

The Institution of Engineers (India)

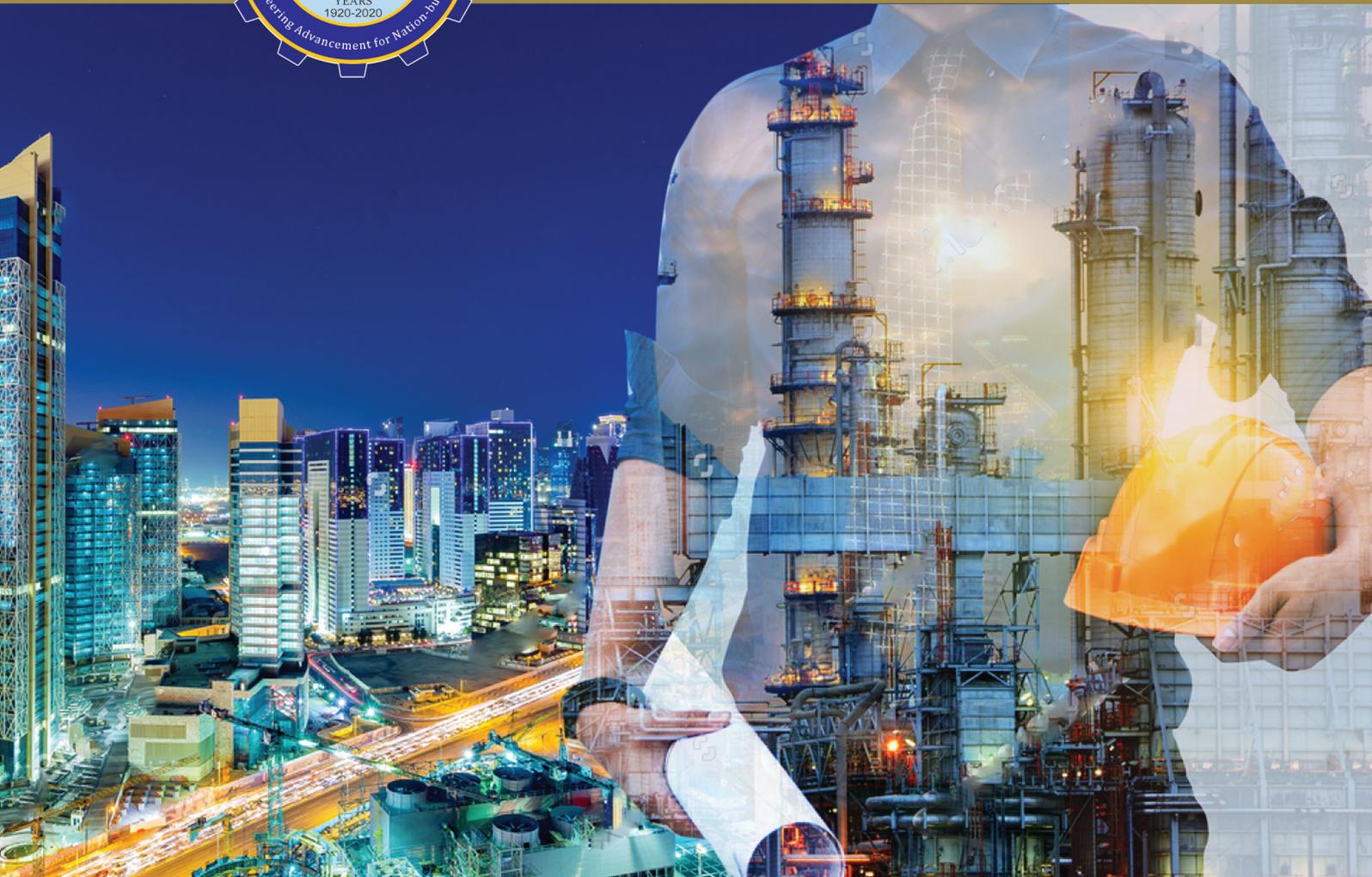
[ESTABLISHED 1920, INCORPORATED BY ROYAL CHARTER 1935]

QATAR CHAPTER



52nd ENGINEERS DAY 2019

SOUVENIR

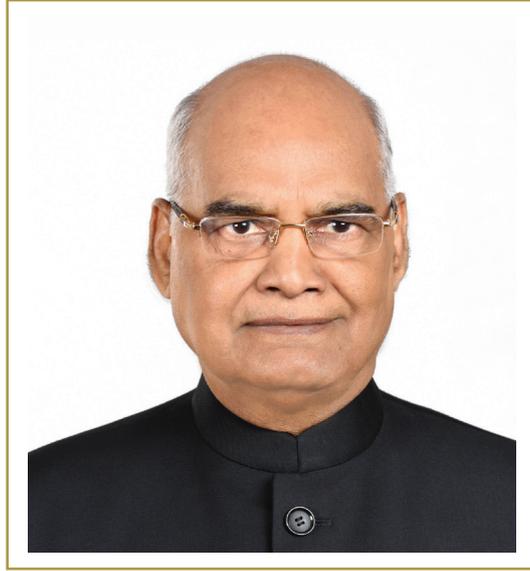




H.H. SHEIKH TAMIM BIN HAMAD AL-THANI
Amir of the State of Qatar



H.H. SHEIKH HAMAD BIN KHALIFA AL-THANI
Father Amir



H.E. RAM NATH KOVIND
President of India



H.E. NARENDRA MODI
Prime Minister of India





Ambassador



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السفارة الهندية
EMBASSY OF INDIA

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MESSAGE

I am happy to note that the Institution of Engineers (India) [IEI], Qatar Chapter, is celebrating the 52nd Engineers' Day and the Centenary of the International Engineering Congress on 26 and 27 September 2019 and is bringing out a technical souvenir on the occasion. IEI Qatar is one of the most active associations of Indian professionals in Qatar. The last two decades have been seminal in Qatar's economic development and progress and IEI and its members have made significant contributions in this journey through their respective vocations.

I am glad that IEI Qatar has been actively involved in organizing several technical activities and events which have contributed to the academic and professional development of the engineering fraternity in Qatar as a whole. These events are attended by engineers and technical experts not only from India and Qatar, but also from third countries. It makes me proud when I hear from Qatari dignitaries about the tremendous contribution made by Indian engineers in the overall development and progress of Qatar over the years.

Engineers' Day is a red-letter day and marks the birth anniversary of Sir Mokshagundam Visvesvaraya, a legendary engineer and recipient of Bharat Ratna, the highest civilian award presented by the Government of India for distinguished services in any field. The event being organized by IEI to mark this auspicious occasion is a fitting tribute to the contribution of the great man to the development of modern India.

I congratulate IEI Qatar, for their stellar contributions in bolstering India-Qatar relations, and wish them the very best in their future endeavours.


 (P. Kumaran)





The Institution of Engineers (India)

AN ISO 9001 : 2015 CERTIFIED ORGANISATION

(ESTABLISHED 1920, INCORPORATED BY ROYAL CHARTER 1935)

HEADQUARTERS : 8 GOKHALE ROAD, KOLKATA - 700 020, INDIA

Ph : (91) (33) 2223 1979 • Website : <http://www.ieindia.org>

Dr. T. M. Gunaraja, FIE
PRESIDENT

*“99 Years of Relentless Journey towards
Engineering Advancement for Nation-building”*

I am happy to note that Qatar Overseas Chapter of The Institution of Engineers (India) is celebrating 52nd Engineers' Day on the topic “Engineering for Change” on 26-27 September, 2019 to commemorate the Birth Anniversary of Bharat Ratna Sir Mokshagudam Visvesvaraya.

In the backdrop of climate change, changing socio-economic paradigm, and disruptive technologies, engineers need to enhance their professional horizon. A good understanding of interdisciplinary innovations, design, planning and undertaking research and project delivery is imperatives that needs to be kept in mind. Rapid development in industrial processes and market driven requirement for production of business processes and market driven requirement for production of quality goods has made it necessary for industry to convert their business process models and give more thrust on systems engineering, which is the trans-disciplinary field of engineering and engineering management that focuses on how to design and manage complex systems over their life cycles.

I am sure that speakers at the event would highlight various issues and connected with the present environment of technological change and challenges and also the importance of sustainability.

I wish the celebration of Engineers' Day to your Centre a grand success.



(Dr TM Gunaraja)





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8 GOKHALE ROAD, KOLKATA - 700 020
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Maj Gen (Dr) S Bhattacharya, VSM (Retd)
Secretary & Director General

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It is indeed a pleasure to know that Qatar Overseas Chapter of The Institution of Engineers (India) is celebrating the 52nd Engineers' Day on the theme "Engineering for Change" on 15 September 2019 to commemorate the Birth Anniversary of Bharat Ratna Sir Mokshagundam Visvesvaraya, the doyen of Indian Engineering.

The theme "Engineering for Change" is very relevant in the context of rapid technological development and disruptive innovation which have become all pervasive affecting all aspects of society. Thus, the management of change at all levels of engineering development pose new challenges especially in the domain of skill development.

I am sure that the deliberations in these areas of interest would be relevant and fruitful.

I wish you all the very best on Engineers Day 2019.

Maj Gen S Bhattacharya, VSM (Retd)



“ With Best compliments from”



مؤسسة قطر
Qatar Foundation

لإطلاق قدرات الإنسان
Unlocking human potential



The key to achieving progress and prosperity for any nation lies in the sustainability of its human, social, and economic development. It is the measured yet transformative growth, founded upon inspiration, collaboration, and innovation, that is essential to the successful pursuit and fulfillment of these goals. In that sense, Engineering plays a central role in the translation of research, development, and innovation into impactful applications for the benefit of society.

On behalf of Qatar Foundation Research, Development, and Innovation, I congratulate the Institution of Engineers India (IEI) on its pioneering efforts to promote and advance engineering and technology for the benefit of society, over a glorious journey spanning one hundred years.

The Centenary International Engineering Congress and commemoration of IEI's achievements, organized by its prolific Qatar-based Chapter, holds special significance as it is being conducted during the Qatar-India Year of Culture - a celebration of our intertwined cultural roots and reaffirmation of the traditionally-close relationship our countries share.

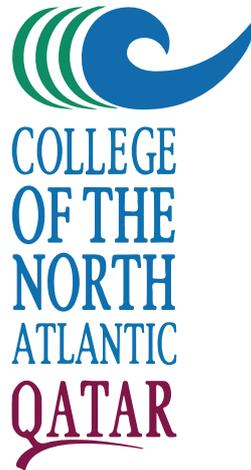
Dr. Nabeel Al-Salem

Chief Advisor Partnerships

Qatar Foundation Research, Development, and Innovation



“ With Best compliments from”





As President of College of the North Atlantic - Qatar (CNA-Q), and former Dean of the College of Engineering at Qatar University, I am pleased to welcome you to the Centenary International Engineering Congress 2019 at Qatar University.

This platform for networking offered by the Institution of Engineers (India) Qatar Chapter allows Engineers from various disciplines to share knowledge, collaborate, and discuss trends such as multi-disciplinary Engineering. It is opportunities like these that are essential to the field of Engineering; there is no overstating the importance of this profession and the invaluable contributions it makes to society. It is also imperative that societies like the Institution of Engineers (India) Qatar Chapter continue to engage in academia, helping to educate and produce the highest level of graduates in the discipline of Engineering.

I wish you a successful conference.

Prof. Khalifa Al-Khalifa

President, College of the North Atlantic - Qatar



Graduate Programs

Masters Programs

-  Master of Science in Civil Engineering
-  Master of Science in Computing
-  Master of Science in Electrical Engineering
-  Master of Science in Engineering Management
-  Master of Science in Environmental Engineering
-  Master of Science in Mechanical Engineering
-  Master of Urban Planning and Design

Programs of Doctor of Philosophy (PhD) in Engineering

-  Doctor of Philosophy in Architecture
-  Doctor of Philosophy in Urban Planning
-  Doctor of Philosophy in Chemical Engineering
-  Doctor of Philosophy in Computer Science
-  Doctor of Philosophy in Computer Engineering
-  Doctor of Philosophy in Civil Engineering
-  Doctor of Philosophy in Electrical Engineering
-  Doctor of Philosophy in Industrial and Systems Engineering
-  Doctor of Philosophy in Mechanical Engineering
-  Doctor of Philosophy in Engineering Management
-  Doctor of Philosophy in Environmental Engineering
-  Doctor of Philosophy in Material Science and Engineering



It is a great honor to host the International Engineering Congress in partnership with the Institution of Engineers, India (IEI) as part of the College of Engineering 40th anniversary portfolio this academic year 2019-2020.

Since 1920 (IEI) is well known for being active in promoting professional activities, supporting students, and spreading technological activities across India.

The conference aims to bring the latest innovations and technology in engineering by providing a rich environment for experts, professionals, and engineers from Qatar, India, and other countries to exchange their knowledge. Similarly, students, faculty, and researchers are expected to maximize their knowledge and networking during this conference. And the conference indeed is to strengthen the ties between Qatar and India.

I would like to take this opportunity to thank the organizing committee from both organizations in Qatar and India and wish you all a very successful and memorable event.

Khalid Kamal Naji, PhD

Dean of the College of Engineering
Qatar University



President, IEI HQ visited H.E. Ambassador of India to Qatar



Excom IEI - Qatar



IEI - Qatar Chapter, 51st Engineers Day, Celebration

Chairman's Message



Er. Abdul Sathar FIE
Hon. Chairman
The Institution of Engineers (India),
Qatar Chapter

Celebrations throughout the world are taken to great heights and strides during the Engineers day in remembering the realized past and visualizing the future of the tenets set out by revered visionary Bharat Ratna Sir M. Visvesvaraya.

Being part of such Celebration for the year 2019 gives me sense of great pride and privilege, as I write this message from my desk at the Doha Chapter.

As the country of Qatar has very well progressed in the last decade as one of the foremost and fastest developing countries in the world, especially welcoming of 2022 FIFA World Cup, blessed.

The Qatar Chapter of IEI is indeed happy to publish this technical Souvenir on the 52nd Engineer's Day to mark the birthday of Bharat Ratna Sir M. Visvesvaraya, the doyen of Engineering fraternity whose creative genius nearly revolutionized the concepts of planning for community welfare of both the rural poor as well as urban masses.

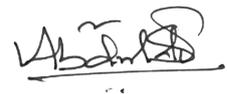
I whole heartily commend all the enthusiastic dynamic & dedicated Engineer Member of all the past and present Executive Committees, who have made a name in the engineering fraternity for their selfless services in uplifting the status of En-

gineer & Engineering profession. But the task is growing more and more complex, with ever expanding technological development and advancement of engineering field and applications.

The theme chosen for this year's commemoration is "Engineering for change". This is a very relevant topic in the current context. 'Change' is the most important challenge faced by the Engineers of a developing India. I have profound optimism that discussions on the Engineers Day Theme will emerge into exiting ideas, developments and opportunities for the Engineers in the coming years.

Engineers Day is the day of reverence and conscientious thinking for all Engineers. This day belongs to the Engineering community and all Engineers shall feel proud to be associated with this highly important and noble profession.

I take this opportunity to express my sincere thanks and gratitude to our well-wishers and supporters for their guidance and support which has enabled the Qatar Chapter to function as a truly professional body in Qatar. I also take this opportunity to congratulate all fellow Engineers on the occasion of the 52nd Engineers Day and wish a great success.



The Institution of Engineers (India) Qatar Chapter Activities Report 2019

As Honorary Secretary of the Qatar Chapter, I consider it a privilege to present this overview of Institution of Engineers India Qatar Chapter and its activities since 51st Engineers Day celebration on 29th September, 2018.

In the second decade of the last century India was embarking on industrialization. A report of the Industrial Commission in 1916 recognized the importance of the engineering profession. Proposals were mooted in 1918-19 for the formation of an Indian Society of Engineers. Finally, the Institution of Engineers (India) was formed and was registered under the Indian Companies Act, 1913 at Madras in 1920. Sir Thomas Holland was one of the active participants leading to the establishment of the Institution and could be considered as its founder. It was formally inaugurated in 1921 by Lord Chelmsford, the then Viceroy and Governor General of India. The Institution of Engineers (India) was granted the Royal Charter of Incorporation by His Majesty the King George V of England in 1935, "to promote and advance the science, practice and business of engineering in all its branches in India".

Starting with this humble beginning, The Institution of Engineers (India) is now an unique professional body encompassing 15 engineering disciplines and with an overall membership of over 800,000. The sapling planted in the 1920 has, by now, grown to a big tree and the track record of The Institution of Engineers (India) has been a matter of pride for all engineers. The Institution of Engineers (India) is the first professional body to represent India in several International Bodies and it also has bilateral agreements with a number of professional societies across the globe.

Qatar Chapter is the IEI's first overseas chapter and was established in July 1991. The Qatar Chapter operates under the sponsorship of the Indian Embassy in Qatar and under the patronage of the Ambassador of India. The aims and objectives of the chapter are to promote the general advancement of engineering and to facilitate exchange of opinion and ideas in engineering profession amongst Members of the Qatar Chapter

The Institution of Engineers (India) - Qatar Chapter organized the 51st Engineers' Day Celebration on 29th September 2018 at Radisson Blu Hotel, Doha. The event was attended by eminent personalities from ministry, industry and financial institution of Qatar. For first time IEI(I) President elect Er. TM Gunaraja attended Qatar chapter Engineers day celebration as chief guest. The Qatar chapter IEI(I) founding chairman Er. John Mathew, past chairman Er. Debbashis Roy, Er. Kha-

lid Al Hashmi, Under Secretary, Ministry of Transport and Communication, Er. Ahmed Jolo, President of Arab Engineers, Er. Said Mubarak Al Mohanadi of Qatar Petroleum and Mr. Johangirbek, Vice President of Qatar Financial Center attended the event and spoke on the occasion and the audience was highly inspired. Members from Kuwait Chapter also attended the event. The technical presentation on the theme of the year "Digital Transformation: A New Industrial Revolution" was delivered by Er. KM Bazeeth Ahamed, co-founder and director of Conserve Greet Building and MEP solutions. More than 300 engineers and invited dignitaries had attended this great event.

A Technical Seminar on "Passive Fire Protection Coating for Steel Structures" was conducted on 26th October 2018, at Hotel Radisson Blue, Doha. The Jotun Paints Regional Support Manger - Infrastructure Er. John Brown delivered an in-depth presentation, which was attended by 100 practicing Engineers from various contracting and consulting organizations. The Seminar was sponsored by Jotun Paints, Qatar.

