating SAP S/4HANA, SAP SuccessFactors, SAP Ariba, manufacturing systems and external applications. A promising demonstration is not sufficient evidence of production readiness. Engineers must test ambiguous inputs, incomplete data, conflicting instructions, integration failures and unexpected results—not merely the successful path.

Where the opportunity becomes tangible

Finance teams may benefit from agent-assisted exception analysis and reconciliation; procurement teams from sourcing research and supplier-risk investigation; human resources from guided employee services; and operations teams from maintenance planning and disruption response. SAP has cited customer examples and pilots, including a Joule Sourcing Assistant pilot co-developed with Novartis. These examples indicate real momentum, but individual product availability and deployment maturity must be verified before a project commitment is made.

The proper value measures are engineering and business outcomes: reduction in cycle time, fewer repeated handoffs, improved first-time resolution, lower manual effort, faster detection of exceptions and stronger compliance. Counting agents deployed is a poor substitute for measuring those outcomes.

A measured path toward autonomy

Enterprises should begin with processes that are both valuable and bounded. First, establish trustworthy data, business ownership and a clear process map. Next, pilot agents in read-only or recommendation roles. Then introduce supervised execution with explicit permissions and approvals. Greater autonomy should follow only after monitoring, audit evidence, recovery procedures and operational performance have demonstrated sufficient reliability.

SAP's vision is ambitious, and its roadmap continues to evolve. Announced assistants and agents should not be presumed generally available in every product, region or tenant; licensing, supported scenarios and release status require case-by-case verification. Nor should the presence of governance features be mistaken for a guarantee that AI outputs are always correct.

Conclusion: autonomy must be engineered, not merely announced

The transition from enterprise applications that record work to systems that can help coordinate and perform work could become a defining development in digital engineering. SAP's Autonomous Enterprise direction is notable because it places agents alongside decades of business-process logic, enterprise data and operational controls.

The lasting advantage will not belong to organizations that deploy the most AI agents. It will belong to those that design the safest and most effective partnership between people, intelligent agents and dependable enterprise systems. In an autonomous enterprise, the critical engineering question remains: not only "Can the system act?" but "Should it act, under whose authority, and how will we know it acted correctly?"

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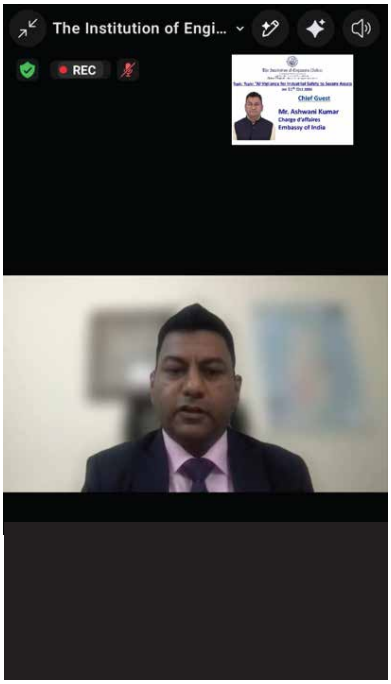
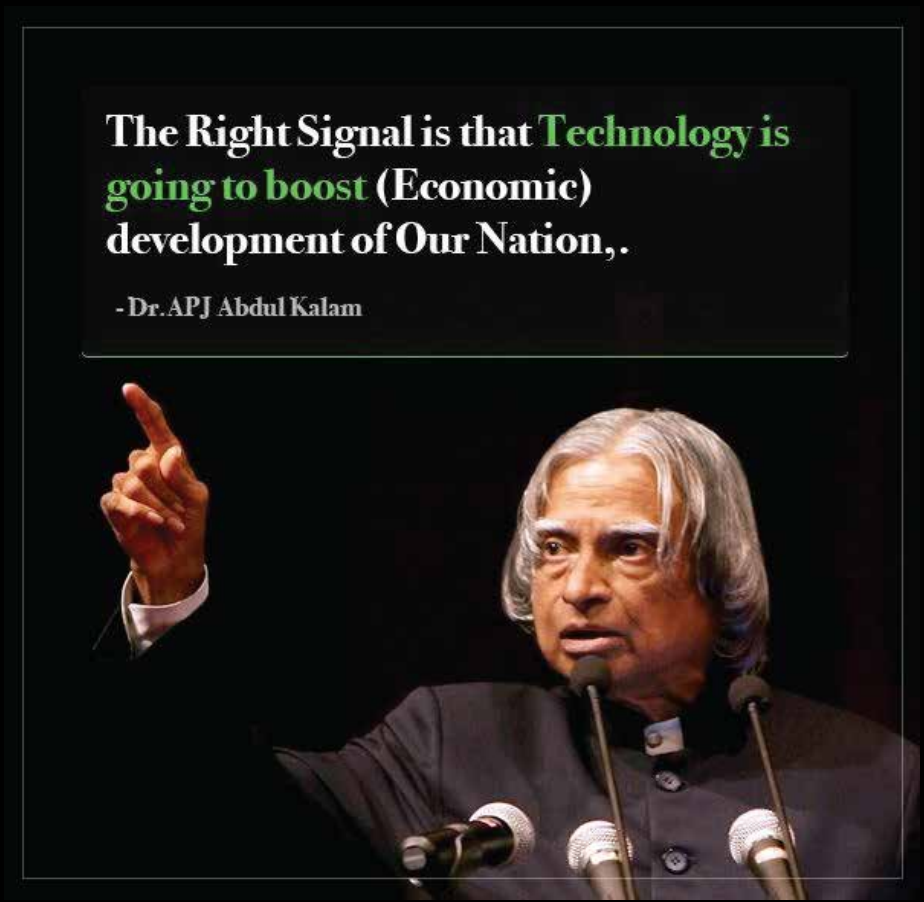
Technical Webinar 11th Oct 2026

Topic : AI VIGILANCE FOR INDUSTRIAL SAFETY TO SECURE ASSETS







FAREWELL OF AMBASSADOR & DCM







Facility Management: The Engineering Behind Everyday Comfort



Er. SHAMEER RAHIM
FM Operations Lead

Facility Management: The Engineering We Often Don't Notice

Most people admire a building when it is newly constructed. They appreciate its architecture, its design, and its appearance. However, very few people think about what happens after the building is handed over and occupied.

Will the air conditioning continue to provide comfort during the peak of summer? Will the water supply remain reliable? Will the lighting systems ensure safety throughout the night? Will the elevators operate smoothly day after day?

Behind all these daily experiences is a team of Facility Management professionals working tirelessly to keep buildings functioning efficiently.

As an engineer working in Facility Management, I have come to realize that our success is often invisible. When everything works perfectly, nobody notices. Yet every comfortable office, safe residential community, shopping complex, school, hospital, or public facility depends on engineering professionals who ensure that critical systems continue to operate reliably.

More Than Maintenance

Many people assume Facility Management is simply about fixing breakdowns. In reality, it is about much more.

Facility Management is about protecting investments, enhancing user experience, ensuring safety, and improving sustainability. It combines engineering knowledge, operational planning, problem-solving, and people management.

Every day presents new challenges. One moment we may be addressing a water leakage issue, while the next we are planning an equipment replacement project, implementing energy-saving initiatives, or responding to an emergency breakdown.

The diversity of challenges makes Facility Management one of the most dynamic engineering fields.

Engineering That Impacts Everyday Life

One of the most rewarding aspects of Facility Management is seeing how our work directly affects people's lives.