The day 1st November 2018 was very saddening to the entire Indian Engineers in Qatar as we hear the sad demise of IEI QC Founder Secretary and Past Chairman Er. Animesh Sarkar. A Condolence Meeting for Er. Animesh Sarkar was arranged on at ICC on the same day and all remembered the contribution of Er. Animesh Sarkar to IEI Qatar Chapter and entire engineering fraternity in Qatar, and prayed for eternal peace of his soul.

A Technical Seminar on "Quality & ISO Standards and Privacy Engineering & Assurance" was conducted on 2nd November 2018, at Hotel Radisson Blue, Doha. Engineers Ajay Kumar Singh and Rakesh Jha from Privacy Virtuoso Global Pvt Ltd detailed on Quality & ISO Standards and Procedures. The event was attended by around 150 practicing Engineers from various contracting and consulting organizations. The Seminar was sponsored by Privacy Virtuoso Global Pvt Ltd, Qatar



A Technical Seminar on “Application of Heat Exchangers” was conducted on 15th December 2018, at Hotel Radisson Blue, Doha. Er. Mr. George Saxon, President - International Markets CONCO, USA, delivered an in-depth presentation, which was attended by more than 150 practicing Engineers from various contracting and consulting organizations. The seminar was sponsored by WALCO Qatar.

A Technical Seminar on “Block Chain Technology and its Application” was conducted on 6th February 2019, at ICC, Doha by Muddassar Ali Baig, which was attended by more than 75 practicing Engineers from various contracting and consulting organizations.

The Institution of Engineers (India), Qatar Chapter held their 29th Annual General Body Meeting (AGM) on 20th February 2018. Honorary Chairman Er. Abdul Sathar welcomed the gathering and announced the good news that IEI Qatar Chapter has been chosen by the Head Quarters for conducting International Engineering Congress at Doha on 26th and 27th September 2019 with various technical seminars and technical panel discussions. The theme of the Congress will be “Smart Engineering – State of Art Technologies in Oil & Gas and Infrastructure Development”. Honorary Secretary Er. Dr. Abdul Hameed Pathiyil presented the activity report for the year 2018-19. Er. Sajeet George, Hon. Treasurer proposed budget for the year 2019-20 and were adopted unanimously. The General Body approved the inclusion of two new executive committee members Er. Durai Mainvannan and Er. Salihudheen in the committee.

A Technical Seminar on “Why do Critical Infrastructure need Health Monitoring” was conducted on 30th March 2019, at Hotel Oryx Rotana, Doha by Prof Dr Sidharth Ghosh, IIT Mumbai. The topic was well received and Dr. Mahesh Var-

ma, Director, Home Structural Health Monitoring and India Nandee Designers also attended and contributed to the subject. The event was attended by around 100 practicing Engineers from various contracting and consulting organizations.

A farewell party to the immediate Past Chairman Er. Anirudh Kulkarni was arranged on 18th April 2019, which was attended by current and past executive committee members and his close IEI and professional associates.

A Seminar on “ISO 45001:2018 Occupational Health & Safety Awareness and its benefits” was conducted on 22nd April 2019, at Hotel Oryx Rotana, Doha. Mr. Samir Ahmed, General Manager, Intertek-Gulf Region, delivered an in-depth presentation on the topic, which was attended by around 100 practicing Engineers from various contracting and consulting organizations.

The IEI(I) President Er. TM Gunaraja and SDG Rtd Maj Gen Dr. Souresh Bhattacharya visited Qatar on 28th May 2019 in order to discuss about International Engineering Congress and to seek supporting Qatar organizations for the event. The committee members given a warm welcome to them and appreciated their presence and inspiration. An Excom meeting was conducted which was chaired by President TM Gunaraja. They visited officials of Indian Embassy, Qatar University, Qatar Foundation and CNAQ. The visit was very fruitful and support of Indian Embassy, Qatar University, Qatar Foundation and CNAQ was ensured for Qatar Chapter and for the International Engineering Congress.

52nd Engineers Day Theme Seminar on “Engineering for Change” was conducted on 8th September 2019 at Hotel Oryx Rotana, Doah. Er. Vikash Sananda delivered the topic, which was attended by around 100 practicing Engineers from various contracting and consulting organizations.

Since its inception, the Qatar Chapter of the Institution of Engineers (India) overseas chapter has been rendering excellent professional services to the engineering community of Qatar in consistent to the objective of the Institution uninterruptedly for last 28 years. One of the major activities is the regular technical seminars and workshop conducted for the member engineers in Qatar. It also promotes general advancement in engineering and technology, provides a platform for technical interaction for continuous professional development of the engineering community of Qatar.

As Qatar marches ahead in progress, as a premier wealth creation and knowledge creation center in the world, Institution of Engineers (India) Qatar Chapter will also march ahead and will continue to provide its fullest professional support in the endeavor. The International Engineering Congress to be conducted on 26th September with support of Qatar University, Qatar Foundation and CNAQ as part of IEI’s centenary Celebration will be definitely stepping stone for more collaborative programs among Indian Engineers and Qatar Engineers, which will be defiantly contributing for the growth and development of Qatar and India.

On behalf of IEI Qatar Chapter, I extend our sincere gratitude to our sponsors, all organizations and fellow engineers for their valuable support in our activities. We look forward to your continued support in the years to come, so we could be partners in progress.

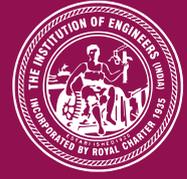


Dr. Abdul Hameed Pathiyil,
B.Tech, MBA, MIT, CEng, PhD, FIE
Honorary Secretary, IEI Qatar Chapter





جامعة قطر
QATAR UNIVERSITY



The Institution of Engineers (India), Qatar Chapter

Centenary International Engineering Congress

26 September 2019

Qatar University

Research & Development Building (H10)

27 September 2019

Al Dana Club

Al Jewana Hall

Technology Partner



مؤسسة قطر
Qatar Foundation

Knowledge Partner



COLLEGE
OF THE
NORTH
ATLANTIC
QATAR

@ / CIECQatar **iei.qa**





IEI Hon. Chairman handing over Momento to Mr. Samir Ahmed, GM, Intertek



Eng. Mudassar Baig, speaks on Blockchain Technology



Farewell party to the immediate Past Chairman Er. Anirudha Kulkarni

Do It Right The First Time-(DRIFT)

“QUALITY is never an accident; it is always the result of High Intention, Sincere Effort, & Intelligent Direction- Edward DEMING”



Engineer Ajay Kumar Singh.

B.E. Civil, FIE, Dip.-Q.A. L.A.
(ISO 9001, 14001 & 45001), Nebosh-IGC

Being an accomplished ENGINEER, our aim shall be to “DO IT RIGHT THE FIRST TIME (DRIFT)”. With the philosophy of DRIFT, we can avoid REJECTION and REWORK. The objective behind DRIFT is to enable the top management of an organisation to ensure that processes are implemented correctly and efficiently, there is no delay in the production and the cost of the final product is reduced. The ideals of DRIFT can be achieved only when a good QUALITY culture is established in an organization.

What is QUALITY?

“Degree to which a set of inherent characteristics fulfils the requirement and meeting or exceeding the customer’s requirements”.

Why do we need QUALITY in an organisation?

- To compete in the market for existence
- Customer satisfaction
- Continual improvement
- To get things right at the first time

- Increased profitability
- Makes life easier for all employees
- Saves time
- Avoids a “blame” culture

Leading organisations in the world are efficiently managed by implementation of the QUALITY MANAGEMENT SYSTEM (QMS), in order to increase their level of productivity and profitability. These leading organisations are run in accordance with seven main QUALITY MANAGEMENT PRINCIPLES, which are as follows:

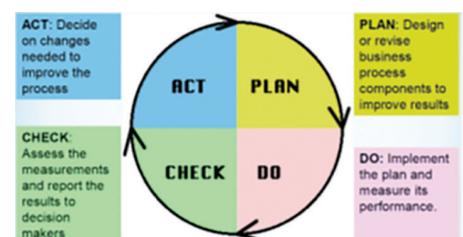
1: Customer Focus - Organisations depend on their customers and therefore, should understand current and future customer needs, should meet customer requirements and should strive to exceed customer expectations.

2: Leadership - Leaders establish unity of purpose and direction in the organisation. They should create and maintain an internal environment in which people can become fully involved in achieving the objectives of the organisation.

3: Involvement of People - Involvement of people at all levels is the essence of an organisation and their full involvement enables their abilities to be used for the benefit of the organisation.

4: Process Approach - A desired result can be achieved more efficiently when activities and related resources are managed as a process.

In 1950, W. Edwards Deming created a simplified diagram to illustrate this continuous process, commonly known as the PDCA CYCLE (PLAN, DO, CHECK, ACT)



5: Continual Improvement - Continual improvement of overall performance of an organisation shall be the permanent objective.

6: Evidence Based Decision Making - Effective decisions shall be taken based on analysis of data and information.

7: Relationship Management - An organisation and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

World's leading brands, organisations, production houses, institutions, and construction companies are managing and implementing the Quality Management Principles through "ISO-9001:2015" accreditation.



History of ISO and their Revisions:

ISO was established in 1947 and it is headquartered in Geneva, Switzerland.

- The first edition of ISO 9000 came in 1987.
- The first revision came in 1994.
- The second revision came in 2000.
- The third revision came in Nov. 2008.
- The fourth revision came in Nov. 2015, which is currently under implementation.

Over 1 million organizations and com-

panies in over 170 countries have accreditation for ISO 9001:2015 standards for their QMS.

As per the new ISO 9001:2015 revision, the following documentation is mandatory:

1. Quality Policy (5.2.1).
2. Quality Management System Manual (Optional).
3. Control of Documented Information (4.4.2).
4. Risk and Opportunity Management (6.1.1).
5. SMART Objectives and KPIs (6.2).
6. Monitoring and Measurement Resources (7.1.5.2).
7. Control of Non-Conforming Products (8.7).
8. Internal Audit (9.2).
9. Management Review Meeting and Output (9.3.3).
10. Non-Conformity and Corrective Action (10.2).
11. Continual Improvement (7.1.1, 10.0).

Benefits of ISO 9001:2015 (QMS) CERTIFICATION

1. Cost savings and increased profit.
2. Mandatory requirement in the industry.
3. Market recognition
4. Catalyst for improved morale and pride among employees.
5. Customer satisfaction.
6. Increases operational efficiency
7. Better documentation
8. Focused performance on quality
9. Enhances internal communications

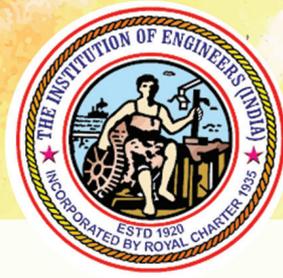
How to acquire ISO 9001:2015 accreditation?

Any organisation can acquire ISO 9001:2015 certification with the following process flow:

- The organisation shall complete their mandatory Quality Management System (QMS) documentation and its implementation to all levels of the organisation.
- An awareness and refreshing training session shall assist and facilitate employees in understanding the Quality Management System Requirement.
- Once the organisation is familiar with QMS, "gap analysis" shall be done and an internal audit shall be conducted to check the QMS compliance.
- An Audit Report shall be issued and presented to the top management and a Management Review Meeting (MRM) shall be conducted.
- In accordance with the MRM, corrective action shall be taken at various levels to mitigate risk.
- A third-party certification agency shall be hired for certification audit.
- Corrective action shall be taken at various levels and departments, if there is any non-compliance identified in the QMS.
- Upon completion of successful corrective action, certification agency awards the ISO 9001:2015 Certificate to the organisation.



The Institution of Engineers (India) delegates with Director, QFC



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.

Honorary

Honorary Fellow (HF)
Honorary Life Fellow (HLF)

Corporate

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

Non Corporate

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



Join

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.

IEI Qatar chapter is licensed with Qatar Financial Centre and its office is located in Regus building Centre, P.O. Box 18523, 1st floor, Office 103, D-Ring road, Doha, Qatar.

IEI Qatar

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Hon. General Secretary:
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Join

Scan the Barcode to learn more and be a part of IEI Qatar.

iei.qa

Distributed Control System (DCS)



Sivabalan Selvarajan
B.E. MBA

ABOUT DCS

Distributed control system (DCS) is a computerized control system for a process or plant usually with a large number of control loops (>256). The Field Instruments / Sensors I/O can be integral with the controller or located remotely via field network. Controllers are extensive computational capabilities and in-addition to perform logic, continuous PID control and sequence control with remote monitoring and supervision.

BRIEF OF DCS

When systems get larger and processes becoming more complex, we need to measure and control in all aspects of your plant in a central location is critical. Whether you have a single factory or multiple sites, getting all the relevant data to a single location has always been a challenge.

In the past, this would have been done with expensive Programmable Logic Controllers (PLCs) with a high density channel count, long cable runs and in some cases, a compromised location. Using a system with distributed I/O, the disadvantages of high channel counts and expensive controllers can be overcome and additional benefits can be realized.

The main characteristics of a distributed I/O system are small field devices with a wide range of I/O options such as digital and analogue channels, temperature measurements and counter inputs. These modular devices give a flexibility that cannot be achieved with traditional devices.

A significant benefit of this distributed approach includes short cable runs for

signals since the measuring devices are located close to the sensors. Direct connection of sensors eliminates the need for signal conditioning while providing standard signal inputs for those unusual and specialized sensors.

Utilizing reliable and conventional communication buses such as Ethernet and RS485 with protocols such as Modbus/TCP, Modbus/RTU, Profibus, and even ASCII, modules can be integrated into existing networks and systems, giving a low

DCS HARDWARE

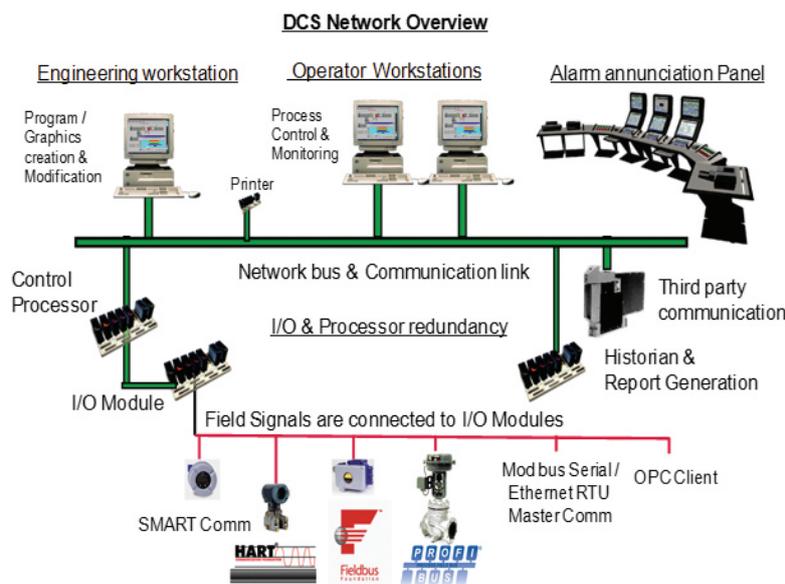
DCS begins at the sensor I/O and extends all the way through I/O Modules, controllers, application processors, workstations, PCs, and communications networks falling within the DCS control domain. Size of the DCS will be based on I/O Counts which is finalized by the Client.

Excluded from the DCS hardware definition are field instruments, control valves, analytical devices, all specialty measurement equipment (such as paper machine gauges and condition monitoring devices), and any other devices that exist outside I/O level of the system. Also excluded are dedicated supervisory workstations that execute applications such as advanced control, production management, real-time optimization, simulation or plant asset management.

DCS SOFTWARE

DCS management programming software includes embedded controller, control system, HMI, engineering, configuration software, Alarm Management, Report tool and plant information management (PIM) software such as bundled data historians in addition to performing HMI functions. HMI software can also perform functions such as I/O communication and it typically resides in the DCS workstation or PC. Control software typically resides embedded in controllers and performs basic control functions.

The DCS software excludes optional supervisory software that performs production management (MES), advanced process control (APC), model-predictive control (MPC), real-time process optimiza-



cost, flexible upgrade path.

These advantages can be extended to the software, presenting data in a standard format for new and existing platforms such as OPC (Open Process Control) using OLE (Object Linking and Embedding), Modbus, SNMP (Simple Network Management Protocol), and the other protocols like email and SMS messages on the cellular network. With the use of appropriate gateway devices, modules can be connected to existing legacy systems such as a plant wide Distributed Control System (DCS) and simply reconfigured if the system is upgraded or replaced.

tion (RPO), process simulation and optimization (PSO), and plant asset management (PAM) applications.

DCS EVALUATION & SELECTION CRITERIA

- Architecture
- Networking & Communication protocol
- System I/O limitations
- OS, Processor, Memory, Speed, Programming
- Redundancy & Backup
- Third party integration (PLC, ERP, Safety Systems)
- Supervisory Applications
- Up gradation/Expansion feasibility
- Report generation
- Alarm Management
- Historian
- Leveraging new technologies like Cloud, virtualization, etc..

SERVICE REQUIREMENTS

Specialized Training

Spare parts

Lifecycle (AMC).

ADVANTAGE OF DCS

- Control function is distributed among multiple Field Control-

lers Hence failure of one controller does not affect the entire plant.

- Inbuilt Redundancy is available at various levels.
- Instruments and its interlocks are created by software.
- Generation and modifications of the interlocks are very flexible and simple.
- Information regarding the process is presented to the user in various formats.
- Field wiring is considerably less.
- Maintenance and troubleshooting becomes very easy.
- Contains more I/O and data integration can be made.
- Visualization is much better than PLC.
- Cost effective in the long run.

APPLICATIONS OF DCS

Major types of Process Industries like Pharmaceutical & Biotech Industries, Chemical Industries, Oil & Gas industries, Refineries, Fertilizers, Cement & Glass Industries, Offshore Processing, Mining, etc..

All type of Generation Units like Power Plants, Food & Beverages, Metal Industries, Pulp & Paper, Water & Wastewater, etc..

CONDOLENCES



Er. Animesh Sarkar

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Project Risk Management



Ramesh Malliappan
BE Civil, PMP, C.Eng (I) MBA, PG Dip,

Introduction

Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, and controlling risk on a project. The objectives of project risk management are to increase the likelihood and impact of positive events, and decrease the likelihood and impact of negative events in the project.