When residents return home and enjoy a comfortable indoor environment, when children play safely in well-lit parks, or when businesses operate without interruption, Facility Management has played a role in making that possible.

Unlike many engineering projects that conclude after construction, Facility Management remains involved throughout the lifecycle of a building. Our responsibility continues every day, every month, and every year.

In many ways, Facility Management is the discipline that keeps engineering alive long after construction is complete.

The Challenge of Aging Assets

As facilities grow older, maintaining performance becomes increasingly challenging.

Pumps wear out, lighting systems deteriorate, underground utilities develop leaks, and air-conditioning equipment becomes less efficient. Environmental conditions, continuous operation, and normal wear and tear all contribute to asset deterioration.

Facility Management engineers must constantly balance operational needs, budget constraints, and long-term asset sustainability.

Often, our role involves making critical decisions about when to repair, when to rehabilitate, and when to replace equipment altogether.

These decisions are not simply technical; they require strategic thinking, risk assessment, and careful planning.

Sustainability Starts with Small Actions

Today, sustainability has become one of the most important responsibilities of Facility Management professionals.

Simple initiatives can have a significant impact. Replacing conventional lighting with LED technology, reducing water losses through leak detection, optimizing air-conditioning systems, and utilizing treated water for irrigation are examples of practical solutions that deliver measurable benefits.

Over time, these small improvements reduce energy consumption, lower operational costs, and contribute to environmental protection.

As Facility Management professionals, we are uniquely positioned to support sustainability because we oversee the systems that consume the majority of a building's resources.

The Human Side of Engineering

While technical knowledge is essential, Facility Management is equally about people.

Every project involves collaboration between engineers, technicians, contractors, suppliers, clients, and occupants. Success depends not only on technical expertise but also on communication, leadership, and teamwork.

Throughout my career, I have learned that the best solutions often emerge when people work together toward a common objective.

Facility Management teaches engineers to look beyond equipment and infrastructure and focus on the people who depend on them every day.

Looking Ahead

The future of Facility Management is exciting.

Smart buildings, data analytics, artificial intelligence, predictive maintenance, and Internet of Things (IoT) technologies are transforming the way facilities are operated and maintained.

The engineer of the future will not only manage physical assets but will also use technology and data to make buildings more efficient, sustainable, and resilient. As our cities continue to grow, the importance of Facility Management will only increase.

Conclusion

On the occasion of the 59th Engineers Day, I would like to acknowledge the countless engineers who work behind the scenes to ensure that buildings, communities, and infrastructure continue to serve society safely and efficiently.

Facility Management may not always be visible, but it is an essential part of modern life. It represents the commitment to preserving what engineers build and ensuring that facilities continue to deliver value for generations to come.

Engineering creates the foundation, but Facility Management keeps it alive.

Author:
Shameer Rahim
FM Operations Lead
Waseef Qatar

"The true measure of an engineered asset is not when it is built, but how well it continues to serve people throughout its life."



Factor of Safety

What the Stoics Taught Me About Building on Uncertain Ground

Er. DIJIN DINESH

The Ground Beneath Us

At five in the morning on an LNG plant site in Qatar, the air already carries heat and the faint smell of hydrocarbons. A heavy crawler crane waits to lift a column module, and the question on my desk is simple: will the ground hold?

After years in structural and geotechnical engineering, I have found that the best answers to that question come from calculation. The best way to carry its weight, though, comes from a philosophy nearly two thousand years old.

Stoicism was never meant for scholars in quiet rooms. Epictetus taught in a provincial school after years as a slave, Marcus Aurelius wrote his private notes in army camps, and Seneca managed the affairs of an empire. It is a working philosophy, and engineering is working life at its least forgiving. Here is what each has taught me about the other.

What I Control, and What I Don't

Epictetus opens his Handbook with a single distinction: some things are up to us, and some are not. Our judgments, intentions and actions are ours. Reputation, fortune and the behaviour of others are not.

Geotechnical engineering lives on that line. I cannot control the soil. A borehole samples a few centimetres of a site that spans hectares, and the reclaimed fills and calcareous sands of the Gulf coast are known for their variability. The design wind, a seismic event, or a crane set two metres off its agreed pad are equally beyond my reach.

What I do control is the quality of my reasoning: how carefully I read the investigation, how honestly I select parameters, how clearly I state my assumptions. The Stoics would say this is where my peace of mind belongs. A good engineer, like a good Stoic, gives full effort to what is theirs and stops spending anxiety on what is not.

Rehearsing the Worst Case

Seneca recommended an exercise later called premeditatio malorum: picturing in advance the losses and setbacks that might come, so they arrive as expected guests rather than ambushes. Many modern readers find this gloomy. Engineers recognise it at once.

Every load combination in American or the Eurocodes is a disciplined rehearsal of misfortune. What if the dead load is heavier than estimated, the live load peaks, and the design wind arrives at the same moment? What if an outrigger lands on the weakest corner of a pavement slab? Load factors and

resistance factors are Seneca's exercise translated into numbers.

The aim is not fear but freedom. Because I have pictured the failure modes on paper, I can stand beside a heavy lift with a calm mind. The Stoic does the same with life: having faced the possibility of illness, loss or failure ahead of time, they meet the real event with steadiness rather than panic.

Testing the Impression

Epictetus taught that people are disturbed not by events but by their opinions about events. He advised questioning every impression before accepting it: you appear to be a disaster, but let me examine what you really are.

I think of this each time I assess a structure after an event such as fire. Blackened concrete, spalled cover and soot-stained steel create a powerful first impression of ruin. Sometimes that impression is right; often it is not. Rebound hammer readings, ultrasonic pulse velocity, cores, and the pink discolouration that marks concrete heated beyond roughly 300 °C tell a far more precise story than the eye ever can.

Non-destructive testing is, in effect, a Stoic discipline. It refuses to let appearance stand in for reality. The same habit serves me away from site: when a project setback or a sharp email sets off alarm, I try to test the impression before I react. Usually the damage, like the fire's, is shallower than it first looks.

The Obstacle Becomes the Path

Marcus Aurelius observed that an obstacle to action can itself become the means of action: what blocks the road becomes the road. It is perhaps the most widely shared Stoic idea today, and it describes site engineering almost exactly.

A crane pad that fails its bearing check is not the end of a lift. It is the start of a better solution: steel mats to spread the load, local ground improvement, or a revised crane position. A piperack foundation that clashes with buried services forces a rethink that often produces a leaner design. The constraint does not stop the work; it shapes it.

Engineers who resent site conditions burn their energy arguing with reality. Engineers who accept them, in the spirit the Stoics called amor fati, the love of what happens, get on with the job. Acceptance is not passivity. It is the starting point of every useful solution I have ever produced.

The Signature and the Inner Foundation

For the Stoics, the only true good was virtue: wisdom, justice, courage and self-discipline. Everything else, including money, status and comfort, was "indifferent." Engineering tests that claim daily. Each time I sign a calculation, I place my integrity behind something people will stand on, work beneath and trust with their lives.

The pressure to cut a corner rarely announces itself. It arrives as a tight schedule, a client's preferred answer, or a check that "probably" passes. The Stoic response is simple, though never easy: do what is right because it is right, and let the consequences fall where they may.

Reserve Strength: Lessons from the Jacket

Offshore, the question changes from "will the ground hold?" to "will the frame stand?"

The gas that feeds Qatar's LNG trains rises through jacket platforms: steel lattice towers piled into the seabed, carrying process decks above the waves. A jacket is designed for the 100-year storm, but its true measure is what it can survive beyond that.

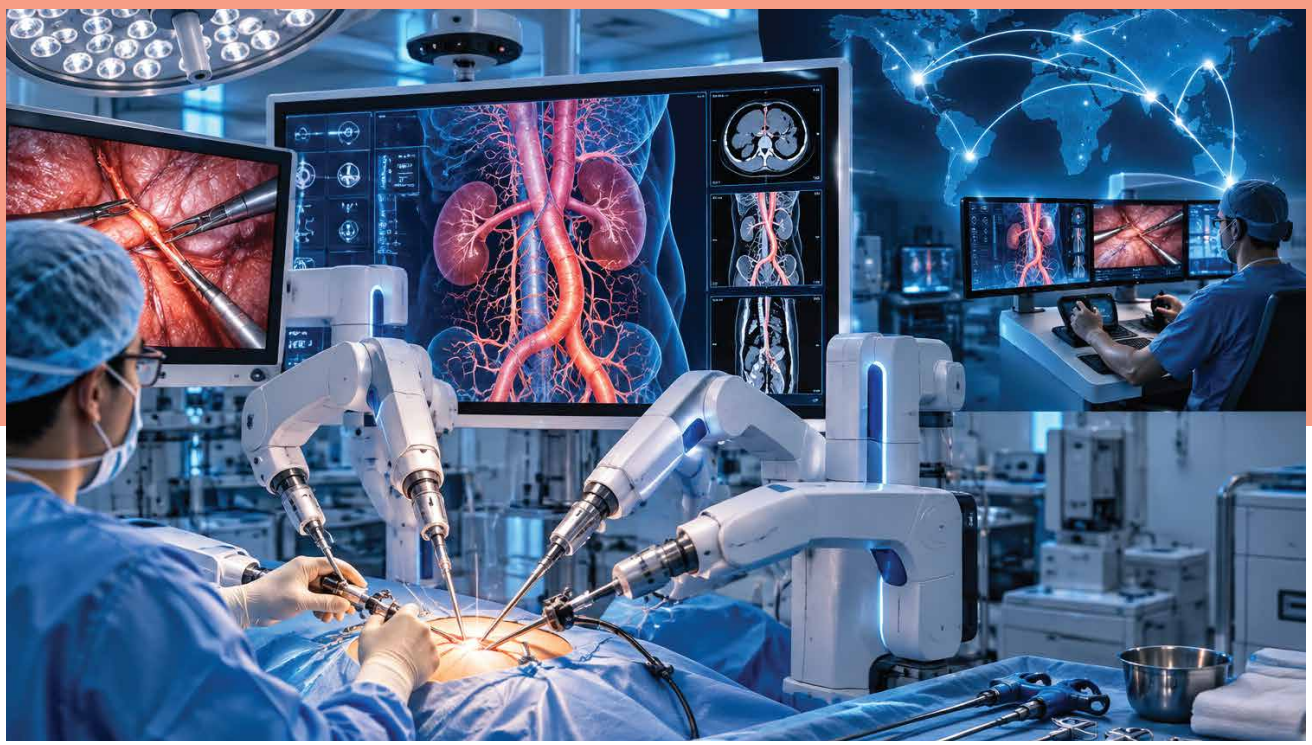
Engineers capture this in the Reserve Strength Ratio: the lateral load that finally collapses the structure, divided by the design storm load. We find it by pushover analysis, pushing a nonlinear model sideways step by step as braces buckle, joints yield and piles plunge, until the frame can take no more. API and ISO codes set the reserve an existing platform must show, demanding more where failure would cost lives or cause major pollution. It is Seneca's exercise taken to its end: not only picturing the storm, but deliberately breaking the structure on paper to learn how it would die.

What decides the answer is rarely one member's factor of safety. It is redundancy and ductility: X-braced frames that send load around a buckled brace, joints that bend before they snap, a system that warns before it fails. A related check, residual strength, asks what capacity remains after a brace is lost to a dropped object, a vessel impact or a fatigue crack. The Gulf of Mexico hurricanes of 2004 and 2005 destroyed more than a hundred platforms, many of them older designs whose decks sat too low for the waves that came. Reserve, the industry relearned, must be judged against the storm as we now understand it, not as it was understood when the drawings were signed.

Marcus Aurelius asked to be like a headland: the waves break on it without end, yet it stands and calms the water around it. Stoic resilience works like a redundant frame, not a single heroic member. When one virtue buckles, patience on a bad day perhaps, another such as judgment or discipline picks up the load. Character, like a good jacket, should be ductile. It bends in the storm, gives warning before it breaks, and keeps a reserve the design storm never touches.

Marcus Aurelius compared a mind free of passion to a citadel, a refuge no outside force can take. I think of it as a foundation. We design structures with a factor of safety because we can never know every load that will come. Stoicism gives a person the same reserve. Build it well, and whatever the ground does, you will hold.

Dijin is a lead Structural Integrity engineer based in Doha, Qatar, working on oil, gas and LNG facilities at Chiyoda Corporation.



Robotics Engineering in Vascular Surgery:

Precision, 3D Visualization and Remote Navigation for Minimally Invasive Treatment



Dr. SAMREEN



Dr. SAHLA

The integration of robotics engineering into vascular surgery represents a significant advancement in modern healthcare. By combining precision mechanical systems, advanced imaging, computer-assisted control and remote navigation, robotic technologies are transforming the way clinicians access and treat disorders of the human vascular system. These innovations support minimally invasive procedures, improve instrument control and may reduce certain occupational risks associated with conventional interventions. Although the technology is still evolving, its potential applications in cardiovascular care, peripheral vascular disease and complex endovascular procedures are considerable. The future of vascular robotics will depend on engineering innovation, clinical validation, cybersecurity, affordability and effective collaboration between engineers and healthcare professionals.

Introduction: Where Engineering Meets Medicine

Vascular surgery deals with disorders affecting arteries and veins, including arterial blockages, aneurysms, vascular narrowing and other conditions that compromise blood circulation. Traditionally, many vascular conditions required open surgical procedures involving substantial incisions, direct exposure of blood vessels and prolonged recovery.

The development of minimally invasive endovascular techniques introduced a new approach. Instead of directly opening the affected area, clinicians can guide specialised catheters, guidewires and other instruments through blood vessels, often entering through a small puncture in the wrist or groin.

Robotics engineering is extending these capabilities by introducing mechanically controlled instruments, computer-assisted navigation and enhanced visualisation. A 2024 review in the Journal of Robotic Surgery discusses the growing role of robotic systems in vascular applications while highlighting the technical and clinical challenges that remain. The objective is not to replace the surgeon, but to provide greater control, improved ergonomics and additional technological support when performing complex procedures.

The Engineering Behind Robotic Vascular Surgery

Robotic vascular systems combine several engineering disciplines to translate the clinician's commands into controlled instrument movements inside the body.

Precision mechanical systems: Robotic drives and actuators control the advancement, rotation and positioning of catheters and guidewires. Carefully designed mechanisms help clinicians make small, controlled movements while navigating delicate and branching vascular structures.

Three-dimensional visualisation: Medical imaging provides information about the shape, position and condition of blood

vessels. Depending on the system and procedure, imaging may include fluoroscopy, computed tomography, ultrasound or three-dimensional angiographic reconstruction. These technologies help clinicians understand complex anatomy and guide instruments towards the intended treatment site.