Project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives such as scope, schedule, cost, and quality. A risk may have one or more causes and, if it occurs, it may have one or more impacts. A cause may be a given or potential requirement, assumption, constraint, or condition that creates the possibility of negative or positive outcomes.

Objective

Identify Project Risks and analyze them in order to categorize and focus for effective management

Identify Project Opportunities (Positive Risk) analyze them in order to leverage and maximize to achieve

Clear responsibilities and accountabilities to take proper response

Continuously monitor the information provided to decision-makers in order to assist them as they manage key risks and protect the interests of shareholders

Risk Management Process

Below figure depicts the Risk Management Process

The first step in the Project risk management process is to establish the context by answering the question such as

“what must the project achieve?” and “what is at risk and why?”

The context provides the structure for undertaking risk management. During this part of the process the following has been considered:

The scope and objectives for the project or specific aspects of the project being reviewed;

The current status of the project;

- Key issues, assumptions and constraints;
- Internal factors which could influence project objectives;
- The external environment which could have an influence over the project outcome;
- Appreciating how stakeholder’s objectives align or conflict with those of the project.

Risk Identification

Risks are initially identified through risk workshops and consultation with department heads. Thereafter these risks are updated and amended through a combination of one-on-one meetings and discipline/area risk workshops (planned on indicative monthly basis) where the more significant risks reviewed by all parties. It is to be noted that new risks, as identified through normal operational management, can be raised at any point during the project life for inclusion in the register and subsequent follow up and analysis.

Project team ensured nothing is lost in the interfaces between the different departments and avoided duplication of risks identified in more than one of these interfaces. This is done in a number of

ways; by identifying both ‘Risk Owners’ and ‘Interested Parties’ on each of the risks identified. Risks that cross more than one area or discipline is communicated to all parties that need to input into a particular risk or will benefit from gaining confidence that it is being managed.

Risk identification process initiated and continued across and throughout the life cycle of the project.

Risk Register:

Project team need to maintain two Risk Register viz, Internal Risk Register and External Risk Register.

- o Internal Risk Register: Contains the Risk and Opportunity which shall be managed internally by Project team and may contain sensitive issues like Revenue R&O, so need to be maintained as confidential document. Refer Appendix – RSKMNG1 – Internal Risk Register.

- o External Risk Register: Contains the Risk and Opportunity which shall be managed by all Stakeholder of the Project like Employer, Consultants and other Externals. Appendix – RSKMNG2 – External Risk Register

The risk register template brings together, clearly and concisely, the details of all identified risks in a single document. The register listed all identified risks, their causes and consequences, assessment of likelihood and impact, and proposed management actions to mitigate the risk. The register is the focal point for addressing and reviewing risks and is the key management tool for communication.

Key Risk Register Components are Risk ID Number, Risk Type, Category, Status, Manageability.

In the context of Project Risk Management:

- a RISK is an uncertain event or set of circumstances that, if it occurs, will have either a positive or negative effect on the project's objectives and is measured through a combination of impact and likelihood;
- a THREAT is 'an uncertain event or set of circumstances that should it occur, will have a NEGATIVE effect on the project's objectives';
- an OPPORTUNITY is 'an uncertain event or set of circumstances that should it occur, will have a POSITIVE effect on the project's objectives';
- an ISSUE is a problem that currently affects the project that is



Qualitative Analysis: Qualitative Risk Analysis is the process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact. The key benefit of this process is that it enables project managers to reduce the level of uncertainty and to focus on high-priority risks.

Perform Qualitative Risk Analysis is usually a rapid and cost-effective means of establishing priorities for Plan Risk Responses and lays the foundation for Perform Quantitative Risk Analysis, if required. The Perform Qualitative Risk Analysis process is performed regularly throughout the project life cycle.

Below Risk Matrix to be used to perform Qualitative Risk Analysis:

Quantitative Analysis: Quantitative Risk Analysis is the process of numerically analyzing the effect of identified risks on overall project objectives. The key benefit of this process is that it produces quantitative risk information to support decision making in order to reduce project uncertainty.

to reduce risk. The project team should decide the appropriate actions to address the root causes of the risk and / or to reduce the effect (impacts) should the risk occur.

Developing good action plans requires knowledge of the underlying problems that need to be addressed. This is why it is crucial that the 'causes' and 'consequences' are accurately captured in the identification stage of the process.

This exercise should result in an action plan with clearly defined actions, responsibilities and completion dates for the agreed actions. It may, however, not be feasible or efficient to develop management actions for all risks.

All the agreed actions will be documented in the risk register and action plan so that progress can be monitored as part of the overall review process.

Monitor & Review: The risk register is a live document, which represents a 'snapshot' of the current situation and relies upon regular updates to be maintained;

Risk Level = Likelihood x Impact (highest)	THREAT				
	1	2	3	4	5
Very high High certainty of occurrence - Probability: >75% probability	M 5	M 10	H 15	H 20	H 25
High Balance of probability will occur. - Probability: >50 - 75%	M 4	M 8	H 12	H 16	H 20
Medium May occur shortly but a distinct probability it won't. - Probability: >25 - 50%	L 3	M 6	M 9	H 12	H 15
Low May occur but not anticipated. - Probability: 5% - 25%	L 2	M 4	M 6	M 8	M 10
Very Low Occurrence requires exceptional circumstances. Exceptionally unlikely, even in the long term future. - Probability: < 5%	L 1	L 2	L 3	M 4	M 5
LIKELIHOOD					

Anyone or combination of methods like Data Gathering and Representation Techniques, Probability Distributions, modeling techniques can be adopted in performing Quantitative Risk Analysis.

	Insignificant	Minor	Moderate	Major	Severe
Time	Program Key Interface Date exceeded by <2 weeks	Program Key Interface Date exceeded by 2 to 4 weeks	Program Key Interface Date exceeded by 4 to 8 weeks	Program Key Interface Date exceeded by 8 to 12 weeks	Program Key Interface Date exceeded by >12 weeks
Cost	Event resulting in <1 Million increase in cost	Event resulting in 1 to 5 Million increase in cost	Event resulting in 5 to 10 Million increase in cost	Event resulting in 10 to 20 Million increase in cost	Event resulting in >20 Million increase in cost
Reputation	No media or external interest.	No media or external interest.	Social issues can be resolved at local management level.	Social issues at national level: Public or media or local Government attention.	Social issues at national and/or international level: Public or media outcry with negative national and/or international coverage.
Health & Safety	Injury requiring no or minor first aid	Injury requiring medical professional first aid but resulting in less than one day loss of work.	Injury requiring inpatient or outpatient care, resulting in loss of one or more days work or hospitalization.	Single fatality or multiple serious injuries (e.g. Loss of limb, possible life threatening, but with significant impact on individual)	Multiple deaths and/or significant number of serious injuries.
Environment	Negligible (i.e. within legally acceptable standards) natural, built or operational environmental impacts limited to the lease area which are mitigatable pursuant to the approved Environmental Management Plan (EMP).	Short term (<3 years), slight and reversible impacts to the natural, built or operational environment which can be mitigated or offset using approved methods and technologies. The potential environmental significance of the impacts can be of local to regional importance and medium to long term duration (3 to >10 years).	Moderate, potentially reversible impacts to the natural, built or operational environment, including social, archeological, and heritage. The potential environmental significance of the impacts are of national or international importance, and of long term duration (> 10 years).	Serious and potentially irreversible impacts to the structure or functioning of the natural, built and operational environment, including social, archeological and heritage. The potential environmental significance of the impacts are of national or international importance, and of long term duration (> 10 years).	Very serious and likely irreversible impacts to the structure or functioning of the natural, built and operational environment, including social, archeological and heritage. The potential environmental significance of the impacts are of national or international importance, and of long term duration (> 10 years).
Legal	Isolated, quickly remedied non-compliance with regulations or contracts.	Repeated, slowly remedied contractual or regulatory non-compliance.	Widespread, prolonged contractual or regulatory non-compliance, potential fines/claims.	Serious breach of regulation leading to investigation or report to authorities with prosecution or major fines/claims possible, major litigation.	Significant prosecution and fines/claims. Very serious litigation including class actions, litigation against one or more executives.
Quality	Quality of product and/or service is not meeting the requirements but can be accepted.	Quality of product and/or service is not meeting the requirements but can be easily recovered.	Quality of product and/or service is not meeting the requirements but can be recovered and/or recovered to acceptable quality requirements.	Quality of product and/or service is not meeting the requirements but can be recovered and/or recovered to acceptable level of degradation.	Quality of product and/or service is not meeting the requirements and must be replaced and/or reworked.

being dealt with through ongoing project management activities.

Risk Response (Risk Treatment): Below Response strategies can be chosen and adopted depends on the Risk attribute.

Action Plan: The next stage of the process is to plan the management responses

reflecting the current status of the project. Risks are reviewed periodically by the project team and updated to reflect the project developments and as a result of actions taken.

Risk Analysis

All identified risks are evaluated in terms of likelihood of occurrence and potential impacts. This helped to prioritize the attention for implementing appropriate responses and determines the current level of risk exposure.

Analysis to be done in two stages viz., Qualitative Analysis and Quantitative Analysis respectively.

Key elements of the review process will include:

- reviewing the validity of existing risks to identify if they have occurred, are no longer a threat or have changed in terms of likelihood or potential impact

Strategy	Possible Actions
AVOID	Modify the approach to eliminate uncertainty. Adopt a different approach to planning/ execution. Undertake a Value Engineering Study. The fall-back plan to Avoid is to Share/ Transfer
TRANSFER/ SHARE	Contractual Means (i.e. fixed price) or subcontracts, joint ventures etc. Financial Means (i.e. insurance, warranties, Liquidated Damages). The fall-back plan to Transfer is Reduce.
REDUCE (Threat)	Take mitigating actions to reduce the likelihood or consequence of the risk: o Obtain information or expertise o Undertake research or trials Risk reduction actions must give a cost benefit i.e. the cost of the risk reduction must be less than the expected cost of the risk. The fall-back plan to Mitigate is Accept.
EXPLOIT (Opportunity)	Improve the likelihood of securing an opportunity and maximize the potential cost benefit.
ACCEPT	Accept risk and make an allowance in contingency/fallback plan. Normally where there nothing can be done to cost effectively manage the risk. Do not ignore - monitor and review.

- identification of any new areas of uncertainty that have not been recorded
- reviewing management actions (giving priority to the more significant risks) to ensure that actions are effective and being progressed within agreed timescales
- ensuring that the overall performance of the risk management process is assessed and reported

This has been undertaken for all risks within a specific project line and separately for the more significant risks across the whole project. Any risks that cannot be effectively managed by the current 'Risk Owner' or within the discipline in which it currently sits should be transferred or escalated to a higher level.

Escalation and Reporting: Risks in all cases have been allocated to the party best able to manage them, this included consideration of knowledge, experience and level of authority. In an instance where the 'Risk Owner' or 'Action Owner' is unable to carry out the defined action, the ownership of the risk response is escalated to someone with appropriate authority or ability to carry out the action.

This process is executed by having discussions with the discipline heads, area managers and the Senior Management Team (SMT) as required. If the project team is not able to deal with the appropriate response, higher level support will be sought within the organization.

The lines of reporting within Project starts with the project team or risk owners and then goes up to the discipline heads and area managers. If necessary, the risks are reported and are discussed with the Project Senior Management Team at the weekly team meeting. If a risk cannot be managed at this level, the SMT reports the risk(s) to the Contract Control Group of the Employer.

On a monthly basis Project Team reports the project risks to Employer & Steering Committee, highlighting the prominent/Top Risks of the project in the Monthly Risk Report and the Monthly Project Report.



IEI, President visiting President, CNAQ



The Cybersecurity Challenge in the Age of Digital Transformation



Samir Pawaskar

It would be very uncommon if in today's age you have not come across terminologies such as Digital Transformation, Industrial Revolution 4.0, Smart whatever...and this is not just restricted to businesses, we have been so subsumed by such technologies that we now talk of Digital Governments, Smart Nations and this is not just jargon or thin air...

Stuff that we watched in Hollywood movies as kids is a reality today. There is not a single aspect of life that has not been touched and transformed by this technologies. These technologies have now pervaded Agriculture, Health, Manufacturing, Defense, Transportation, Education, Service Industries and what not...

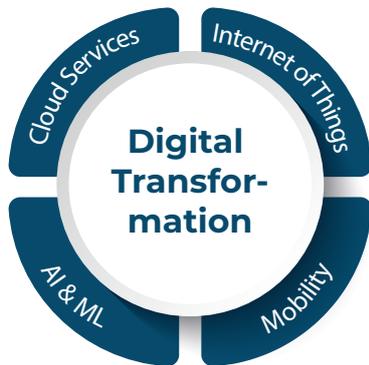
So well it looks and probably it is very cool, with all these gadgets and technologies being able to do stuff that probably a few years back was presumed impossible!

So what exactly is Digital Transformation? Putting it simply, Digital Transformation is the use of technology and data to drive innovation and better business outcomes. Primarily it endeavors to achieve key business goals such as operations optimization, customer engagement and enhanced experience, increased market shares, busi-

ness agility and better performance.

To achieve this goals Digital Transformation primarily relies on the following technologies:

Cloud Services | Internet of Things | Mobility | Artificial Intelligence and Machine Learning



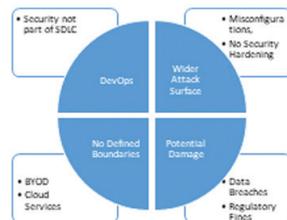
So what is the concern here? What am I worried about or rather what should we all be worried about?

Technology is the proverbial "Double Edged Sword", as much as ease and comfort that it drives in to our lives, the technology and the information that is gen-

erated, processed or goes around this technology, if not controlled adequately has the power to disrupt our privacy, in the hands of our enemies can be used to launch attacks against us (not necessarily life threatening but that is a possibility as well...)

The use of technology and the immense information introduces the following threats for our businesses:

- A Wider Attack Surface
- Increased Potential of Damage
- Networks without defined boundaries
- Constant Changes (DevOps)



A Wider Attack Surface:

As more and more processes become digitized, the number of applications, systems and data grows, increasing the opportunities for a malicious actor to compromise

them. Further as more and more systems become inter-connected, a potential breach in one part could allow easy lateral movement for the malicious actor throughout the network and systems.

Increased Potential of Damage:

The potential for damage is huge, as systems are being digitized end-to-end up to the last mile. The trend has moved into critical infrastructures as well. Manufacturing plants, Oil fields, Energy Generation and Distribution, Agriculture, Health Services etc., are all being digitized. A breach in the systems could be far reaching and impact hundreds and thousands of people and could even be life threatening...

Further as "Information" gains value, malicious actors have been known to breach and exfiltrate data. Besides the direct cost (loss of proprietary or commercial information, loss of reputation and customer confidence etc.) due to loss of such information, organizations may have to spend millions by way of regulatory fines, law suits and breach notifications.

Network without defined boundaries:

The concept of a network (enterprise) perimeter that most of the IT Network and Security engineers (Currently in their 30s and 40s) grew up with does not exist anymore. If there is one place on this earth where we have been able to do away with boundaries it is probably the current IT infrastructure.

This in turn does away with ownership and accountabilities, which in turn springs questions on policies and enforcement. How do organizations enforce security policies on systems that they do not own in entirety or are shared across globally?

This requires a paradigm shift in our understanding, our expectations, innovative controls and security strategy.

Constant Changes (DevOps)

The rush to reduce the "Go to Market" has ensured that Software Development teams have quickly adopted methodologies such as DevOps, Agile, and Kanban etc. These ensures that developers can now quickly create and update software. However, the speed of change makes it more prone for

security vulnerabilities to creep in especially if security processes are not adhered or integrated within such methodologies.

All this coupled with a lack of visibility resulting from a legacy of non-integrated, siloed, multi-vendor point defense products creates enterprise blind points for the security teams, decrementing their ability to identify anomalous behavior and rapidly mitigate threats.

So how can the businesses deliver security assurance while embracing Digital Transformation?

The most important thing that businesses should understand that Security is a MUST, it is not a choice and neither is it a luxury. Having said that, it is important that Security becomes an integral part of the Digital Transformation program, in more than one ways, Security itself should undergo this Digital Transformation to be able to mitigate the risks emanating from such a program. Following are some of the best security practices that will help businesses in their Digital Transformation journey.

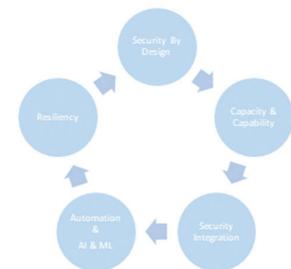
Security by Design: Ensure that applications and devices have built in security controls. Use secure software development methodologies. Ensure that default security controls and settings are enabled. Adhere to internationally accepted best practices and security standards.

Build Capacity and Capability: Security is not a "One Man Army" job. Businesses will need to have a proper team with adequate skill sets to be able to secure and defend your business against cyber adversaries. The employees need to be trained from time to time to ensure currency of skills. Using specialized outsourced services could be another option.

Security Integration: It is important to avoid Security Blind Spots and improve security visibility within your organization. This involves ensuring that all the relevant teams, processes and the technology used to secure your organization is integrated and talking to each other. Threat Intelligence should be shared amongst all teams including IT teams. Further, as more and more physical security controls become automated (CCTV, Access Control for Doors, Intruder Alert systems etc.) the

interplay between them increases driving the need for businesses to also look at options of integrating or increasing interaction between the IT and Physical security teams.

Transform Security- Use Automation, AI and ML: Automation of security processes can help businesses continuously monitor growing number of sophisticated cyber security threats and expand cyber protections, even with limited personnel and resources. Systems based on Artificial Intelligence coupled with Machine Learning can help businesses detect attack patterns in a fully or semi-automated fashion. They can also identify indicators of complex attacks, which are hardly identifiable to human centric monitoring.



Build Resiliency: Perform regular testing of systems to uncover potential vulnerabilities and opportunities to improve security. These include Vulnerability Assessments, Penetration testing and of late corporate Bug Bounty programs as well. Businesses need to build practical and effective Disaster Recovery and Business Continuity Plans. Such plans should be exercised at regular intervals. Businesses should also simulate end to end business disruptions through custom built scenarios executed in a Cyber Drill. Se

Disclaimer: This disclaimer informs readers that the views, thoughts, and opinions expressed in the text belong solely to the author, and not to the author's employer, organization or other group or individual.