Computer-assisted control: Control software translates commands from the operator into instrument movements. Depending on the platform, features may include motion scaling, movement constraints and tremor filtering. These capabilities can improve fine control, although the degree of assistance varies between systems.

Remote navigation: In robotic endovascular procedures, the clinician can operate controls from a workstation while the robotic mechanism manipulates compatible catheters and guidewires. This can reduce the need for continuous direct handling of instruments and may increase the distance between the operator and the X-ray source during image-guided procedures.

These technologies demonstrate how mechanical engineering, electronics, software development, imaging science and medical expertise can work together to support precision treatment.

Clinical Applications and Potential Benefits

Robotic technology has potential applications across several areas of vascular care.

Coronary and peripheral vascular interventions: Robotic catheter systems can assist clinicians in delivering and manipulating compatible guidewires and catheters during selected procedures. The CorPath GRX system, for example, has US Food and Drug Administration clearance for specified coronary and vascular catheter-control applications. This demonstrates that robotic catheter navigation has progressed beyond a purely experimental concept, although its use remains dependent on approved indications and clinical suitability.

Treatment of vascular blockages and aneurysms: Robotic assistance may support the navigation and positioning of devices used in selected interventions for narrowed arteries or aneurysmal disease. In suitable cases, endovascular treatment can avoid the need for a large surgical incision. However, robotic assistance does not eliminate the risks of vascular injury, bleeding, contrast exposure or the need for further treatment.

Complex vascular reconstruction: Robot-assisted laparoscopic surgery is a related but distinct application. It can support surgeons performing selected vascular reconstructions through small incisions using articulated instruments and magnified three-dimensional vision. This approach differs from robotic endovascular surgery, in which instruments are navigated within the blood vessels themselves.

Potential benefits include improved instrument precision, enhanced visual guidance, reduced operator exposure to scattered radiation in certain endovascular settings, and improved working posture. Patient benefits depend on the procedure, the technology used, the experience of the clinical team and the patient's condition. Robotic assistance should therefore be evaluated on demonstrated clinical outcomes rather than technological sophistication alone.

Challenges, Safety and Cybersecurity

Despite its promise, vascular robotics faces several important challenges.

First, the cost of robotic equipment, specialised instruments, maintenance and staff training can limit adoption, particularly in healthcare facilities with constrained resources. Second, many systems provide limited or no direct tactile feedback, making it difficult for the operator to feel the forces exerted on a catheter or vessel. Reliable imaging and appropriate safety controls are therefore essential.

Third, robotic procedures require careful planning for equipment failure, communication interruptions and unexpected clinical complications. The surgeon must retain the ability to respond promptly and transition to an alternative technique when necessary.

Cybersecurity is also increasingly important as medical devices become connected to hospital networks and digital imaging systems. Secure communication, access controls, software updates, system monitoring and resilience against unauthorised access are essential design considerations. For any remote-operated or network-connected medical robot, a loss of connectivity or compromise of control systems must not create an unacceptable risk to the patient.

The Future: Artificial Intelligence and Intelligent Navigation

The next generation of vascular robotics is likely to integrate artificial intelligence, advanced image processing and real-time navigation more closely.

AI-assisted image analysis may help clinicians interpret vascular anatomy, identify relevant structures and plan suitable instrument pathways. Image-fusion techniques can combine information from different imaging sources, while improved tracking may help estimate instrument position within complex vascular networks.

Future progress will depend on multidisciplinary collaboration among vascular surgeons, mechanical engineers, biomedical engineers, robotics specialists, software developers and cybersecurity professionals. Engineers must design systems that are not only precise and innovative, but also reliable, maintainable, accessible and safe.

Robotics engineering is creating new possibilities in vascular surgery by combining precision mechanics, three-dimensional visualisation, computer-assisted control and remote navigation. These technologies can support minimally invasive treatment, improve operator control and help address some of the limitations of conventional vascular interventions.

Nevertheless, successful adoption requires more than sophisticated machines. Clinical evidence, patient safety, skilled professionals, robust cybersecurity and equitable access must remain central to development and deployment.

The true achievement of medical robotics is not simply the ability to move an instrument with greater precision; it is the ability to translate engineering excellence into safer procedures and better outcomes for patients.







Quality Does Not Slow the Project Down

Quality Prevents the Project from Slowing Down



Er. Rama Darisa
Senior Quality Specialist
Roads Projects, working in Qatar with
Public Works Authority (Ashghal) for Capital Projects

How can quality become a performance enabler in infrastructure delivery ?

"In Ashghal's Roads Projects Department (RPD), quality is viewed not simply as compliance, but as a driver of predictable project performance—using NCRs as sources of learning and prevention, while managing the Cost of Quality to minimize rework, delays and avoidable expenditure.

By leveraging quality data, trends and performance indicators, RPD can transform project information into actionable insight, enabling earlier intervention, evidence-based decisions and continual improvement across the infrastructure portfolio.

Most importantly, quality is built into project planning from the outset through risk-based planning, clear requirements, robust ITPs, effective controls and early engagement—creating the conditions for right-first-time delivery, reduced disruption and improved cost, time and asset performance."

"The role of NCRs: from correction to learning"

Non-conformance reports are an important part of project quality management.

However, their greatest value is not simply recording that something went wrong.

The more important question is:

"Why did the system allow non-conformance to occur?"

Consider an example where a drainage pipe is installed outside the specified tolerance.

The immediate cause may be incorrect installation.

But further analysis may identify that survey verification was not completed before the activity progressed.

The corrective action may be to rectify the affected section.

The preventive action could be to strengthen the activity sequence and introduce mandatory verification before backfilling.

This changes the focus from:

"Who made the mistake?"

to:

"What can we improve in the process so that the problem is less likely to happen again?"

This is where NCR management becomes a mechanism for continual improvement rather than simply defect administration.



"Quality data can become an early-warning system"

Infrastructure projects generate significant quantities of quality information:

- Inspection records
- Material approvals
- Laboratory results
- Test records
- NCRs
- Audit findings
- Inspection requests
- Defect trends
- Approval status

The value of this information increases when it is analyzed rather than simply recorded.

For example:

Repeated failed density tests may indicate a process problem.

Increasing NCRs for one activity may indicate inadequate supervision, methodology or competency.

Repeated overdue inspections may indicate a resource or planning constraint.

Repeated material rejection may indicate a weakness in procurement or supplier control.

This creates simple progression:

Data → Trend → Insight → Action → Prevention

Digital dashboards and automated reporting can support this transition, allowing Quality and project teams to focus attention on emerging risks rather than relying exclusively on retrospective reporting.



"Building quality into project planning"

One of the most effective ways to prevent quality-related delays is to integrate quality requirements into look-ahead planning.



Before a critical activity starts, the team can ask:

Are we ready?

- Are approved drawings available?
- Are materials approved?
- Is the method statement approved?
- Is ITP available and understood?
- Are competent resources available?
- Are testing arrangements established?
- Are equipment and instruments calibrated?
- Are inspection resources available?
- Are survey requirements confirmed?
- Are previous relevant NCRs addressed?
- Are interfaces with other disciplines clear?

This simple readiness approach can identify potential obstacles before labor, plant and materials are committed to the activity.

Quality therefore becomes part of production planning, rather than a downstream verification exercise.