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Warranties & Guarantees in the construction industry



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Warranty

When you buy a watch, you look for some sort of guarantee that it will perform and that too with accuracy. The dealer gives you a manufacturer's warranty card. So, in the event something goes wrong with the watch and in the absence of your negligence or misuse, the manufacturer would repair and restore it to the same condition as when purchased or replace it. The repair work may be carried out by the dealer or by the manufacturer depending on the dealer's contract with the manufacturer or the terms of your warranty. You don't have to pay anything. But you don't get any substitute watch in the meanwhile. Neither will you receive monetary compensation or a refund. Consumables like batteries are excluded from the warranty. Similarly, when you buy a new car, you may get a warranty covering defective material such as engine parts. However, fuel, lubricants, regular service/ maintenance, etc. are all excluded. In both these cases, the warranty is for a certain specific period after which you must pay for the cost of repairs or replacements. Warranties usually cover the cost of the required workmanship for the repair work.

A warranty can hence be defined as a legally binding promise that a given product or its certain parts will remain in a certain condition and perform in a certain way, for a certain period and any defect not attributable to misuse, will cause the product to be repaired or replaced at the manufacturer's cost. As is evident, the product is already made or manufactured and the warranty is then effective from the date sold. Hence, it's a guarantee, but in a limited sense, as will be evident from the following paragraphs.

In construction too, we have warranties- e.g. for generators, transformers, air conditioners, exhaust fans, water filtration units, etc. Some parts of the same equipment have a longer warranty period- e.g. the compressor of an air conditioner may have a five-year warranty whereas other parts may be covered only for one year.

Guarantee

A guarantee is a legally binding promise to do or not do something. Like a warranty, it is ultimately a means to protect something or someone from anything detrimental happening but could include some cover for compensation. The construction guarantees come in two stages - pre and post.

The pre-construction guarantees come even before the construction is completed i.e. even before the product is made! During the pre- construction stage, the contractor may be required to give to the employer several guarantees such as a tender guarantee, an advance payment guarantee, a performance guarantee, a

parent company guarantee, a retention guarantee and other guarantees in the form of insurances and indemnities. In case the guarantees are issued by a bank (which is usually the case), then there are certain terminologies frequently encountered as follows:

The contractor is called the "Principal";

- The employer, who is the beneficiary is called the "Obligee"
- The bank or insurance company who is the issuer/ guarantor/ debtor- is called the "Obligor".
- The guarantee is called a "security", "surety" or a "bond"

Here's a quick review of some of these guarantees:

Tender guarantee or bond - A promise by the Obligor to pay the Obligee upto the limit of the sum stated, upon demand by the Obligee, in case the Principal refuses or withdraws his offer after the bid submission closing date for any reason.

Advance payment guarantee or bond- A promise by the Obligor to pay the Obligee upto the limit of the sum stated, upon demand by the Obligee, in case the Principal is unable to repay the outstanding amount of the advance money paid by the Obligee to the Principal.

Performance guarantee or bond- A promise by the Obligor to pay the Obligee upto the limit of the sum stated, upon demand by the Obligee, in case the Principal defaults on certain contractual conditions related to the performance under the contract.

Retention guarantee or bond- A promise by the Obligor to pay the Obligee upto the limit of the sum stated, upon demand by the Obligee, in case the Principal is unable to repay the outstanding amount of the retention money paid by the Obligee to the Principal

Parent company guarantee – A promise by the parent or holding company of the Principal to fulfill the contractual obligations of the Principal in case of it's inability to rectify a default.

As is evident, the above are all guarantees by the contractor to the employer. However, the employer too may be required to give the contractor some sort of

payment guarantee under the terms of the contract. This could be in the form of an escrow account or a project bank account.

During the post-construction stage, the contractor may be required to give to the employer guarantees such as:

- a defects liability guarantee
- a decennial liability guarantee
- other guarantees for specific items such as waterproofing, paint system, etc.

Key differences between a construction warranty and a guarantee

Parties – A warranty is bipartite - provided by the manufacturer to the customer whereas a guarantee is usually tripartite

- between the contractor, the surety and the client.

Subject – A warranty covers a part or a product whereas guarantees are may cover obligations, liabilities and products.

Stage - A warranty is issued for products or parts already manufactured whereas a guarantee may be issued either before, during or after the product is made.

Compensation - A warranty does not provide any monetary compensation to the customer but either causes to repair or replace it. A guarantee may either provide financial compensation or restoration of a breach in the contract.



A Technical Seminar on "Application of Heat Exchangers" sponsored by WALCO at Radisson Blue Hotel



Annual General Meeting at Indian Cultural Centre



Engineering Beyond Earth



Loading on the Earth, Moon and Mars

one-third on Mars as compared to Earth), thermoelastic loads, and micro meteoroid impact. Thankfully our

Earth protects us from the meteoroid impacts.

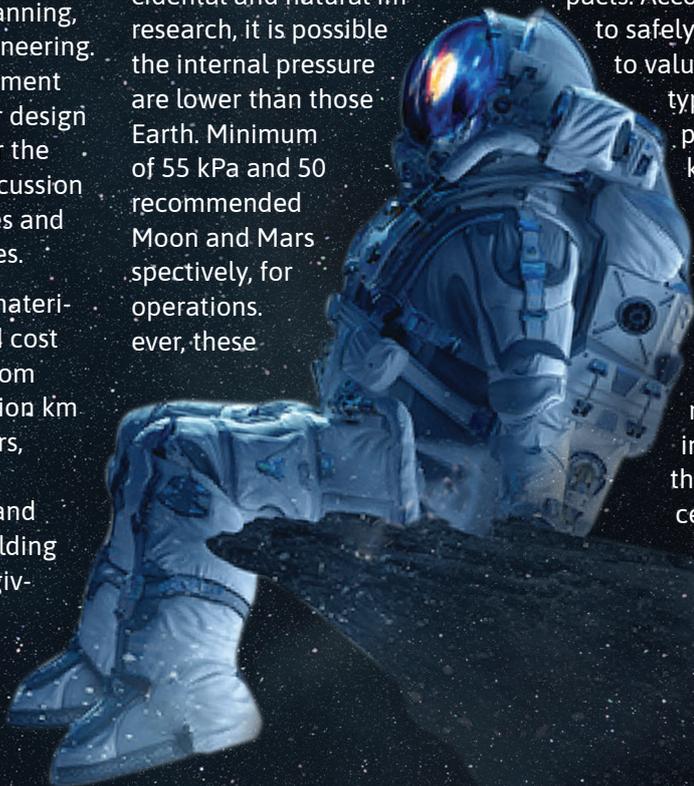
The time is much nearer than we may think for human inhabiting distant planetary body in our universe and striving to make our new home. Its neither far stretched nor impractical, given the work in progress achieving the goal. Indian Space Research Organization (ISRO) having succeeded in launching and placing its first ever interplanetary mission Mars orbiter mission Mangalyaan in pursuit to study Mars. Hence the race to find next new home has begun and progressing in rapid phase with renewed interest in space exploration and specifically in future human inhabitation far beyond Earth's surface. This is a challenging, multi-disciplinary problem that requires expertise from a wide variety of fields: aerospace engineering, environmental engineering, social science, urban planning, design, architecture and especially structural engineering. Unlike structural engineering for the built environment on Earth, there are virtually zero rules of thumb or design precedents to draw on for construction on Mars or the Moon. There is exciting potential to shape this discussion with fundamental structural engineering principles and forward-looking material and fabrication strategies.

The whole need to be built from scratch with materials available locally. It is estimated one brick would cost around \$1.3 million if it needs to be transported from Earth for commuting across a distance of 225 million km of space, average distance between Earth and Mars, which would be a nightmare. So transportation of material is impractical. Civil structural engineers and material engineers have a huge role to play in building habitable structures withstanding the most unforgiving and alien nature, environment and forces. The Martian dust storms pose a new challenge unlike on Earth.

Structural Engineering Considerations

Structural systems for space habitats must be designed for four main loading types - Internal pressure, reduced gravity (one-sixth on the moon and

Because of the lack of atmosphere on the Moon and Mars, a pressure differential of up to 100 kPa across the habitat enclosure is required to sustain Earth level pressures inside. This results in 'outwards' pressures on the structure that are several orders of magnitude greater than conventional structural loads due to gravity and environmental loading on Earth. Therefore, the structure will be mainly subjected to tensile stresses instead of the compression induced in Earth bound structures under gravity loading. In comparison, a tension structure on Earth, such as an air inflated sports dome, typically withstands a net pressure of 0.05 kPa and the pressure differential on an airplane may be between 50 to 70 kPa. Furthermore, since the loss of pressure is catastrophic to human life, the structure must be designed with redundancy and safety measures against decompression disasters caused by accidental and natural impacts. According to research, it is possible to safely reduce the internal pressure to values that are lower than those typical on Earth. Minimum pressures of 55 kPa and 50 kPa are recommended for the Moon and Mars respectively, for operations. However, these



to safely reduce to values that are lower than those typical on Earth. Minimum pressures of 55 kPa and 50 kPa are recommended for the Moon and Mars respectively, for operations. However, these

oxygen in the air from 21% to 32%. This higher oxygen concentration corresponds to the maximum non-metallic materials flammability level currently used in operational human space flight programs.

Thermo elastic loading is related to the presence of the sub that produces a thermal gradient of about 332 deg C on the Moon in 29 days and 64 deg C on Mars in 24.6 hours. These gradients occur between the sunlit and shadow exposed parts of the structure, as well as between the internal and external face of the envelope.

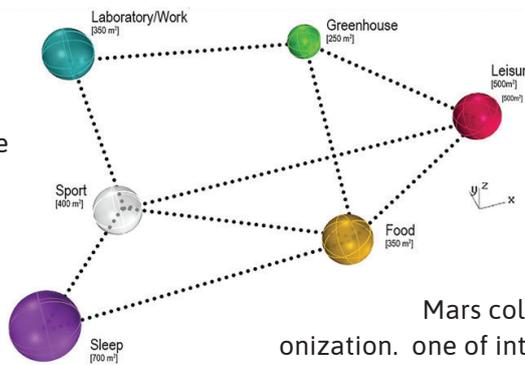
Design Concepts and Building strategies

As discussed in previous section, the internal pressurization is the controlling loads on the structural system, several inflatable architectural concepts have been explore over time. since 1986 level types of structures have been proposed as concept settlements for both the Moon and Mars. The first one from Archigram in 1966, with the living pod project was a free roving exploratory house inspired by the Lunar modules that was prepared for Moon landings. A few decades later, the architect Dante Bini developed design proposal in collaboration with Harrison Schmitt, the twelfth astronaut to set foot on the Moon. These projects are interesting because they are self shaping, pressurized units. One of the proposals, Lunit was essentially a kind of mechanical worm three meters in diameter. it would

be transported and installed in a compact position and then its length would be extended telescopically using compressed liquid air stored in cylinders inside the unit.

Application of sphere packing as a form-finding strategy for inflatable Moon exploration habitats.

Recent developments are being made rapidly with private organizations like SpaceX spearheading the Mars exploration and researching on



Mars col-

onization. one of interesting and potential building material that's being studied is Martian bricks which are stronger than steel reinforced concrete.

The most recent and famous of all building structure proposal is the mars ice house which is conceptualized to be built with use of 3D printing technology primarily out of Martial ice.

This proposed Ice house would have a sinter foundation constructed by automation upon site selection for landing. Inflated ETFE membrane which is transparent and fully closed will be deployed to form pressurized boundary over the foundation. 3D printing of ICE underneath of the ETFE membrane begins giving the Mars ICE house a shape.

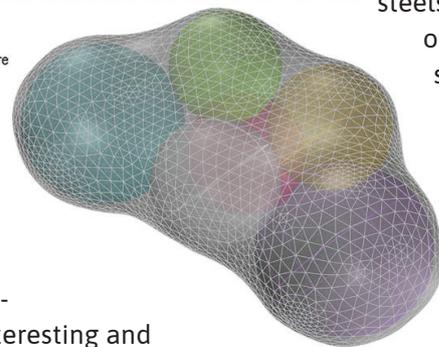
Up Ahead

Designing a structure on an extraterrestrial surface includes numerous challenges, including the

internal pressure, the dead loads, the live loads under reduced gravity, the consideration of new failure modes such as those due to high velocity micrometeoroid impacts, and the relationships between severe Lunar/Martian temperatures cycles and structural and material fatigue. Also of concern is the structural sensitivity to temperature between different sections of the same component, the very extreme thermal variations and possibility of embrittlement of metals, the out gassing for exposed

steels and other effect of high vacuum on steel, alloys and advances materials. when considering a permanent settlement on another planet, one of the crucial aspects involves evaluation of the

an total life cycle of the structure. That is, taking a system from conception through retirement and disposition or the recycling of the system and its components. All these said and done, the exploration to settle in another planet is becoming an inevitable option and sooner we gear up with solutions and working model the more prepared humans are. Gearing up for the future.



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Arc flash study in electrical power systems



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An Arc Flash Assessment / Analysis is a study of the facility's power system to determine the incident energy available at specific electrical devices that employees would be exposed to while "interacting with" the electrical equipment at the facility. The output of the Assessment/ Analysis is a determination and labeling of the PPE required of the electrical devices, suitability of the devices for service as installed and if there are any miss- coordination issues involved as the system is currently installed.

A short circuit current available analysis and the clearing times of the overcurrent devices involved is required to determine the incident energy at the various points in the system.

OSHA 1910.132 requires that employers identify and protect their workers from workplace hazards. Every industrial / commercial power system includes inherent risks – specifically electrical shock and arc flash, any-

time employees are "interacting with" electrical equipment while energized. Interacting with electrical equipment includes operation of fully enclosed switches and power circuit breakers as well as any exposure to energized equipment or circuit parts, including all energized testing or troubleshooting activities.

NFPA 70E – Standard for Electrical Safety in the Workplace, Section 110.1 - requires "The employer shall implement and document an overall electrical safety program that directs activity appropriate to the risk of electrical hazards. The electrical safety program shall be implemented as part of the employer's overall occupational health and safety management system, when one exists." Section specifically includes identifying and quantifying the risks of both shock and arc flash hazards, before work begins.

NFPA 70E, Section 130.5 Arc Flash Analysis – requires an arc flash risk as-

essment shall be performed to determine the risk, safety related work practices required, the arc flash boundary, the incident energy at the working distance, and the PPE that people within the arc flash boundary shall use. This assessment shall be reviewed at intervals not to exceed 5 years.

NFPA 70E Section 130.5 (H) Labeling requires all equipment "likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked" ... with a label containing arc flash risk identification, severity of the risk, arc flash boundary and required PPE level among other things. This includes any energized testing or troubleshooting activity..

NFPA 70E, Section 110.3 (A) Host Employer Responsibilities - requires that host employers of contractor or outside service personnel are responsible for notifying the contractor of the hazards they may encounter in the performance of their work. This holds

Can Do!



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the host employer / facility owner responsible for identifying the hazards a contractor may encounter on the site. Therefore, using contract maintenance and electrical workers does not reduce the need for arc flash analysis.

It is impossible to know what level of arc flash hazard risk is inherent in your power system without assessment by knowledgeable technical resources. However, it is a true statement that every industrial / commercial electrical system has some level of inherent arc flash hazard. In order to protect the safety of your employees or contract employees working on or operating your electrical equipment an arc flash assessment must be completed and the equipment appropriately labeled.

Arc Flash Analysis Methodologies

Standard Bracketing Method

This is the most common and cost-effective method as it identifies the Arc Flash PPE requirements at the last electrical device to be interacted with by bracketing the PPE level changeover points at the last device by ampacity size based upon the fault current and device type at the Power Distribution Panel, MCC or Bus Duct and accounts for the connected horsepower at each of these distribution centers. With this method it will be known and identified on the model drawings that for instance up to a 200-amp overcurrent device will result in a PPE level 0 exposure and any device larger than the 200-amp overcurrent device will result in a PPE level 1 exposure at the final device to be interacted with.

Detailed ONE LINE Method

This method identifies and shows on the drawings all field devices connected and provides what is typically known as a power distribution one-line drawing. This method is labor intensive and thus is typically many times more expensive than the most common standard bracketing method. The end result of the exposures at the last device is identical to the standard bracketing method. This method is done using ETAP models with Relay coordination study using fault levels from utility and more accurate results are obtained.

Calculate to the NFPA 70E Tables Method

This method calculates to the equipment types listed in the NFPA 70E HRC tables and when the equipment type meets the requirements of the tables, the calculations stop and the equipment is labeled to the table requirements. The NFPA 70E tables are conservative and will result in many exposures that are in reality a PPE Level 0 or 1 exposure but the tables will require a PPE Level 2 protective system. This change to a PPE Level 2 system results in the Balaclava requirement under the arc rated face shield to be utilized. This is generally only used in much smaller facilities, usually 500 Kva of capacity and one service. This method does save upfront analysis costs over the Standard Bracketing Method but usually incurs more PPE required for the majority of the standard maintenance tasks at the last device interacted with by the electrical worker.

How Can My Facility Ensure Proper Protection for Electrical Workers and Be Compliant with NFPA 70E?

1. Electrical safety and arc flash training of electrical workers
2. Arc Flash Assessment of electrical equipment
3. Labeling of equipment with
 1. Nominal system voltage
 2. Arc flash boundary
 3. And at least one of the following:
 - a. Available incident energy at working distance, or required PPE Level
 - b. Minimum arc rating of clothing
 - c. Site-specific level of PPE (must be equal to or greater than incident energy)
4. Use of proper arc flash PPE (arc rated clothing as daily wear and higher levels available where needed) and shock protection PPE (insulated tools and rubber insulating gloves with leather protectors for all energized contacts over 50V AC or DC)
5. Written Electrical Safety Program for the site, as described in Section 110.1, including auditing and reporting processes to show compliance, identify gaps and keep the program on track.

Important Facts:

Industrial electrocutions (deaths) occur every other day (about 170 in 2013) in the US. If electrical workers would use appropriate insulated tools and rubber insulating gloves every time they are within the restricted approach boundary, this would also become a very small number.

The Three Key Factors in Making Electrical Safety a Success Are:

- Understanding the energy available in your power system for both shock and arc flash.
- Having the proper PPE available and making its use a standard practice / requirement.
- Once hazards are identified, use engineering controls and work practice modifications to reduce personnel exposure. Remote controls, modified switching or LOTO procedures,

Our goal is to educate electrical workers to understand the shock and arc flash hazards associated with the electrical equipment they work on daily and the appropriate methods used to perform that work safely.