Strategic Procurement in an Era of Geopolitical Uncertainty:

Building Resilient Supply Chains for Qatar's Engineering and Construction Sector

A strategic perspective on risk management, cost optimization and sustainable project delivery



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UCC Holding

Introduction: Procurement Beyond Cost and Contracts

In an increasingly interconnected world, the success of engineering and construction projects depends not only on technical excellence, effective project management and financial discipline, but also on the strength and resilience of their supply chains.

The evolving geopolitical landscape in the Middle East has brought supply chain vulnerability into sharp focus. Regional tensions, disruptions to international shipping routes, fluctuating commodity prices and uncertainty in global trade have created additional challenges for the construction and engineering industry.

For Qatar, with its ambitious infrastructure, energy and industrial development agenda and strong international trade connections, these developments reinforce the importance of strategic procurement in protecting project investments, maintaining construction schedules and ensuring business continuity.

Procurement has evolved beyond its traditional role of purchasing materials and services at competitive prices. It is now a strategic management function that directly influences project performance, cost efficiency, operational resilience and long-term sustainability.

The Strait of Hormuz: Disruption with Regional and Global Consequences

The recent disruption to maritime traffic through the Strait of Hormuz has demonstrated how geopolitical developments can rapidly affect international trade and regional supply chains.

As one of the world's most strategically important maritime corridors, the Strait of Hormuz is vital for the transportation of energy resources and a wide range of other goods. The conflict and associated security risks in 2026 have caused substantial interruptions to vessel movements, cargo deliveries and established shipping arrangements. Industry data reported by S&P Global in August 2026 indicated that ship crossings had declined by more than 80% compared with pre-conflict levels.

The consequences have extended well beyond the energy sector. Construction materials, industrial equipment, mechanical and electrical components, project cargo and other essential supplies have faced exposure to shipping delays, rerouting, higher freight charges and increased insurance costs. Reports from the project logistics sector have highlighted how the disruption affected cargo availability, shipment schedules and the movement of specialized project equipment.

For the engineering and construction industry, the impact can be particularly significant. Delayed delivery of critical equipment or materials may interrupt construction sequences, reduce workforce productivity and affect project completion milestones. Where construction activities depend on tightly

coordinated deliveries, a delay in a single critical package can create a cascading effect across several work fronts, resulting in additional costs and contractual pressures.

The financial implications are equally important. Higher ocean freight rates, war-risk insurance premiums, fuel costs, storage charges and additional handling expenses place pressure on procurement budgets. These increases can complicate commercial negotiations, affect project cash flow and require organizations to reassess budgets and delivery commitments established under different market conditions.

At the wider economic level, disruptions to energy flows and regional trade can contribute to inflationary pressures, increase operating costs and create uncertainty for businesses and investors. The effects can spread across industries, influencing construction costs, investment decisions and economic activity throughout the region

This experience highlights a fundamental lesson: supply chain disruptions are not merely logistics problems. They are strategic business risks capable of affecting entire project portfolios and the wider economic environment.

From Cost Reduction to Strategic Value Creation

One of the fundamental principles of strategic procurement is recognizing that the lowest initial price does not necessarily represent the lowest overall project cost.

Effective procurement requires a comprehensive assessment of total cost, technical compliance, delivery performance, supplier capability, quality, warranty provisions and long-term operational requirements.

Early involvement of procurement teams during project planning and engineering design can create significant value. Identifying long-lead materials, evaluating alternative technical solutions and engaging in the supply market at an early stage allow organizations to make informed decisions before procurement risks translate into construction delays.

Value engineering also plays an important role in this process. Through close collaboration between engineering, commercial and procurement teams, technically acceptable alternatives can be explored to optimize costs without compromising design requirements, quality, safety or operational performance.

The objective is to achieve the right balance between cost competitiveness, technical integrity and project delivery commitments.

Building Resilient and Diversified Supply Chains

Recent global disruptions have demonstrated the importance of reducing excessive dependence on a single supplier, manufacturing location or transportation route.

Supplier diversification, alternative sourcing strategies and long-term supplier relationships can help organizations respond more effectively to unexpected market developments.

For Qatar's construction and engineering industry, a balanced approach combining qualified local suppliers with reliable international sourcing can provide greater flexibility and supply continuity.

Developing local supply capabilities, technically and commercially feasible, can reduce logistics exposure, improve response times and strengthen the domestic industrial ecosystem.

At the same time, supplier selection must remain based on objective assessments of technical compliance, manufacturing capacity, quality standards, financial stability and delivery performance.

Resilience is not simply about having more suppliers. It is about developing a dependable supply network capable of supporting projects under both normal and challenging market conditions.

Procurement Governance, Digitalization and Risk Management

Strong procurement governance is particularly important during periods of uncertainty, when commercial pressures and urgent project requirements can increase the complexity of procurement decisions.

Transparent evaluation procedures, clearly defined approval authorities, competitive tendering, proper documentation and structured commercial reviews help organizations maintain accountability while protecting their commercial interests.

Equally important is the adoption of risk-based procurement strategies. Critical packages should be assessed for exposure to market volatility, logistics disruptions, supplier capacity constraints, delivery risks and contractual uncertainties. Appropriate mitigation measures should be incorporated into procurement plans and monitored throughout the project lifecycle.

Digital transformation offers additional opportunities to strengthen procurement performance. Integrated procurement systems, reliable market intelligence, supplier performance monitoring and data analytics can improve transparency, forecasting and decision-making.

The use of emerging technologies, including artificial intelligence and predictive analytics, may further enhance demand forecasting, market monitoring and procurement planning. However, technology must complement professional expertise, sound governance and informed engineering judgment.

The Way Forward for Qatar's Engineering Sector

The evolving geopolitical and economic environment presents an opportunity for Qatar's engineering and construction industry to strengthen its procurement capabilities and develop more resilient operating models.

Achieving this requires closer collaboration among engineering, procurement, finance, logistics and project management teams. Procurement professionals should be involved early in project planning, while project teams should recognize supply chain risks as an integral part of overall project risk management.

Continuous improvement, professional development, strategic supplier partnerships and effective performance monitoring will remain essential to achieving these objectives.

Above all, organizations must move from reactive procurement practices towards proactive planning, informed commercial decisions and a culture of shared accountability.

Conclusion: Resilience as a Foundation for Engineering Excellence

Geopolitical uncertainty is an external reality that individual organizations cannot control. However, its impact on project delivery can be managed through effective planning, strategic sourcing, robust governance and resilient supply chain strategies.

For Qatar's engineering and construction sector, strategic procurement is increasingly important in safeguarding investments, maintaining project continuity and supporting sustainable development.

The true value of strategic procurement is not measured solely by the savings achieved during stable market conditions, but also by an organization's ability to protect its projects, manage risks and sustain performance when uncertainty arises.

In an increasingly interconnected world, resilient procurement is no longer merely a competitive advantage; it is a fundamental pillar of engineering excellence and successful project delivery.

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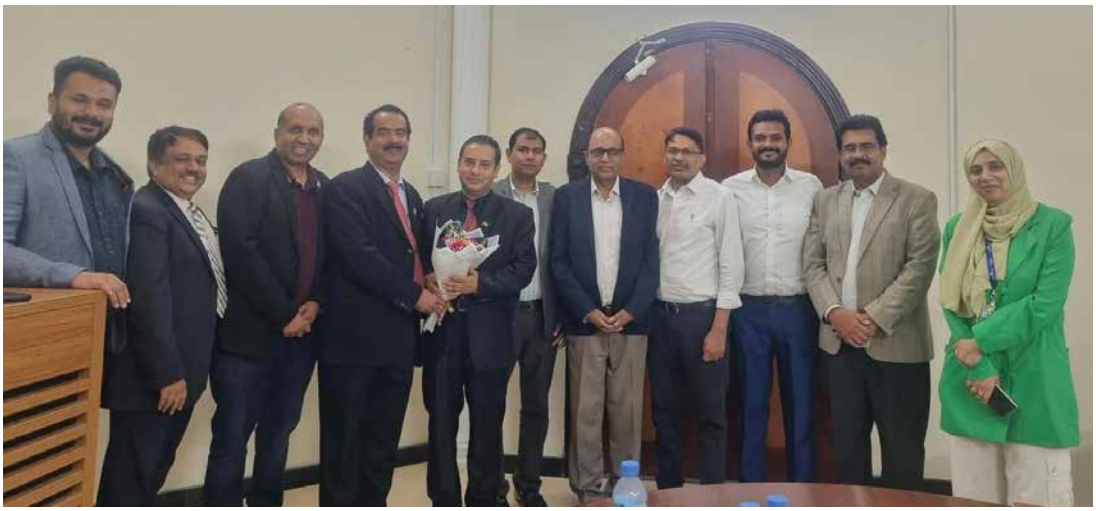

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Engineering Beyond the Grid:

Reliable Power Solutions for Extreme Environments



Er. AMAL KHAN
Mechanical Engineer

Beyond the Conventional Power Socket

Electricity is so readily available in our homes and workplaces that we often take it for granted. But consider a maintenance team at a remote industrial site, a contractor establishing a temporary work area, or a family camping in the desert. Each needs dependable power, often without the convenience of a permanent electrical connection.

In Qatar and across the Gulf, the challenge goes beyond reaching the location. Heat, dust, humidity and coastal corrosion influence how electrical equipment performs. Meanwhile, demand for mobile lighting, refrigeration, communications and monitoring devices continues to expand. The engineering question is no longer just how to provide power, but how to make it safe and reliable wherever it is needed.

The Weather Is Part of the Specification

An enclosure operating safely inside an air-conditioned room may not be appropriate on an exposed pumping station or temporary distribution board. Dust and moisture can affect connections, while direct sunlight can raise internal temperatures even when the enclosure remains properly sealed.

Ingress Protection (IP) ratings offer an essential starting point. Under IEC 60529, IP65 indicates dust-tight protection and resistance to water jets; IP67 includes protection against temporary immersion under specified test conditions. Yet IP ratings do not independently establish ultraviolet resistance, corrosion resistance or allowable operating temperature. Nor does an IP67 marking automatically confirm an IP66 water-jet rating.

Take a weatherproof junction box fitted with cables through several glands. The enclosure rating alone cannot compensate for an incorrectly sized gland, an unsealed spare entry, or components that exceed their temperature ratings in direct sunlight. Engineers must assess enclosure materials, cable entry arrangements, thermal performance and installation quality as one assembly. A specification is only useful when it matches the environment in which the product will actually work.

Portable Power Has Become an Everyday Engineering Need

Remote work locations require electricity for tools, work lights and communications. Temporary events need safe distribution. Even desert camping has changed: a simple lantern is now often joined by fans, compact refrigerators, chargers and other appliances.

Portable generators still have an important role, particularly for large loads and extended operating periods. But they bring fuel logistics, noise, maintenance and exhaust emissions. For smaller or intermittent demands, battery storage with suitable inverters—and solar photovoltaic charging—can offer a practical alternative.

The distinction between power and energy matters even without complex calculations. A system must deliver enough instantaneous power to start and run its appliances, and store enough energy to operate them for the required hours. A portable refrigerator, for example, may use modest energy across a day but still demand a higher instantaneous input when its compressor starts. Selecting equipment from an advertised capacity alone can therefore be misleading.

A Desert Campsite as a Small Engineering Laboratory

Imagine a weekend campsite equipped with a foldable solar panel and portable battery station. In daylight, the panel helps charge the battery; after sunset, the stored energy supplies lighting, charging and suitable low-power appliances. It sounds straightforward until the environment is considered.

Airborne dust gradually reduces solar-panel output. Poor panel orientation or shade limits charging time. A battery or inverter left in direct sunlight can approach its temperature limits, while a loose outdoor connection may expose users to moisture or mechanical damage. A reliable arrangement needs realistic load planning, protected connections, careful positioning, and a battery system operated within the manufacturer's temperature and charging limits.

This familiar example has a useful engineering lesson: portability is not the opposite of design discipline. The smaller and more convenient the equipment becomes, the easier it is to overlook the conditions under which it must perform.

Three Disciplines, One Working System

Mechanical engineering shapes the physical arrangement: the panel mounting, resistance to wind, ventilation, equipment enclosure and practical handling. Electrical engineering addresses the source, battery, inverter, cables, overcurrent protection and distribution. Instrumentation and control engineering monitors battery voltage, current and temperature, manages charging, and responds to abnormal operating conditions.

Each contribution affects the others. A sealed enclosure may resist dust yet trap heat. A compact layout may be easy to carry but difficult to cool. Sophisticated battery monitoring cannot make up for poor thermal design. The best system is not a collection of individually impressive components, it is a set of components that work reliably together.

Safety Must Travel with the Power

Outdoor portable equipment invites frequent handling, connection and relocation. Plugs, sockets, flexible cables and distribution boxes must therefore suit the expected environment and mechanical exposure. Overload and short-circuit protection remain essential, as do safe charging practices and appropriate battery safeguards.

For AC outputs, protection against electric shock must be designed for the specific power-source configuration. Earthing and residual-current protection cannot simply be copied from a conventional building installation: a portable inverter may have a different output and fault-protection arrangement. Convenience should never become a reason to compromise electrical safety.

Beyond Camping—and Looking Ahead

The same design principles apply to remote instrumentation stations, pipeline monitoring, telecommunications, temporary site facilities and environmental sensors. A modest solar-and-battery installation may support a wireless monitoring system where extending the grid would be difficult or uneconomical. Its success still depends on autonomy during poor sunlight, durable outdoor construction, appropriate protection and maintainable equipment.

As solar technology, batteries and intelligent controls develop, electricity can be produced and stored closer to the point of use. But new technology does not remove old engineering responsibilities. We must still understand the load, respect the environment, select compatible equipment and consider how the complete system will behave over time.

Engineering beyond the grid is ultimately about making electricity available where people need it—without treating safety or reliability as optional. Good engineering is measured not only by how a system performs under ideal conditions, but by how well it serves people in the real world.

Technical references: IEC 60529 (IP Code); IEC 60364 series (low-voltage installations); IEC 62109 series (PV power converters); IEC 62619 (industrial lithium batteries, where applicable



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We wish you every success for your celebration on October 17, 2026.



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The Role of Qatar Industrial Laboratories (QIL) in Advancing Sustainability in Qatar

Supporting Qatar National Vision 2030 Through Quality, nnovation, and Environmental Stewardship



HASSAN A. ELZEIN
General Manager , QIL

Introduction

Sustainability has become a cornerstone of national development worldwide, and the State of Qatar has demonstrated its commitment through Qatar National Vision 2030, which aims to balance economic growth, social development, and environmental protection. The vision is built upon four interconnected pillars: Human Development, Social Development, Economic Development, and Environmental Development. As Qatar continues its journey toward a diversified and knowledge-based economy, Qatar Industrial Laboratories (QIL) plays an important role in supporting sustainable development through quality assurance, testing, inspection, and technical services.