Climate Change

The current state of the climate is troubling at best. The average global temperature has increased, glaciers are melting and the sea level has risen. There are no signs of these trends slowing down unless significant action is taken to curb greenhouse gas emissions. Climate change including increases in frequency and intensity of extremes, has adversely impacted food security and terrestrial ecosystems as well as contributed to desertification and land degradation¹. The current warming trend is of particular significance because most of it is extremely likely to be the result of human activity since the mid-20th century and proceeding at a rate that is unprecedented over decades to millennia². The heat trapping nature of carbon dioxide and other gases was demonstrated in the mid-19th century and there is no question that increased level of greenhouse gases must cause the Earth to warm in response³.

Built Environment

According to Architecture 2030, nine hundred billion square feet of buildings will be newly constructed or renovated by 2030. Buildings are one of the leading contributors to carbon emission, mainly from their use of fossil fuels during operations. In fact, cities and urban areas are responsible for approximately 75% of carbon emissions⁴. The built environment accounts for two thirds (67%) of all greenhouse gas emissions. Because the already existing built environment contributes to so much of the GHGs it is important that those resources are made more efficient – perhaps by operating them more efficiently, i.e. buildings, and by using them more effectively⁵. Buildings have a significant impact on the environment, consuming 32% of the world's resources, including 12% of its water and upto 40% of its energy.

Building also produce 40% of waste going into landfill and 40% of air emissions⁶.

Green Building

A 'green' building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life⁷. Green buildings are specifically designed structures that reduce the overall negative impact of the built environment on human health and the natural environment by efficiently using energy, water, land and materials; protecting occupants' health and improving employee productivity; reducing waste and pollution from each green building and continuously looking for ways to improve performance. High performance green buildings address sustainable development throughout the building's entire life cycle – from the beginning with the building's site selection and design all the way through to the end of the building's life. Sustainable buildings are significantly better than standard buildings. They use less energy, save money over time, provide better occupant health and comfort, and are better for the environment⁵. Savings on the resources are directly linked with the design, construction and operation of green buildings.

There is estimated saving in water consumption by 40%, saving in emergency use & reduction of GHGs emission by 30% and reduction of construction and demolition waste sent to landfill by 75%. Apart from environmental benefits, designing and constructing sustainable buildings brings economic benefits⁸, some of the economic benefits are as follows:

- Decrease in operating cost – 13.6%
- Increase in building value – 10.9%
- Improvement in return of investment – 9.9%
- Increase in occupancy – 6.4%
- Increase in rent – 6.1%

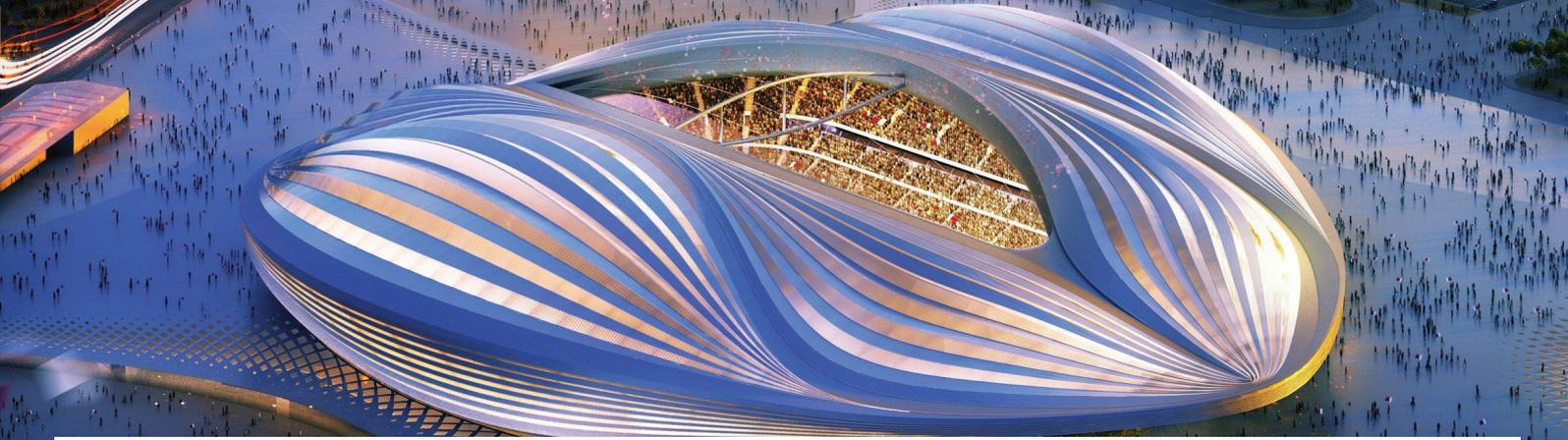
Green Building Sustainability Rating System

Since the harmful effects of construction practices on the natural environment were highlighted, the performance of the buildings has become a major concern for occupants and built environment professionals. In response to this concern of reducing environmental impact of the design and operation of buildings, many researchers have

developed methods for measuring environmental performance of buildings with the intension of creating a sustainable built environment. Current development in sustainability rating systems



**SUSTAINABLE
BUILT
ENVIRONMENT**



have led to a numbers of comprehensive systems that take into account many aspects of sustainability.

BREEAM (Building Research Establishment Environmental Assessment Method) launched in 1990 by the Building Research Establishment (BRE), United Kingdom. BREEAM is the world's first sustainability assessment method for buildings that awarded 569,462 certificates and 2,280,165 buildings are registered across 83 countries⁹. **LEED** was developed by U.S. Green Building Council, and available for virtually all buildings, community and home project types, provides a framework to create healthy, high efficient and cost saving green buildings. More than 2.2 million square feet is LEED certified every day with more than 90,000 projects using LEED across 165 countries and territories¹⁰. The 'greenness' of a LEED project is based on a 100 point scale with an additional 10 bonus points. There are four levels of LEED certifications – Certified (40-49 points), Silver (50-59 points), Gold (60-79 points) and Platinum (80+ points). **GREEN STAR** launched by the Green Building Council of Australia in 2003, GBCA claims that Green Star rated buildings produce 62% fewer GHG emissions, use 66% less electricity than average Australian buildings and consume 51% less potable water than minimum industry standards and recycle 96% of their construction and demolition waste. **CAS-BEE** (Comprehensive Assessment System for Build Environment Efficiency) is a method developed by Japan for evaluating and rating the environmental performance of buildings and the built environment. **Green Globes** was developed in 2000, based on the preexisting structure of BREEAM. The system is commonly used in the United States and Canada. It is accredited as a standards developer by the American National Standards Institute. Since 2004, French projects have used the voluntary **HQE** (high quality environment) standard to assess green and high performance building. **DGNB** is the German certification system for green buildings which is modeled after the American and British standards. The German system covers more than fifty sustainability criteria, and the certification levels are named after the Olympic bronze, silver and gold medals. **HK-BREAM** (Hong Kong Building Environmental Assessment Method) for certification and labeling in Hong Kong. The assessment tool can be used for new and existing buildings. Indian Green Building Council (**IGBC**) was formed in 2001 with the vision to enables a sustainable built environment in India. **GRIHA** (Green Rating for Integrated Habitat Assessment) is the national rating system of India for any completed construction.

Sustainability Rating System in Qatar

QGBC (Qatar Green Building Council) was formally established in 2009, provides leadership and encourages collaboration in conducting environmentally sustainable practices for green

building design and development in Qatar¹¹. Various buildings in Qatar Foundation campus have accorded LEED certifications. **GSAS** (Global Sustainability Assessment System), started in 2007, is the first performance based system in the Middle East and North Africa (MINA) region, developed for rating green buildings and infrastructures by GORD. GSAS certifications include GSAS Design & Build Certification, GSAS Construction Management Certification and GSAS Operation Certification¹². Supreme Committee for Delivery & Legacy¹³ has set target to achieve 4-star GSAS Certification for all stadiums of 2022 FIFA World Cup™. Al Janoub Stadium (Al Wakrah) and Khalifa stadium both have already achieved 4-star certification for Design & Build and Class A* certification for construction management. Al Bayt-Al Khor stadium has achieved Class A* certification whereas Al Thumama and Education City stadiums awarded with provisional certification of 5-star rating for implementing GSAS-D&B standard.

Conclusion

The built environment is the human-made surrounding that provides the setting for human activity, ranging in scale from personal shelter and buildings to neighborhoods and cities. This goes beyond just buildings, but also includes transportation systems – roads, bridges, etc. The built environment contribute to air pollution, land use and contamination, fossil fuel depletion, water depletion, water pollution, material depletion, impact on human health, and climate change. If these buildings continue to be developed and run in the traditional manner, the environmental damage will only progress. Responsible design, construction, and building operations can mitigate the negative effects of the built environment⁸. This can only be achieved by following goals of sustainable development where the prime goal is to meet the need of present without compromising the ability of future generation to meet their own needs.

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AFC Asian Cup, Qatar winning celebration



Er. Khalid Al Hashmi addressing at 51st Engineers Day, Celebration



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USE OF BUILDING INFORMATION MODELLING (BIM)- ENGINEERING SMART WAY

In today's Design & Build projects the challenges faced by the Client, Contractors, Consultants & the operators are extreme. The main task for any major project will be Co-ordination of Services in MEP or other field. The services to be co-ordinated include MEP, Structural, Architectural and Civil. Which makes the job of Design Managers & Engineers, Construction professionals including CADO's a challenging aspect.

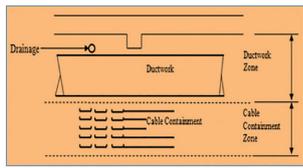
The Services to be coordinated with the structures taking full account of down stand beams and the architectural fixtures such as false ceilings, lightings, PABX systems having complex profile with different levels. Many of the coordination problems could be traced back to insufficient space allowance in the ceilings having been made for ductwork, cable containment, drainage, and fire protection etc. for any Project from Design stage up to construction, to a considerable extent.

For any project, in the back of house service corridors, and elsewhere system of service levels was used. Typically this would consist of the first top space below the slab being reserved for ductwork, the next being reserved for cable containment and a 300mm zone below that for other services. Chilled water would be routed through any remaining space after the main space consuming services of ductwork and cable containment had

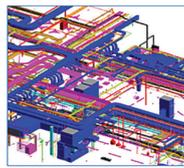
been accommodated. This greatly simplifies the task of coordinating the services, as specialist engineers were largely able to route and size their own services independently of others, provided that they could maintain their service within their own zone. Where services could not be

drainage, and water supply or drawing for Lighting and Fire Protection, the engineers can create all in BIM.

BIM helps to plan intelligent models and allow the team to coordinate every aspect of the project, including design, detailing & construction. It helps in detecting constructability issues before installation through the existences of clashes and thus can avoid a work stoppage, rework as well as wastage of time, material & workforce.



TRADITIONAL WAY OF CO-ORDINATION



BIM TECHNOLOGY

maintained within the service zone then a solution was determined working in conjunction with other engineers. This was the previous method used by all the Design Engineers, but now after the coming of BIM technology the co-ordination of the services has improved to a greater extent.

Engineers coordinate the Model for Clash Detection, Mitigation, and Visualization, using Revit software for 3d model creation, and Navisworks application for coordination. The advantage of reviewing the constructability of the project through a model update, reflecting changes from Design Modification and RFIs (Request for Information).

Engineers create BIM Model of the Project for various trades like Architectural, Structural, Concrete, Mechanical, Electrical, Plumbing & Fire Protection. BIM helps for resolving issues through co-ordination among various trades and preparing of Coordinated Service Drawings. Whether it's the design, construction or shop drawing creation of ductwork,



ABDUL ZAMEER SAB



52nd Engineers Day 2019, Theme Seminar "Engineering for Change"



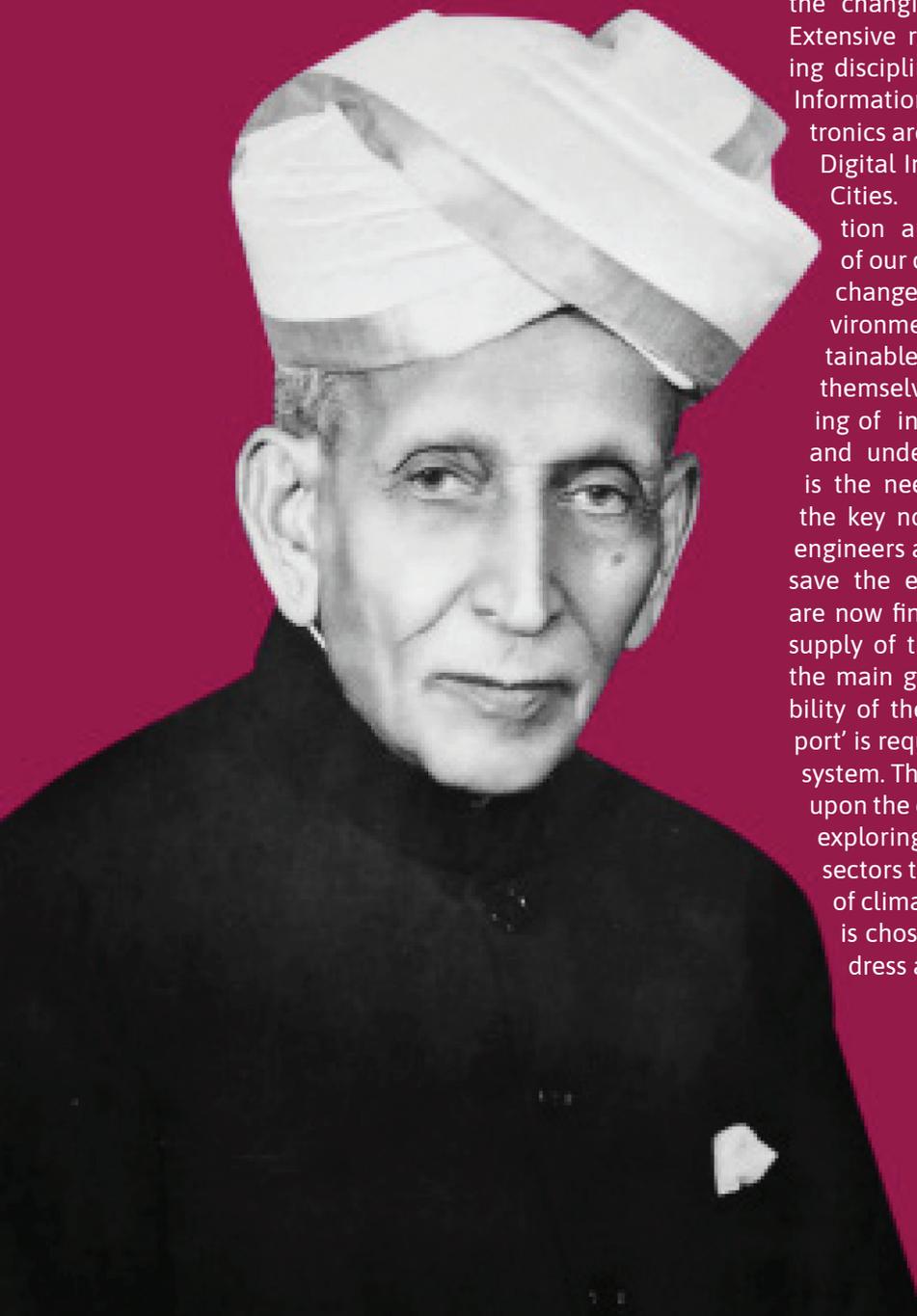
Sir Sayyed Day Celebration

52nd Engineers Day

Theme: "Engineering for Change"

September 15 is celebrated every year in the country since 1967 as "Engineers' Day" to commemorate the birthday of the legendary engineer Sir Mokshagundam Visvesvaraya. Sir Visvesvaraya, an eminent Indian engineer and statesman was born in a remote village of Karnataka, the State that is incidentally now the Hi-tech State of the country. Due to his outstanding contribution to the society, Government of India conferred "Bharat Ratna" on this legend in the year 1955. He was also called the precursor of economic planning in India. His learned discourse on economic planning in India, Planned Economy for India and Reconstructing India, was the first available

document on the planning effort of the country and it is still held as the parent source matter for economic planners. A theme of national importance is chosen every year by the Council of the Institution and deliberated at its various State/Local Centres to educate the engineering fraternity in general and the society in particular. This year the 52nd Engineers' Day will be celebrated all over the country and the Council of the Institution has selected the theme as "Engineering for Change" to mark the occasion. 52nd Theme: "Engineering for Change" "Change" is the most important challenge faced by the engineers of a developing India. They are further being challenged by the changing climate and ever increasing population. Extensive research is being carried out in all engineering disciplines to cope with such emerging challenges. Information and communication technology and Electronics are playing a key role in several initiatives such as Digital India, Make in India, Start-up India and Smart Cities. Keeping in view of the rapid transformation and innovation at international level, engineers of our country should be prepared to cope-up with the changes. The complexity further increases due to environmental concerns and actions needed for sustainable development. Engineers now cannot restrict themselves to a particular discipline. Good understanding of interdisciplinary innovations, design, planning and undertaking of researches and projects on that is the need of the hour. Renewable energy has become the key notion of all Electrical as well as Environmental engineers as we have to move away from fossil fuel to save the environment. Wind energy and solar PV energy are now finding place amidst the conventional energy supply of the nation and interconnectivity of those with the main grid is being looked into. To facilitate the mobility of the huge population of our country, 'Green transport' is required to be implemented for all mass transport system. Therefore the theme "Engineers for Change" calls upon the engineers to be the harbinger for the change by exploring the disruptive technologies in all engineering sectors to enable India to lead the crusade of mitigation of climate change. The theme 'Engineering for Change' is chosen for Engineer's Day 2019 celebrations to address all these aspects



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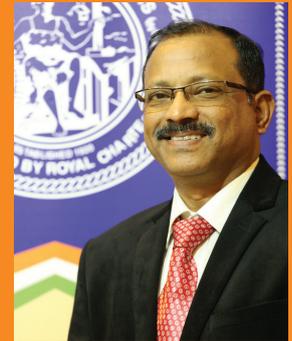
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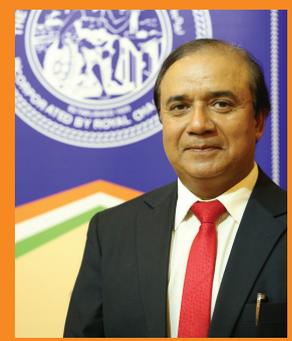
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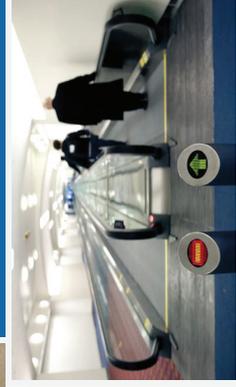
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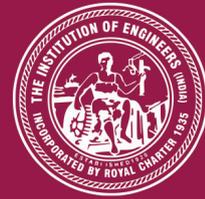
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Common Terminologies used in Construction Industry

Construction industry, by and large, is most complicated and diversified industry, involving architects, engineers, machine operators, project managers, technicians and labourers etc. all combining to bring unique skill sets, expertise, understandings and their own interconnected vocabularies and communications.