Ensuring Quality for Sustainable Growth

Quality is the foundation of sustainability. By providing reliable testing and certification services, QIL helps ensure that materials, products, and industrial processes comply with national and international standards. Through accurate evaluation and quality control, organizations can reduce waste, prevent costly failures, improve efficiency, and optimize resource utilization. Such measures not only enhance business performance but also contribute directly to sustainable economic growth.

Supporting Environmental Protection

Environmental sustainability is a key component of Qatar's development agenda. The Environmental Development Pillar of Qatar National Vision 2030 emphasizes responsible use of natural resources and protection of the environment. QIL contributes to these objectives by providing scientific testing and monitoring services that help industries measure, manage, and reduce their environmental impacts. Through environmental analysis and compliance verification, the laboratory supports pollution prevention, responsible resource management, and environmental stewardship.

Enhancing Infrastructure Sustainability

Qatar's continued investment in infrastructure requires durable and reliable construction materials capable of performing throughout their intended lifecycle. QIL supports sustainable infrastructure development through material testing, calibration, and technical assessments that ensure quality and durability. By helping stakeholders make informed decisions, QIL contributes to safer structures, lower maintenance requirements, reduced resource consumption, and improved long-term value.

Driving Innovation and Digital Transformation

As Qatar moves toward a knowledge-based economy, innovation and technology play an increasingly important role in sustainable development. QIL embraces modern testing technologies, automation, digital systems, and data-driven decision-making to improve accuracy and efficiency. These advancements support smarter industrial practices and align with Qatar's ambitions for technological excellence, operational efficiency, and sustainable growth.

Building Competence and Industry Excellence

Beyond its technical services, QIL contributes to sustainability by promoting professional competence and quality awareness across industries. Through collaboration, technical guidance, and the sharing of best practices, QIL helps develop skilled professionals who understand the importance of quality, safety, environmental responsibility, and continual improvement. Such human capital development is essential for achieving the long-term objectives of Qatar's sustainability programs.

Conclusion

Qatar Industrial Laboratories is much more than a testing and inspection organization. It serves as a key enabler of sustainable development by supporting quality, safety, innovation, and environmental responsibility. Through its commitment to excellence and continual improvement, QIL contributes significantly to the successful realization of Qatar National Vision 2030, helping to build a resilient, sustainable, and prosperous future for generations to come.

Note: Call us on 44601580 or Write us: qil@qitqatar.com and check our services on our Web: www.qilqatar.com for any information.


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AI-Enabled Cooling in Qatar:

Advancing Climate Resilience, Energy Efficiency, and Human Health



Dr. Fathima Risna
BDS, CPHQ, AACP

In Qatar, cooling is no longer a question of comfort but of survival. Across the Arabian Gulf, summers now push the human body toward the limits of what it can physiologically withstand, and the built environment remains habitable only because it is continuously cooled. The decisive measure here is the wet-bulb temperature, which combines heat and humidity to capture how effectively the body can shed heat by sweating; once it approaches about 35°C, even a healthy person at rest can no longer maintain a safe core temperature. The Gulf is among the few regions on Earth edging toward this threshold. In such a climate, the way a nation cools itself is not a matter of convenience but of public health, and it falls squarely within the responsibility of engineering.

Cooling, however, comes at a cost. Air-conditioning and district cooling already account for a dominant share of Qatar's electricity demand, and because the need for cooling rises with temperature, a warming climate sets in motion a self-reinforcing cycle: more heat demands more cooling, which consumes more energy, whose emissions deepen the warming. Meeting a growing cooling need while containing energy use and emissions is therefore one of the defining engineering challenges facing the region.

This article asks whether artificial intelligence (AI), applied to cooling systems and especially to district cooling, can help resolve that tension by advancing three goals at once: climate resilience, energy efficiency, and human health. Drawing on recent engineering research and on practice from across the Gulf, it explains how intelligent cooling works, what evidence supports it, and why it matters for a country that depends on cooling to remain habitable.

Cooling as a health issue

Prolonged heat exposure causes heat exhaustion and heat stroke, and the people most at risk are outdoor workers, the elderly, and those with chronic illness. Qatar already recognizes this in law, halting outdoor work whenever the Wet Bulb Globe Temperature exceeds 32.1°C. Reliable indoor cooling is, in effect, a protective health measure that shelters vulnerable people when outdoor conditions turn dangerous.

District cooling: Qatar's backbone

Qatar meets much of its cooling need through district cooling, in which large central plants chill water and distribute it to clusters of buildings. This is markedly more efficient than individual air conditioning, reducing electricity use by roughly 30 to 40 per cent. Around 70 plants operate nationally, with a combined capacity near 1.15 million refrigeration tons, and in 2024 the sector saved an estimated 18.5 million cubic meters of water. District cooling raises the efficiency ceiling of the system; what it does not resolve on its own is how that system should be operated from hour to hour as demand fluctuates, which is where AI enters.

Where AI comes in

Conventional cooling is reactive: it responds only once a space has already grown too warm. AI makes cooling anticipatory. Across recent research, four approaches recur: load forecasting, which predicts demand from weather and usage data; digital twins, virtual models that let strategies be tested before they are applied; reinforcement-learning control, which tunes individual zones rather than cooling a building uniformly; and predictive maintenance, which services equipment on evidence of wear rather than on a fixed schedule.

The shift is most consequential for district cooling, where a single plant serves many buildings and even small improvements in how it is operated compound across the whole network. Rather than producing chilled water to a fixed plan, an AI-managed plant can read the day ahead, anticipate when and where demand will peak, and prepare for it in advance. The result is a system that wastes less energy in normal conditions and is better braced for the extreme heat events that matter most.

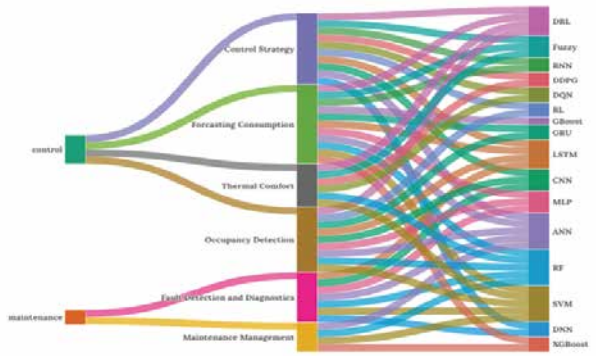

Figure 1. AI methods, techniques, and algorithms in HVAC systems. Source: Aghili et al. (2025)

What the evidence shows

Studies of AI in buildings show that it can improve energy efficiency and indoor environmental quality together, rather than trading one against the other. Energy management and demand prediction form the single largest application area, at nearly 48 per cent of studies. Regional practice confirms the approach works at scale: the cooling company Tabreed now operates 92 AI-managed plants and uses AI demand forecasting as part of a drive toward a 30 per cent improvement in plant efficiency. Because cooling dominates electricity demand in the Gulf, such proportional gains translate into large absolute savings in energy and emissions.