Construction Industry has a number of unique 'terminologies', which these different professionals and people use to describe their jobs, activities, requirements, details and what works to be done.

Various type of Construction terms, like languages, evolve over a period of time. The standard construction terminology around technical aspects of construction industry remain largely the same, whilst some of the common construction terms, which people use on sites all over the world, are always changing and adding.

Being in the Construction Industry, it is important and fundamental to know various such construction terms as an integral part of working in the construction industry. One may find it quite embarrassed if her / his fellow worker talks about a construction terminology which he / she has never heard of or don't understand, even if one has to just nod head in agreement.

The good knowledge of construction terminology will serve to improve interactions, communications and career incredibly as well. Like any other field or industry or new subject, the best way to gain knowledge and learn about construction terms is to read them, understand the details, and then applying them in the conversations and various communications.

To assist engineers, especially the younger ones, and to help them to better understand the construction industry, a few construction terminologies are compiled here that many professional may encounter during the interactions at various levels.

Construction Management

Without knowledge and practice, it would be difficult to explain and recall the construction terms, especially when discussing a construction project at senior level, project manager or director. The list of some basic construction management terms that one should be aware of and well versed with are :

Project Life Cycle - A standard project typically has the following four major phases (each with its own tasks and issues) i.e. initiation, planning, implementation, and closure. These phases together represent the path a project takes from the beginning to its end and are generally referred to as the project "life cycle."

Work Breakdown Structure (WBS) - WBS is one of the most important construction management term. Work breakdown structures, often called as WBS enable construction and project managers to breakdown project deliverables into sub-deliverables, which enables companies to manage project into manageable pieces.

Stakeholder - Stakeholder can often be confused with shareholder, and vice versa. A stakeholder is any person who is engaged with and influenced by a project including client, project management team, contractors, subcontractors, governments and communities.

Baseline - Baseline is a construction term which is the basis used to measure the performance, progress and results of a project.



Some of the more common baselines include cost baselines and schedule baselines.

Triple constraint - The triple constraint is a term that refers to three (3) major and constant constraints involved in delivering a project, i.e. time, scope and cost and having quality at the centre of the constraints. The triple constraint theory is often referred to as the project management triangle. Each side or point of the triangle represents the triple constraints of project management: scope, time, and cost.

Gantt chart - Gantt charts are one of the most powerful project management terms and useful ways of showing activities (tasks or events) displayed against time. On the left side of the chart various project activities are listed and along the top is a suitable time scale. Each activity is represented by a bar and the position and length of the bar reflects the start date, duration and end date of the activity. This bar chart is a simple tool to visualize the start and completion dates, durations etc. for various activities, works and overall project.

Contingency plan - Contingency plans are one of the construction terms you may hear during the planning phase of a project. A contingency plan is simply a 'backup' plan which a company can engage when the original plan fails to work or has some issues.

Critical path method (CPM) - The critical path method is a methodology which enables construction companies to analyse the critical steps in the project - separating them from the non-critical paths.

Deliverable - One of the most commonly used construction terms for project managers, the deliverable. Every project will require a certain number of required outputs/results, known as deliverables. A specific phase of a project or specific document or report are examples of deliverables.

Change requests - Most construction projects feature changes from the original plan. A change request is a formal request submitted by one of the project stakeholders to make a change during the life cycle of the project. Change requests take on many different construction terms in the industry, including variations, change orders and change requests.

Quality control and quality assurance - Quality is a broad and extremely commonly used construction term. Quality refers to a product or service being fit for purpose, while quality control and assurance are terms which describe how quality will be maintained and communicated. Construction software - Construction software is one of the most commonly used construction terms, and it refers to any software-based product or tool

which seeks to digitise an aspect of a construction activity, for example Primavera, Microsoft Project Management, Autocad, BIM etc.

Building Construction

Building construction has its own set of building construction terms to know, and depending on your role or specific construction function, you may or may not hear a lot of these terms.

Balustrade - Balustrades are a common building construction terms because they are the vertical support members of stairs, platforms, landings and bridges.

Finial - Finial is bit confusing unless you know the definition. A finial is the decorative fitting or a distinctive section or ornament at the apex of a roof, canopy, etc. on a building / conical, pyramid and domes roofs.

Brick bond - Brick bond is a pattern in which the bricks are laid, there are different types of such bonds / patterns used.

Laminate - Laminate is a commonly used construction term, but one which can be confused. Laminate is simply any product made by bonding together two or more layers.

Rafter - There's plenty of different types of rafters (common rafters, cripple rafters, hip rafters etc.), but they all share a common meaning: they are the sloping member of a roof which provide the main structural support for the roofing material.

Seasoning - Don't get caught out if someone uses this construction term just before or during lunch. While they may be using the term to ask for the salt and/or pepper, there's a chance they are referring to the building construction term about eliminating excess moisture from timber by air or kiln drying.

Shoring - Kind of what it sounds like, shoring is a building construction term which refers to the support of a building to prevent it collapsing. Shoring is a term most commonly used before excavation or demolition.

Vent - A hole or pipe through which gases, liquid etc can enter or escape from an enclosed space or container.

Valve - Similar to the vent, a valve is a device which controls in this case, the movement of liquid or gas through a specific item such as a piston or gate.

Sump - A sump (also called a drain pit), is a pit at or below the lowest point of any structure. The sump collects unwanted / drained water and also facilitates its removal.

Beam - Beams come in various forms including simple beams, cantilever beams and continuous beams, and all beams share



the common term meaning of being a structural member which carries loads cross-ways to their longitudinal axis.

Cantilever - A cantilever is a long projecting beam or girder fixed at only one end, generally used in bridge construction, balconies etc.

Dead load - Dead load describes the loads from the weight of the permanent components of a structure - in contrast to dynamic loads which vary over time.

Girder - Girder is another structural construction engineering term, referring to the main horizontal member spanning between to main supports.

Joist - Joist is one of the more commonly used construction terms, referring to a load-carrying member with a web system used to support floors and roofs - two of the most common elements of any building.

Shear - Most people have heard of sheared bolts, and this describes the term sheared well. Shear refers to the force resulting in two touching parts of a material sliding in opposite directions, often resulting in damage.

Torsion loads - A torsion load is a load which causes a member to twist.

Construction Estimating

Construction estimating is a vital skill and practice in the industry, and can mean the difference between 'winning' and 'losing'.

Bid bond - A bid bond is a formal and written guarantee issues by a third party, assuring that the work performed will be performed in-line with the contract.

Bill of materials - A bill of materials outlines in a list, the materials required to deliver a project (or part of a project).

Building information model (BIM) - A building information model is a computerised model of a building in multiple dimensions, allowing digital and hypothetical changes in plans.

CAD - CAD is one of the most common construction estimating terms, referring to any type of computer assisted drawing, which similar to BIM, allows for digital modelling and estimating.

Cost validation - A cost validation is a critical check and balance on a construction firms own estimate. A cost validation is a professional affirmation that the cost of the materials and/or labour is consistent with the estimate.

Performance bond - Similar to a bid bond, a performance bond is a guarantee secured by a third party by the winning bidder, that work will be completed according to the contract and project plans and specs.

Riser diagram - A riser diagram is a diagram which companies use to illustrate and depict a system, such as an electrical or plumbing system which travels through and up and down a building.

Specification (spec) - A specification is the inclusion of a product into the construction plan.

Value engineering - We will dive into construction engineering

terms next, but value engineering is still estimating related, being a suggested alternative to save money on a construction project.

Construction Contract and Legal

The contract and legal sides of construction is serious matter, with claims, disputes and litigation being common scenarios for projects issues and overruns. There are a number of construction contract and legal terms being used to explain and clarify important aspects under this section, some of these are :-

ADR or alternative dispute resolution - It is the procedure for settling disputes without litigation, such as arbitration, mediation, or negotiation.

Arbitration - It is a private, contractual form of dispute resolution, a part of ADR. It provides for the determination of disputes by a third party arbitrator or arbitration panel, selected by the parties to the dispute

Change orders and variations - Change orders and variations are formal letters and documents which enable construction companies to instruct changes in the work specified in the original contract.

Completion - The complete execution of all the stipulated work as per the scope.

Defect liability period - Defects are an inevitable part of partaking in any construction project. A defect liability period is a grace period for which project parties can rectify their defects without charge.

EOT - An extension of time (EOT) is an extension granted to a project party resulting from delays and other issues.

Prolongation Cost - It is an additional cost that a contractor has incurred as a result of the completion of the works being delayed by an event that is the responsibility of the other party (usually the Employer).

Practical completion - A very commonly used construction term, practical completion is defined by the project or phase of work being sufficiently completed to be handed over (even if there are a few minor defects).

Programme, program and schedule - The sequence of events proposed for a construction project, which is intended to be followed.

Quantity surveyor - A surveyor who's job is to measure and value building work.

Snagging list or punch list - A snagging list or punch list are used as legal construction terms, and as basic quality terms, referring to an actual list of defects or omissions which a project party needs to be rectified before their work is deemed to be complete.

Tender - The formal written offer by a contractor to do work.

Hopefully, the listed construction terminologies would assist in real term to various engineers and professionals working at different portfolios to further read on this topic, gain more knowledge and to better perform their duties on the construction projects / sites.



Technical Seminar on "Quality & ISO Standards and Privacy Engineering & Assurance"



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IEI - QC Executive Members with Er. Sarkarda during his last visit to Doha



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Artificial Intelligence The Future of Industry Automobile



Siyam Ul Hakkim
QD-SBG, Mechanical Engineer

AI in Automobile Sector

“ *Self-driving cars are the natural extension of active safety and obviously something we think we should do.* ~Elon Musk ”

Autonomous vehicles are the future of transportation. Self-driving cars will be the norm in the not so distant future. Imagine getting an Uber without a driver. That day is coming soon.

It is becoming increasingly evident that data science and artificial intelligence are key technologies in the future of the automotive industry.

Artificial intelligence, as an idea, firstly appeared soon after humans developed the electronic digital computing that make it possible. Just like any digital technology, AI has ridden waves of hype and gloom. Nowadays, AI is poised to unleash the next wave of digital disruption, as we are already seeing real-life benefits in several domains, such as computer vision, robotics, automotive and language processing.

Interest in AI has increased again lately, because of advances in fields such as deep learning (DL), underpinned by faster computers. These machines are equipped with powerful graphics processing units (GPUs), which can process images between 40 and up to 80 times faster than a normal processor

The analysis of large data volumes using specialized learning algorithms and pattern recognition provides the modelling of complex systems and dynamic processes. This enabled the automotive industry to focus more on AI

research towards autonomous vehicles, with applications such as environment perception through occupancy grids, or synthetic data generation.

Present Scenario

At the present stage, the development of driverless car is engaged in all the leading automotive manufacturers. The main priorities for developers were the tasks of security, transport communication and the organization of the regulation of traffic flows. Their solution is possible with the help of an effective motion control system. Information processing is realized with the help of artificial intelligence, organs of “senses” and executive mechanisms.

The modern producers of cars in unison with experts of information technologies conduct the fissile developments of vehicles with a possibility of the complete autonomous driving. In some models of cars of function of pilotless driving already exist. Important component of such cars is the control system. In compliance with the international classification of society of automobile engineers (SAE international) there are 6 levels of systems of the intellectual help to the driver or to ADAS (Advanced Driver Assistance System). Numbering begins with 0 – completely manual control, up to 5 – completely automatic.

Self-driving cars are technologically a reality and in the next decade, they are expected to reach the highest level of automation. While there is general agreement that an advanced human-autonomous vehicle (HAV) interaction is key to achieve the benefits of self-driving cars, it is less clear what role artificial intelligence (AI) should play in this context. While the scientific community is debating

on the role and intersections of AI, autonomous vehicles and related issues, above all ethics, the automotive industry is already presenting AI-based products and services that may influence, in a direction or in another, our technological and societal futures..

In brief, the tasks to be performed are those needed to bring driver and passengers to destination at the highest standard of safety for all drivers, passengers, and pedestrians. To achieve the objective of road safety, the main expected benefit for introducing self-driving cars, a complete range of technical requirements needs to be met, including the support of a sophisticated in-car artificial intelligence (AI) system. This is also referred as vehicle intelligence, a notion embedding autonomy, deep learning and adaptability that enables the car to learn by experience to continuously improve, eventually outperforming human driving skills.

Key features

These autonomous vehicles are equipped with virtual assistants which are their key features. The virtual assistant is a specific software functionality originally conceived within the “desktop” computing environment to support the user in the learning and use of a specific software package. Recent technological developments in robotics, artificial intelligence, natural language processing and user interfaces for mobile and ubiquitous interaction generated a renewed activity around virtual assistants: unlike the previous generation, the new wave of virtual assistants is designed for mobile contexts and conceived for ubiquitous interaction with the IoT ecosystem. Smartphone-based virtual assistants, also known as conversational agents, are increasingly sophisticated and is able to perform a variety of tasks. Mobile virtual assistants such as Apple Siri, Microsoft Cortana and Google Assistant, just to mention some of the most popular ones, are typically integrated with the mobile

device operating system. These are activated by default, but the user can customize their use (granting access to specific applications and data) or disable them.

The new wave of mobile and ubiquitous virtual assistants is connected to the ongoing shift from touch to speech-based interfaces (i.e. conversational interfaces) and to the incorporation of these agents in “smart” devices such as smart watches, smart televisions and, of course, smart cars (not necessarily self-driving ones). Although the proactive (AI-based) functionalities are an integral part of these virtual assistants, their typical use concerns speech-based queries. In this sense, the idea behind is to further increase the convenience of the user, while leaving the full control to the user over the range of choices. This vehicle autonomy as an application of AI has several challenges like infallibly recognizing traffic lights, signs, unclear lane markings, pedestrians, etc. These problems can be overcome by using the technological development in the fields of Deep Learning, Computer Vision due to availability of Graphical Processing Units (GPU) and cloud platform.

The combination of traffic signals and road signs determine a visual language that forms set of rules whose interpretation aids for disciplined driving. In the field of autonomous driving, the perception of traffic discipline has high industrial potential. The vision system helps to analyse the current traffic situation on the road, danger and difficulties near the vehicle, warn and help them for safe, convenient and healthier navigation by providing useful information. But easier said than done the vision-based object detection and recognition in traffic scenes is still a major challenge to be successfully overcome by the autonomous driving industry.

Honda, Toyota and Volkswagen are among those manufacturers aiming at a custom in-car virtual assistant,

for the moment not yet commercially available. Honda has unveiled HANA (Honda Automated Network Assistant), which is part of the concept car NeuV, a city-friendly electric AI-powered self-driving vehicle. In this case, Honda’s vision goes beyond the IoT connectivity and introduces an AI-based “emotion engine” to personalize the driver experience based on drivers’ emotions, moods and behaviors. Similarly, Toyota presented the Yui in-car virtual assistant as part of its Concept-i car: based on the official statements and demonstrations, the idea behind Yui is closer to a virtual companion to that of virtual butler. In this sense, Yui would make the car experience more social, turning the smart social car into a type of social robot. Lastly, Volkswagen introduced the Sedric concept car that is optimized for both individual use and shared mobility. Sedric is also the name of the virtual assistant, which in the Volkswagen vision would act as a reliable and efficient virtual butler.

A technology to look ahead in future.

Interestingly, AI-based virtual companions are more strongly promoted in “concept cars”, while the already available virtual assistants stress more the functional utility of supporting specific tasks than the relational and emotional aspects. Overall, this quick review of the latest developments concerning in-car virtual assistants hints that they are designed to address three broad areas: i) safety-related functionalities related to car navigation (including AI-based self-driving tasks); ii) customized infotainment; iii) gateway to IoT (e.g. car controls, home controls). The IoT related area represents a novel aspect of virtual assistants, which can no longer be regarded just as an extension of the self, but also as a “connection hub to everything”. In this respect, Hyundai’s vision explains the idea: “Hyundai Motor’s future vision makes full use of the car for mobility and, crucially, when not traveling it enables customers to continue living without interruption

by integrating its functionalities with the home. The new concept combines the comfort, convenience and connectivity features of the car and the home into 'one space'. [...] The 'Mobility Vision' ambition extends to connected technologies that make users' lives easier on a daily basis. Hyundai Motor's investment in 'hyper-connectivity' will become so advanced that users will not feel the movement of transport as they continue using the living and working space". In short, the expectation is that in-car virtual assistants will enable the car to turn the Internet into a "Hyper-net", thus allowing convenient and ubiquitous access to content, products and services.

Social Impact

The automotive sector is particularly relevant in the Industry 4.0 context, as it is expected to be among the first ones that will impact the everyday life of millions of inhabitants worldwide. From the viewpoint of human labor, what AI-based vir-

tual assistants would imply? If their role will be that of replacing human drivers rather than assisting them, this would make several jobs (such as taxi and truck drivers) obsolete. According to Moshe Vardi, "self-driving vehicles will have many positive impacts on us and on the environment, until you start to think about what it will do to the job market". In this respect, a few basic principles should be agreed by all relevant stakeholders: in reference to the European context, a study commissioned by the European Parliament on the European Civil Law Rules in Robotics underlined that "it is essential that the big ethical principles which will come to govern robotics develop in perfect harmony with Europe's humanist values". By keeping in mind these values, we would be able to better "reflect on what kind of society we want to build and live in. This includes the robots we build and use, and tells us about the model of our society". This means that to fully address the conceptual and practical

challenges related to connected and autonomous vehicles, research communities and policy makers should jointly integrate and further develop existing knowledge and frameworks on human, ethical, legal and social aspects of artificial intelligence, robotics and autonomous technologies to be applied to research, innovation and policy-related activities.