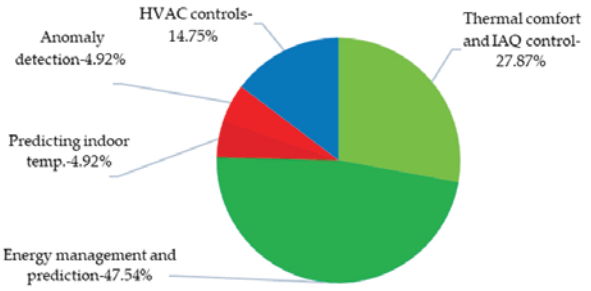

Figure 2. Distribution of AI application areas in buildings. Source: Ogundiran et al. (2024)

These systems are built on data rather than guesswork. Tabreed's operations, for instance, draw on more than 27 years of accumulated plant records, a reminder that useful intelligence is grown gradually from real-world experience rather than switched on overnight. Importantly, the resulting gains do not come at the expense of comfort or health: the same body of research shows that intelligent control can hold indoor conditions within safe and comfortable limits while consuming less energy, which is precisely the balance a hot climate demands. Efficiency and wellbeing, in other words, need not be traded against each other.

In practical terms, intelligent cooling can:

- cut the energy a cooling system uses, and the emissions that follow, by working only as hard as conditions require;
- flatten demand peaks on the hottest days, easing strain on the electricity grid when reliable supply matters most;
- keep indoor spaces within safe limits for the elderly, the young, and the unwell, who are most vulnerable to heat;
- detect faults early through predictive maintenance, lowering the risk of breakdowns during extreme heat;
- support more water-conscious operation, an essential consideration in a country that relies on desalination.

Why it matters for Qatar

For Qatar, the relevance is immediate and specific. District cooling is already woven into the country's infrastructure and its sustainability goals, which means the platform for intelligent cooling exists in practice rather than only in theory. At the same time, the human stakes are rising: summers are growing longer and more severe, outdoor workers remain directly exposed, and the electricity grid faces its heaviest strain at exactly the moments when a failure would be most dangerous. Intelligent cooling speaks to all three pressures at once, turning an unavoidable national expenditure into a lever for resilience, efficiency, and public health. This aligns directly with Qatar's national vision for sustainable development, in which the efficient use of energy and water is a stated priority. It reframes cooling not as a passive cost of living in a hot country, but as an active instrument of climate adaptation.

Benefits and trade-offs

The benefits are both economic and human: lower energy use and emissions, and a more stable electricity grid on the hottest days, when uninterrupted supply matters most for hospitals and homes. Three tensions remain, however. First is the cooling paradox, in which cooling consumes the very energy whose emissions intensify the heat. Second is water, since district cooling can raise water consumption in an already water-scarce country. Third is data dependence, because AI is only as effective as the sensors and operational history that feed it.

Recommendations

- Policy: embed AI-enabled efficiency targets within national cooling and sustainability strategy, building on Qatar's existing commitment to district cooling.
- Industry: invest in sensors, connectivity, and data governance on which intelligent cooling depends, since good data are a prerequisite rather than an afterthought.
- Research: generate Qatar-specific evidence on how AI-enabled cooling performs under local conditions, rather than relying on results from elsewhere.
- People: extend intelligent heat forecasting beyond buildings to protect the outdoor workers who cannot shelter indoors.

Limitations and strengths

This article is a review rather than an original study, and much of the evidence it draws on comes from other hot-climate settings or from industry reporting rather than from Qatar itself; locally validated data remain limited, and this is an honest gap. Its strength lies in bringing together three fields usually treated separately (climate, energy, and health) and reading them through the single, pressing lens of a country that must cool in order to remain habitable. In doing so, it offers a timely and locally grounded case for treating intelligent cooling as a priority for Qatar's engineering and policy agenda.

Conclusion

The case for intelligent cooling in Qatar rests on a simple but far-reaching idea: in a climate that is turning hostile to human life, the systems that keep people safe must become as efficient and as foresighted as current technology allows. Cooling is where climate, energy, and health converge, and in Qatar that intersection is unusually sharp. The country has already built one of the most extensive district-cooling networks in the world; layering artificial intelligence onto that foundation would multiply its efficiency across a vast installed base, ease the strain on the electricity grid during the most dangerous days of the year, and extend protection to the people most exposed to extreme heat.

The benefits are therefore not abstract. They are measured in lower emissions, in energy and water conserved, and ultimately in lives safeguarded against a threat that intensifies with each passing year. Realizing them will require locally grounded, Qatar-specific evidence on how AI-enabled cooling performs under the country's particular conditions, together with a deliberate effort to carry intelligent forecasting beyond buildings to the outdoor workers who cannot shelter indoors. For a nation whose progress has been built on engineering ambition, making its cooling intelligent is not merely an upgrade but a necessary step in adapting to a warming world. The question is no longer whether Qatar can afford to pursue it, but whether it can afford not to.

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PETROLEUM MINISTER VISIT





IEI PARTICIPATION



Jamia Milia Programm



Teluge Engineers Association



ICC Program



Meeting with Global South Engineers Association (GSEA), UK



The Institttion of Engineers Srilanka

IEI COLLABORATING PARTNERS

Collaborating partners
with Liverpool John Moores University











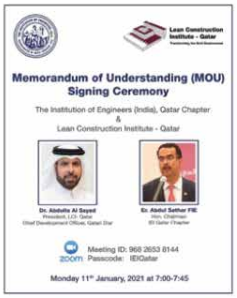
Engineers Australia MOU Signing Ceremony.







MOU Signing ceremony







IEI signs pact with LCI-Qatar

A memorandum of understanding (MoU) was signed between Institution of Engineers India (IEI) Qatar Chapter and Lean Construction Institute - Qatar (LCI-Qatar) recently.

The signing ceremony was conducted in the hybrid mode owing to the Covid-19 pandemic. Guests and office-bearers joined in person at the venue with over 100 members and engineers from Qatar, India, and other parts of the world joining in via Zoom online.

Abdul Sathar, chairman of IEI Qatar chapter, welcomed the delegates with an inspiring address, calling upon all members of the engineering profession as well as the wider community to utilise their skills, knowledge, and efforts for the welfare of society and humankind.

Dr Abdulla al-Sayed, LCI-Qatar president, highlighted the efforts of IEI Qatar as a high performing chapter of the organisation and also complimented the Government of Qatar for supporting the cause of the engineering profession in a big way.

He highlighted the importance for engineers to be aware of and prepared for the ever-changing engineering paradigms.

The MoU was signed by Dr Abdulla and Abdul Sathar. The ceremony was also addressed by Angelina Premalatha, consular of Indian embassy. She lauded the contributions of IEI Qatar Chapter to the Indian community in Qatar, including its engineers, towards strengthening and furthering the friendly relations between Qatar and India through their work. She commended the dedicated efforts of IEI Qatar Chapter in bringing together the engineering community through excellent events and meaningful themes despite the challenges posed by Covid-19 throughout the difficult period last year.

The event had the presence of Nishad Assem, CEO Coastal Qatar; Abdulla Mohamed al-Saker, vice president of LCI-Qatar; Dr Luai EL Sabek, general secretary of LCI-Qatar; Ahmed Jassim al-Jolo, former president of Qatari Society of Engineers; Yaqoub Y al-Mulla, Abdulla al-Hajri, Azmy Ameer, executive director of OUC | Liverpool John Moores University; and Sunil Kulkarni from Qatari Diar. They congratulated LCI-Qatar and IEI for the mutual agreement and co-operation for the benefit of engineers' community in Qatar.

Dr Abdul Hameed Pathiyil, secretary of IEI Qatar Chapter, compered and delivered the vote of thanks.





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