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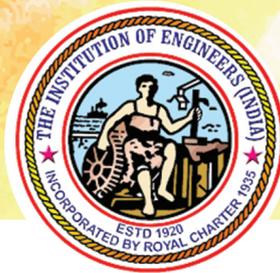
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CODE OF ETHICS FOR CORPORATE MEMBERS

1.0 Preamble

1.1 The Corporate Members of The Institution of Engineers (India) are committed to promote and practice the profession of engineering for the common good of the community bearing in mind the following concerns :

- 1.1.1 Concern for ethical standard;
- 1.1.2 Concern for social justice, social order and human rights;
- 1.1.3 Concern for protection of the environment;
- 1.1.4 Concern for sustainable development;
- 1.1.5 Public safety and tranquility.

2.0 The Tenets of the Code of Ethics

- 2.1 A Corporate Member shall utilise his knowledge and expertise for the welfare, health and safety of the community without any discrimination for sectional or private interests.
- 2.2 A Corporate Member shall maintain the honour, integrity and dignity in all his professional actions to be worthy of the trust of the community and the profession.
- 2.3 A Corporate Member shall act only in the domains of his competence and with diligence, care, sincerity and honesty.
- 2.4 A Corporate Member shall apply his knowledge and expertise in the interest of his employer or the clients for whom he shall work without compromising with other obligations to these Tenets.
- 2.5 A Corporate Member shall not falsify or misrepresent his own or his associates' qualifications, experience, etc.
- 2.6 A Corporate Member, wherever necessary and relevant, shall take all reasonable steps to inform himself, his employer or clients, of the environmental, economic, social and other possible consequences, which may arise out of his actions.
- 2.7 A Corporate Member shall maintain utmost honesty and fairness in making statements or giving witness and shall do so on the basis of adequate knowledge.
- 2.8 A Corporate Member shall not directly or indirectly injure the professional reputation of another member.
- 2.9 A Corporate Member shall reject any kind of offer that may involve unfair practice or may cause avoidable damage to the ecosystem.
- 2.10 A Corporate Member shall be concerned about and shall act in the best of his abilities for maintenance of sustainability of the process of development.
- 2.11 A Corporate Member shall not act in any manner which may injure the reputation of the Institution or which may cause any damage to the Institution financially or otherwise.

3.0 General Guidance

The Tenets of the Code of Ethics are based on the recognition that -

3.1 A common tie exists among the humanity and that The Institution of Engineers (India) derives its value from the people, so that the actions of its Corporate Members should indicate the member's highest regard for equality of opportunity, social justice and fairness;

3.2 The Corporate Members of the Institution hold a privileged position in the community so as to make it a necessity for their not using the position for personal and sectional interests.

4.0 And, as such, a Corporate Member -

- 4.1 should keep his employer or client fully informed on all matters in respect of his assignment which are likely to lead to a conflict of interest or when, in his judgement, a project will not be viable on the basis of commercial, technical, environmental or any other risks;
 - 4.2 should maintain confidentiality of any information with utmost sincerity unless expressly permitted to disclose such information or unless such permission, if withheld, may adversely affect the welfare, health and safety of the community;
 - 4.3 should neither solicit nor accept financial or other considerations from anyone related to a project or assignment of which he is in the charge;
 - 4.4 should neither pay nor offer direct or indirect inducements to secure work;
 - 4.5 should compete on the basis of merit alone;
 - 4.6 should refrain from inducing a client to breach a contract entered into with another duly appointed engineer;
 - 4.7 should, if asked by the employer or a client, to review the work of another person or organisation, discuss the review with the other person or organisation to arrive at a balanced opinion;
 - 4.8 should make statements or give evidence before a tribunal or a court of law in an objective and accurate manner and express any opinion on the basis of adequate knowledge and competence; and
 - 4.9 should reveal the existence of any interest - pecuniary or otherwise - which may affect the judgement while giving an evidence or making a statement.
- 5.0 Any decision of the Council as per provisions of the relevant Bye-Laws of the Institution shall be final and binding on all Corporate Members.

Geographic Information System (GIS) in Qatar



Er. Afroz Alam
B.Sc. Engineering (Mech.)

What is GIS

A geographic information system (GIS) is a framework for gathering, managing, and analyzing spatial data. Rooted in the science of geography, GIS integrates many types of data. It analyzes spatial location and organizes layers of information into visualizations using maps and 3D scenes. With this unique capability, GIS reveals deeper insights into data, such as patterns, relationships, and situations-helping users make smarter decisions.

The Centre for GIS (CGIS)



Qatar has established a nationwide GIS since 1992. Today there are more than 80 Government and Semi-Government agencies integrated with this system sharing GIS information and using in their day to day work. CGIS is the official geospatial agency in the State of Qatar under the Ministry of Municipality & Environment (MME). CGIS is comprised of Planning & Projects, Mapping & Archives, Topographic Survey, Systems Services. CGIS set the objectives for a nationwide GIS on a top to bottom approach.

CGIS's Roles & Responsibilities

- Creating and updating Qatar's Topographic Database and all related services for the entire country in coordination with other related agencies.
- Maintaining Qatar's Geodetic Network and all related services.
- Providing the connection to Qatar's Topographic Database and maintaining it.
- Conducting studies and research required for developing the implementation of Geographic Information Systems and Global Positioning Systems in Qatar.
- Creating, developing and monitoring National GIS and GPS standards and specifications.
- Establishing and maintaining Qatar's high speed GIS data sharing network (GISnet), linking it with agencies GIS databases and securing its data.
- Providing technical assistance and consultation to ministries and government agencies with issues related to GIS and GPS

implementation.

- National level coordination between all ministries and government agencies implementing GIS.
- Cooperating with Arab, Regional and international bodies associated with Geographic Information Systems.
- Analyzing the requirements of GIS software licenses for all government agencies in addition to providing, and maintaining those licenses.
- Providing GIS e-services for Qatar.
- Managing and administering Qatar's GIS infrastructure.
- Designing and implementing plans and procedures for maintaining the safety and security of Qatar's GIS databases connected to GISnet in addition to initiating disaster recovery plans.

CGIS's Products: A few examples for the public;

CGIS's Services

The Centre for GIS provides several services to the public like;



- Map and data sales
- Geodetic and QCORS services
- Qatar Network for Continuously Operating Reference Stations (QCORS)

With the technical advancement in the field of satellite navigation systems such as Global Positioning System (GPS), survey activities around the world have changed and enhanced tremendously. To cater for the growing need of various entities such as real-time support for survey and mapping, search and rescue, emergency, fleet management, scientific research, automatic



machine control system, aircraft navigation systems, precision landing system; a network of Continuously Operating Reference Stations (CORS) was established in Qatar in 2009 and started its operations in 2010.

National Data Capture & Mapping Strategy of CGIS

The current approach of country-wide image capturing data update was achieved through procuring outsourced aerial photography and mapping services. The main products of the current project are: 20 cm. Color Orth imagery with 2pixel horizontal accuracy, Vector data with absolute 30 cm. Horizontal and vertical accuracy, Aerial LIDAR with 5 cm. Vertical accuracy with resulting DEM, and 30 cm satellite imagery with 2 Pixel horizontal accuracy.

Adopting new technologies



By using Drones CGIS recently acquired Multi Rotor and Fixed

wing drones for acquiring updated imagery rapidly and in high quality, producing DEM and 3D capabilities. CGIS own resources are operating drones and processing data.

Another newly adopted technology is using Mobile Mapping CGIS acquired an advanced Mobile Mapping Solution. The system uses Laser Scanner in combination with GNSS (Global Navigation Satellite System) Receiver, Inertial Measuring Unit (IMU) and Distance Measurement Instrument (DMI). Captures accurate and precise spatial data with 7 cameras.

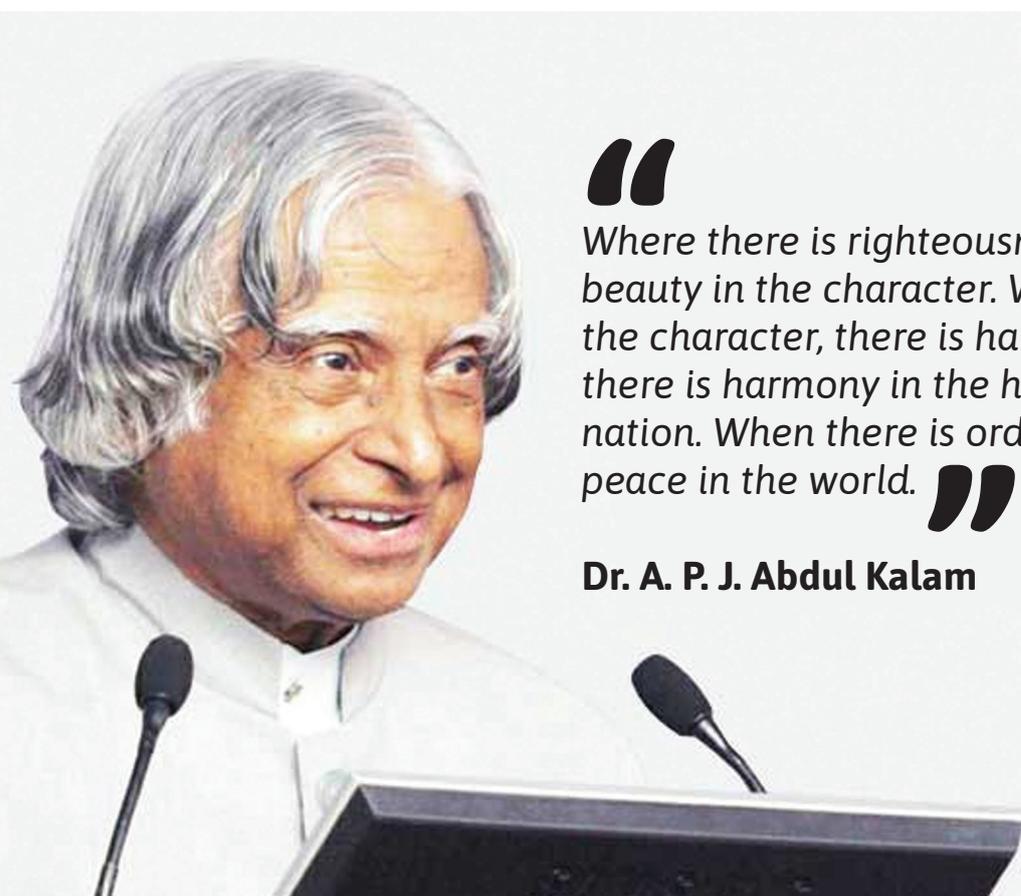
Qatar’s National Aerial Mapping Steering Committee

Recently formed to support enhancing the nation’s own capabilities represented by CGIS to own and operate airborne mapping and image capture equipment and resources in addition to processing and extracting all types of generated data. Members of the committee includes: CGIS, Ministry of Defense, Ministry of Interior, Private Engineering office & Qatar Petroleum.

CGIS’s Training Programs

The Centre for GIS has implemented a comprehensive training program, which provides beginning, intermediate and advanced courses in all aspects of GIS operation and management.

CGIS has adopted a modular approach to training, allowing staff to attain a certain level of proficiency and then practice and develop those skills before moving on to more advanced classes. In addition to holding regularly scheduled classes, our training sponsors seminars, workshops and special training courses. As a result of the world renowned position held by Qatar’s GIS, we reached an agreement with Environmental Systems Research Institute (ESRI), USA to establish an authorized regional training program. This program which covers the Gulf countries, provides trainees with ESRI certified certificates.



“
Where there is righteousness in the heart, there is beauty in the character. When there is beauty in the character, there is harmony in the home. When there is harmony in the home, there is order in the nation. When there is order in the nation, there is peace in the world.”

Dr. A. P. J. Abdul Kalam

Sustainable Alternative to Conventional Fuel



Abstract – Biofuels are products that can be processed into liquid fuels for either transport or heating purposes. Bioethanol is produced from agricultural products including starchy and cereal crops such as sugarcane, corn, beets, wheat, and sorghum. Biodiesel is made from oil- or tree-seeds such as rapeseed, sunflower, soya, palm, coconut or jatropha. Although efforts to produce biofuels date back to the early days of the automobile biofuels have only started to be seen as a serious alternative to oil worldwide over the last few years. Their reduced carbon emissions compared to conventional fuels and their positive impacts on rural development, together with the current high oil prices, are key elements behind their market development. Trade in biofuels is expected to expand rapidly, as many countries will not have the domestic capacity to supply their internal markets. Biodiesel consisting of mono alkyl esters is one type of a renewable diesel fuel derived from a number of vegetable oils or animal fats. As a renewable fuel, biodiesel has been promoted to reduce petroleum consumption. However, the life cycle analysis for biodiesel remains uncertain. Biodiesel reduces tailpipe emissions of PM, HC, and CO, while increasing NOx.

The article provides a brief description of the different types of biofuels (with main focus on BioDiesel), identifies the major international biofuel producers, analyses the main links between biofuels and sustainable development and concludes by identifying some gaps and ideas for further work.

Keywords – BioFuel, BioDiesel, Sustainable Energy, India, Policy.

INTRODUCTION

What Is Biodiesel

The use of biologically derived fuels in diesel engines is as old as the diesel engine itself. Rudolph Diesel reportedly considered vegetable oils as a potential fuel for use in his invention. During the 1970s and 1980s, research was conducted with pure vegetable oils and partially esterified oils, both in their neat form and in blends with petrodiesel. Eventually, biodiesel research focused on alkyl esters due to their superior properties.

In the USA, the ASTM Biodiesel Task Force adopted a definition of biodiesel that limited it to “mono alkyl esters of long chain fatty acids derived from renewable lipid feedstocks, such as vegetable oils and animal fats, for use in compression ignition (diesel) engines” [Howell 1997]. The mono alkyl ester definition eliminates pure vegetable oils as well as monoglycerides and diglycerides from consideration as biodiesel.

At the time this definition was developed, alkyl esters began to receive significant attention and were the only fuel that was considered to carry the label “biodiesel”. As discussed in the article on alternative fuels, later developments created pressure to expand the definition to include renewable diesel-like fuels made with other processes and composed of chemically different compounds. For instance, the term biodiesel has also been used by some authors to describe hydrocarbon-based fuels manufactured through refinery hydrogenation of fats or vegetable oils—an increasingly more important type of biofuel. Thus the term “biodiesel” is no longer necessarily limited to alkyl esters. To avoid confusion, hydrocarbon fuels produced by hydrotreating oils at

a refinery are now commonly referred to as “renewable diesel” fuels. This became a widely accepted naming convention. In the remainder of this article, we use the term biodiesel in its conventional scope, limited to mono alkyl ester fuels.

The most common alcohol used in the production of mono alkyl esters is methanol and the more specific label “methyl ester” is often attached to this type of esterified biodiesel. Higher order alcohols such as ethanol and propanol can also be used in the production of mono alkyl esters. These produce other classes of compounds called “ethyl esters” and “propyl esters” respectively.

The structure of three example methyl esters representative for biodiesel—those of oleic acid, C17H33COOH, linoleic acid, C17H31COOH, and linolenic acid, C17H29COOH, three acids of one, two, and three unsaturated bonds, respectively—is shown in Figure 1.

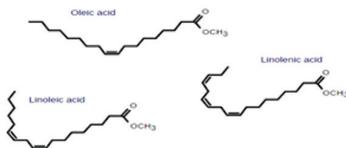


Figure 1. Fatty acids methyl esters

Oil from jatropha (*Jatropha curcas*) nuts was considered as a potential biodiesel feedstock in tropical climates in the early years of the 21 century because jatropha plants tolerate poor, degraded soils and are resistant to pest and disease. Plantations for biodiesel production were started in India and in some African countries [Openshaw 2000]. However, under marginal growing conditions, jatropha plants produce few of the nuts from which the oil is extracted and good yields typically require growing conditions that make it compete with food crops. Additionally, unlike other crops, the residuals from jatropha plants have no commercial value which makes revenue from its cultivation entirely dependent on marketing the nuts. Since interest in jatropha has waned, some hybrid varieties have been developed that make it a more appealing crop [Charles 2012][Lane 2014].

Depending on the feedstock, biodiesel may be referred to by a number of more specific terms and corresponding acronyms, the most common ones being:

- Soybean methyl ester—SME or SOME
- Rape methyl ester—RME
- Canola methyl ester—CME
- Palm oil methyl ester—PME
- Fatty acid methyl ester—FAME (a collective term including all of the above)
- Vegetable oil methyl ester—VOME
- Tallow methyl ester—TME

Biodiesel is usually blended with petroleum diesel. The blends are often designated by a capital B followed by biodiesel percentage (by volume) in the blend. For example, B5 indicates a blend containing 5% of biodiesel and 95% of conventional petrodiesel, while B20 is composed of 20% biodiesel and 80% petrodiesel. Under the same convention, neat biodiesel is termed B100.

What are the different types of Biofuels?

There are two main types of biofuels – ethanol and biodiesel. The simplest way to distinguish between the two is to remember ethanol is an alcohol and biodiesel is an oil. Ethanol is an alcohol formed by fermentation and can be used as a replacement for, or additive to, gasoline whereas biodiesel is produced by extracting naturally occurring oils from plants and seeds in a process called transesterification. Biodiesel can be combusted in diesel engines.

Biofuels are grouped by categories - first generation, second generation, and third generation – based on the type of feedstock (the input material) used to produce them.

- First generation biofuels are produced from food crops. For ethanol, feedstocks include sugar cane, corn, maize, etc. For biodiesel, feedstocks are naturally occurring vegetable oils such as soybean and canola[2].
- Second generation biofuels are produced from cellulosic material such as wood, grasses, and inedible parts of plants. This material is more diffi-

cult to break down through fermentation and therefore requires pre-treatment before it can be processed[2].

- Third generation biofuels are produced using the lipid production from algae.

Biofuels are not as energy dense as conventional transportation fuels. 1 gallon of biodiesel has 93% of the energy of 1 gallon of diesel and 1 gallon of ethanol (E85) has 73% of the energy of 1 gallon of gasoline.

Vegetable oil methyl esters	Kinematic viscosity at 40 °C (mm ² /s)	Density at 15 °C (kg/m ³)	Calorific value (MJ/kg)	Flash point (°C)	Pour point (°C)	Cloud point (°C)	Oxidation stability (h, 110 °C)	Reference
<i>Jatropha curcas</i>	4.48	864	40,224	160.5	3	5.8	9.41	Silotoenga et al., 2013
<i>J. curcas</i>	4.84	879	–	191	–	–	–	Mofigur et al., 2012
<i>Sterculia foetida</i>	4.92	873	40,167	160.5	-3.0	1.2	3.44	Silotoenga et al., 2013
<i>S. foetida</i>	6	875	40,211	162	1	–	–	Devan and Mohideen, 2009
<i>Colaplyllum inoplyllum</i>	4.57	872.5	40,204	158.5	6	6	13.08	Silotoenga et al., 2013
<i>C. inoplyllum</i>	4	869	41,397	140	4.3	13.2	–	Ong et al., 2011
<i>Alsevia mchurcana</i>	3.84	869	40,127	165.5	8	8	5.31	Silotoenga et al., 2013
<i>A. mchurcana</i>	4.12	886.9*	–	–	–	–	–	Sulastyo et al., 2008
<i>Hevea brasiliensis</i>	4.93	886.8	39,605	166.5	3	0	8.61	Silotoenga et al., 2013
<i>H. brasiliensis</i>	5.81	874	36.5	130	-8.0	4	–	Ramadas et al., 2005
Palm oil	4.45	857	40,511	156.5	10.5	10.5	7.5	Silotoenga et al., 2013
Palm oil	4.5	–	–	135	–	16	13.37	Sarin et al., 2007
Diesel fuel	2.91	839	45,825	71.5	1	2	23.7	–

BioDiesel Producing Countries Worldwide

Rank	Country	biodiesel potential (ML)	Production (S/L)
1	Malaysia	14,540	0.53
2	Indonesia	7,595	0.49
3	Argentina	5,255	0.62
4	USA	3,212	0.70
5	Brazil	2,567	0.62
6	Netherlands	2,496	0.75
7	Germany	2,024	0.79
8	Philippines	1,234	0.53
9	Belgium	1,213	0.78
10	Spain	1,073	1.71

Feed stock of BioDiesel Producing Countries

Country	Feedstock
Brazil	Soya oil, castor oil, palm oil
US	Soya oil
Canada	Straw
Colombia	Palm oil
Argentina	Soya oil
Ecuador	Palm Oil
Germany	Rapeseed
France	Rapeseed
Italy	Rapeseed
UK	Rapeseed
Czech Rep.	Rapeseed
Poland	Rapeseed
China	Jatropha and others
India	Jatropha
Thailand	Palm, peanut, soya, Jatropha
Indonesia	Palm oil
Philippines	Coconut oil
South Africa	Jatropha
Australia	Soybeans



Typical biofuel toxic emissions compared to standard fuels

Source: USPA 2002a 'Clean Alternative Fuels: Biodiesel'; Feed stock By Percentage of BioDiesel Producing Countries

BIODIESEL (B20 & B100)	FISCHER-TROPSCH
<ul style="list-style-type: none"> • 10% (B20) and 50% (B100) reductions in carbon monoxide emissions. • 15% (B20) and 70% (B100) reductions in particulate emissions. • 10% (B20) and 40% (B100) reductions in total hydrocarbon emissions. • 20% (B20) and 100% (B100) reductions in sulphate emissions. • 2% (B20) and 9% (B100) increases in nitrogen oxide emissions. • No change in methane emissions (either B20 or B100). 	<ul style="list-style-type: none"> • Nitrogen oxide reductions due to the higher cetane number and even further reductions with the addition of catalysts. • Little or no particulate emissions due to low Sulphur and aromatic content. • Expected reductions in hydrocarbon and carbon monoxide emissions.

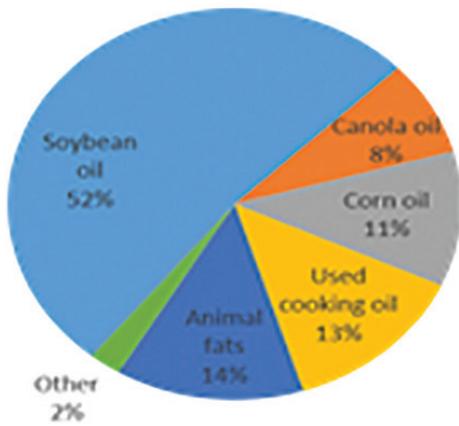
ied and complex. On the one hand, biofuels may imply improved energy security, economic gains, rural development, greater energy efficiency and reduced Green House Gas emissions compared to standard fuels. On the other hand, production of energy crops could result in the expansion of the agricultural frontier, deforestation, monocropping, water pollution, food security problems, poor labour conditions and unfair distribution of the benefits along the value chain.

Conclusions and Recommendations

Biofuels represent important opportunities and challenges for sustainable development, both globally and domestically. Biofuels can help to tackle climate change and improve rural employment and livelihoods. They may also help to diversify energy portfolios, ameliorate trade balances and improve air quality. However, they are not a panacea and they have many limitations. The cultivation of energy crops could cause or exacerbate environmental problems associated with agricultural commodity production. Of these, the expansion of the agricultural frontier is a key concern. On the social side, there are important concerns about the impacts of biofuel production on labour practices and on food security.

Biofuels and the sustainable development debate

Links between biofuels and sustainable development are var-



Dr. Yagnesh Kumar Kanubhai Gohil
FIE(I), C Eng (I), PMP-USA, MASHRAE-USA, MCI0B-UK, LEED AP(BD+C)-USA

ACKNOWLEDGMENT : sincerely thank my senior colleague Mr. Sunil Kulkarni for inspiring me to write this article. I thank my Wife Vidhya, Daughter Shradhdha (Aspiring Engineer) and Son Akshit, who has always stood by me and provided encouragement to take up such a prestigious task of preparing technical writeup.

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IEI Hon. Chairman handing over memento to Eng. Mudassir Baig, IIT Mumbai on the topic of Blockchain Technology.

The Internet of Things (IoT): APPLICATIONS, Investments and Challenges for Enterprises



Azeem Salahudeen
BE, Mechanical Engineer

1. The Internet of Things (IoT)

The Internet of Things (IoT), also called the Internet of Everything or the Industrial Internet, is a new technology paradigm envisioned as a global network of machines and devices capable of interacting with each other. The IoT is recognized as one of the most important areas of future technology and is gaining vast attention from a wide range of industries. The true value of the IoT for enterprises can be fully realized when connected devices are able to communicate with each other and integrate with vendor-managed inventory systems, customer support systems, business intelligence applications, and business analytics.

In addition to manufacturers' adoption of the IoT, various service industries are in the process of adopting the IoT to increase revenue through enhanced services and become leaders in their markets. Disney's MagicBand is a new wristband with RFID chips that serves as a ticket and connects to Disney's data repository regarding park visitors. Kroger's new IoT-based system, Retail Site Intelligence, is one complete retail platform of video analytics, wireless devices, POS devices, handheld sensors, IP cameras, and video management software that was designed to help customers have a better shopping experience by more

easily finding the products they want and saving time at checkout.

The adoption of this technology is rapidly gaining momentum as technological, societal, and competitive pressures



push firms to innovate and transform themselves. As IoT technology advances and increasing numbers of firms adopt the technology, IoT cost-benefit analysis will become a subject of great interest. Because of the potential but uncertain benefits and high investment costs of the IoT, firms need to carefully assess every IoT-induced opportunity and challenge to ensure that their resources are spent judiciously.

2. Essential IoT technologies

Five IoT technologies are widely used for the deployment of successful IoT-

based products and services:

1. radio frequency identification (RFID);
2. wireless sensor networks (WSN);
3. middleware;
4. cloud computing; and
5. IoT application software

3. IoT applications to enhance customer value

Despite growing popularity of the IoT, few studies have focused on categorization of the IoT for enterprises (e.g., Chui, Lo'ffler, & Roberts, 2010). Based on the technology trends and literature review, this article identifies three IoT categories for enterprise applications: (1) monitoring and control, (2) big data and business analytics, and (3) information sharing and collaboration. Understanding how these three IoT categories can enhance the customer value of an organization is a prerequisite to successful IoT adoption

4. Evolution of the foundational IoT technologies

Various types of IoT applications have emerged, and the willingness of enterprises to utilize them is growing rapidly. According to Bradley, Barbier, and Handler(2013),the IoT will generate \$14.4 trillion in value; the combination of increased revenues and lower costs will migrate among companies and industries from 2013 to 2022. From an industry perspective, four industries make up more than

half of the \$14.4 trillion in value. These leading four industries in terms of value at stake include manufacturing at 27%; retail trade at 11%; information services at 9%; and finance and insurance, also at 9%. Other industries such as wholesale, healthcare, and education lag behind in terms of value generation, with a range between 1% and 7%. Much of the value for manufacturers comes from greater agility and flexibility in factories, and from the ability to make the most of workers' skills. Additionally, a large amount of the value for retailers comes from connected marketing and advertising. Geographic distributions of the value are heavily driven by each region's relative economic growth rate and by the relative size of industry sector in each region. In the United States, \$4.6 trillion of value is most prevalent in the services area. However, in China, \$1.8 trillion of value is derived from rapid economic growth, mainly in the manufacturing sector.

5. Challenges in IoT development Based on the survey of IoT practices, this section discusses challenges in IoT development by enterprises. As with any disruptive innovation, the IoT will present multiple challenges to adopting enterprises. For example, due to

the explosion of data generated by IoT machines, Gartner(2014) suggested that data centers will face challenges in security, the enterprise, consumer privacy, data itself, storage management, server technologies, and data center networking. This section discusses five technical and managerial challenges: data management, data mining, privacy, security, and chaos.

6. Conclusion

Because the IoT is such a recent development, there is still a paucity of studies on the social, behavioral, economic, and managerial aspects of the IoT. This makes it very challenging for companies to make informed decisions as regards IoT adoption/implementation. Our article is one of the first studies on a conceptual model of IoT applications for enterprises. In this article we identified three categories of IoT applications: monitoring and control, big data and business analytics, and information sharing and collaboration. Finally, we discussed five challenges in implementing IoT applications for enterprises.



Visiting Dean and Associate Dean at College of Engg. Qatar University

Doha to host international engineering congress in September

Doha will host the International Engineering Congress, which is to be held as part of the centenary celebrations of the Institution of Engineers, India (IEI).

The two day conference will start on September 26, it was announced yesterday.

"The conference, which will throw light on the latest innovations and technology in engineering sector, is to be attended by delegates from GCC countries and across the world apart from those in India," IEI president T M Gunaraja told a press conference yesterday.

Experts will present papers on various topics. Young aspirants will be also provided with opportunities



IEI president T M Gunaraja flanked by other officials at the announcement ceremony yesterday.

to present papers. "We have plans to invite papers from across the world," Gunaraja explained.

The conference will be sup-

ported by various educational institutions in Qatar.

The event will promote engineers in Qatar and help them

achieve professional excellence.

"IEI delegation has held discussion with College of North Atlantic- Qatar president Dr

Khalifa al-Khalifa. A team of IEI functionaries will also meet Qatar University authorities. Hope they will extend help and co-operation," said IEI Qatar chapter chairman Abdul Sathar.

Since its inception in 1920, IEI has been active in promoting professional activities, supporting students and spreading technological activities across India. Started in 1990, Qatar chapter is one of the old chapters of IEI. The organisation has 2,20,000 corporate members and 1,25,000 student members in 15 engineering disciplines.

IEI officials Major General Suresh Bhattacharya, Dr Abdul Hameed and Sajeeth George were also present.

DPS-MIS marks Qatar National Sport Day



CELEBRATIONS: Institution of Engineers India - Qatar Chapter (IEI-Qatar) recently organised an event to celebrate Qatar's win in 2019 AFC Asian Cup at Ashoka Hall, Indian Cultural Centre. Abdul Sathar, Chairman of IEI-Qatar, welcomed the gathering and cut a cake as part of the celebrations. The event was attended by over 80 engineers.

IEI-QC holds annual general meeting

The Institution of Engineers India - Qatar Chapter (IEI-QC) recently conducted their annual general meeting at Indian Cultural Centre. The meeting was attended by over 40 members of IEI.

Abdul Sathar, Chairman of IEI, welcomed the gathering and appreciated the efforts and active participation of all engineers in the functioning of the chapter. He also explained the planning

stage of 'International Engineering Congress' that is scheduled to be held in September 2019. Dr Abdul Hameed, Secretary of IEI, gave a presentation on the activities of the Qatar Chapter for the previous year, including technical seminars, workshops and Engineers' Day celebrations. Sajeeth George, Treasurer at IEI, presented the audited accounts and budgets. Durali Manivannan proposed a vote of thanks.



IEI Qatar chapter Annual General Meeting held

THE Qatar Chapter of the Institution of Engineers, India (IEI) held its Annual General Meeting at the Indian Cultural Centre (ICC) recently, which was attended by 40 member engineers.

Honourary Chairman Abdul Sathar welcomed the gathering and appreciated the active participation of the engineers in the functioning of the chapter.

Honourary Secretary Dr Abdul Hameed gave a presentation on the chapter's activities in the past year, which included technical seminars,



workshops and Engineers' Day celebrations. The meeting unanimously approved the audited accounts and budget presented by Honourary

Treasurer Sajeeth George. Razulilahi commended the event and Durali Manivannan proposed the vote of thanks. (TNN)

IEI Qatar elects new office bearers

Annual general meeting was recently held by Qatar Chapter of the Institution of Engineers, India (IEI) at the Indian Cultural Centre. The meeting was attended by member engineers.

Abdul Hameed, Honourary Chairman of IEI, welcomed the gathering and appreciated the efforts and active participation of all engineers in the functioning of the chapter. He also explained the planning stage of 'International Engineering Congress' that is scheduled to be held in September 2019. Dr Abdul Hameed, Secretary of IEI, gave a presentation on the activities of the Qatar Chapter for the previous year, including technical seminars, workshops and Engineers' Day celebrations. Sajeeth George, Treasurer at IEI, presented the audited accounts and budgets. Durali Manivannan proposed a vote of thanks.



NEWS

COMMUNITY



IEI holds technical seminar

The Institution of Engineers India (IEI) Qatar Chapter recently organised a technical seminar on Quality and ISO Standards and Privacy Engineering and Assurance at Adhok Hall, Indian Cultural Centre. The seminar was well attended by over 100 members of IEI. Abdul Sathar, Chairman IEI, welcomed the gathering and introduced the guest speakers to the audience. He also spoke about the active role of IEI Qatar Chapter in the professional development of its member engineers, outlining the forthcoming programmes. He said that IEI plays a significant role for the development of agriculture and food processing, infrastructure, education and healthcare, information and communication technology, critical technologies and strategic industries such as nuclear, space technology and defence technology with larger objectives. The seminar was conducted by Ajay Singh, QA/QC Manager, and Rakesh Jha.

Founding Director and CEO of Privacy Virtuoso Global Pvt Ltd, Ajay elaborated on the quality and ISO standards. He said that these are based on seven quality management principles that senior management can apply for organisational improvement on including customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making, relationship management. Speaking on the occasion, Rakesh said that privacy engineering and assurance is the engineering methodology to bridge the gap between laws and principles and technologies and is intended to foster the birth of the new professional. Abdul Sathar presented the mementoes to Ajay Singh and Rakesh Jha for their contribution as guest speaker. The event was completed by Dr. Abdul Hammed, Secretary of IEI and Saad George, Treasurer of IEI, proposed a vote of thanks.

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IEI Qatar chapter holds technical seminar on corrosion control

A technical seminar on the topic of 'Cathodic Protection and Corrosion Control' was recently held by Qatar chapter of Institution of Engineers India (IEI) at City, Rotana hotel. The seminar was attended by around 100 member engineers. Abdul Sathar, Honorary Chairman, welcomed the gathering and introduced the speaker. He also talked about the active role IEI Qatar chapter in the professional development of its member engineers. **Saith George, Senior CP Training Seminar Manager and Senior CP Engineer of Middle East Engineering and Corrosion Solutions (MEESC),** conducted the seminar. He is a certified NACE (National Association of Corrosion Engineers) CP technologist and a member of NACE and ICOR (Institute of Corrosion). The seminar covered the topics of corrosion theory, simplified galvanic series, types and factors of corrosion, cathodic protection systems and its international standards. He explained about the corrosion and CP theory and its various scenarios. Vote of thanks was proposed by Saith George, treasurer. He also informed that 5th engineers' day 2018 of IEI Qatar chapter would be marked in September. Maheshwaran completed the event. Since its inception, the Qatar chapter of IEI has been rendering excellent professional services to the engineering community of Qatar in consistent to the objective of the institution for 27 years.



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GULF TIMES COMMUNITY

COMMUNITY

IEI-Qatar Chapter holds technical seminar

The Institution of Engineers India (IEI) Qatar Chapter recently conducted a technical seminar 'Why Do Our Critical Infrastructure Systems Need Health Monitoring at Dhya Ustana Hotel'. The seminar was well attended by over 80 members of IEI. Abdul Sathar, Honorary Chairman of IEI-Qatar Chapter, welcomed the gathering and introduced the guest speaker to the gathering. **Dr. Siddhartha Ghosh, Professor of Civil Engineering at the Indian Institute of Technology, Mumbai and Head of Structural Health and Resiliability (SH&R) Lab,** at IIT Bombay, explained about the Critical Infrastructure Systems (CIS), particularly in civil infrastructure systems, including housing, roadways, water supply and other

transportation networks. He said that smooth functioning of these CIS at their required capacity is an essential condition for the sustenance and growth of urban human habitats. **Structural health monitoring (SHM)** is an efficient tool through which engineers and decision makers can assure a reliable operation of CIS. Abdul Sathar presented a memento to Dr. Siddhartha Ghosh as a token of appreciation. **Anushaba Kulkarni** presented a memento to Dr. Mahesh Varma who had travelled from Mumbai to attend the seminar. The event was completed by Dr. Abdul Hammed, Honorary Secretary of IEI-Qatar Chapter. **Ashik K.** Executive Committee Member of IEI, proposed a vote of thanks.



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THE MARRIED COUPLE**

AL JUWAN HALL
قاعة الجيوان



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مركز للتطوير التكنولوجي
والبحوث والابتكار

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and tech entrepreneurs

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companies and research
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