المهندس
جمعية المهندسين البحرينية

الأبنية الخضراء و التنمية المستدامة
• شخصية العدد: المهندس مازن العمران
• الأخبار و النشاطات

المهندس
جمعية المهندسين البحرينية

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نوفمبر ٢٠١٣

الأخبار و النشاطات
• Green and Sustainable Buildings
• Profile: Eng. Mazen Alumran
• BSE News and Activities
Dear colleagues,

Welcome to “Almohandis” issue #57, in which we have covered many important technical articles together with a coverage report on green and sustainable buildings, BSE news and activities in addition to University of Bahrain student’s projects.

We apologize for not being able to present “Talents & Hobbies” in this issue due to lack of members contribution. We hope you enjoy reading this issue, and we always welcome your comments, feedback and contributions and urge you all to give us a hand to help publish “Almohandis” regularly and on time.

Best regards,

Effat Redha

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Dear BSE Colleagues,

I Hope by the time you read this issue of Almohandis magazine, the weather is cooler. I also believe you had an enjoyable summer this year. I am confident that few of you travelled outside Bahrain and now you are back and relaxed and you will exert your utmost efforts in promoting BSE activities. Here in BSE, during the last few months, we were busy handling few conferences issues and mainly the Energy Management which will commence on the 9th December 2013.

You are all aware that our training center has been rated as “inadequate” with National Authority of Quality & Qualification Assurance for Education & Training NAQQAET. Therefore we covered vast amount of work to raise the quality of our training center to meet NAQQAET's requirement to achieve a rating of satisfactory and above. I am very pleased to advice you that the recent NAQQAET audit of BSE Training Center has proved that almost all the previous audit findings have been completed and I have no doubt that we will have our satisfactory level rating achieved before the mid of 2014.

Almohandis magazine and BSE newsletter continues to remain issued and circulated on time. To make our magazine as interesting and relevant as possible for value of memberships, we would appreciate your continuing support in sending us any news and information that you deserve to mention in this prestigious magazine. I would also like to see our magazine full of activity photos like the fast growing Toastmaster group meetings, Tuesday Forum evening seminars and site visits.

Finally as you all know, this is my 3rd and the last term as the President of The Bahrain Society of Engineers. This prestigious post which I will always cherish in my memory. In a few weeks time, we will circulate the announcement and ballots for the new officers election, including the President. I sincerely encourage you to apply for the soon vacant posts in order to ensure sailing of the BSE flag high.

I hope you enjoy reading this issue of our magazine and confident that the Information Director Eng. Abdul Nabi Al Sabah will welcome any comments/feedback you might have. Wish you all good health & every success.

Best Regards,

Majeed Al Gassab
President
Engineer

Mazen Ahmed Alumran

In this edition we host Engineer Mazen Alumran, Managing Director of Mazen Alumran Consulting Engineers (MACE) and member of Bahrain Society of Engineers, to shed some lights on his professional career and his voluntary work.

Here we leave you with Eng. Mazen presenting his thoughts and memories.

Early Years:
I was born in August 1953. We were living in Muharraq at that time. I vaguely remember my grandparents’ old houses there. I remember hearing the children playing in the streets of Muharraq. I was too young to be allowed out of the house, so I was told, I stood on a chair and peered out of the wooden balcony windows (Mashribya). We moved to Adliya into our new house (Albayt Alowd) in 1957. My first feelings were that the house was big and strong and there were lots of hideouts everywhere! It was the only house with a big garden in the area. There was nothing around as far as the eye can see. Much further away there were the old horse- racing grounds. At that time all this empty land around the house was our playground, mine and my brother Dhafer and my sister Hala. It was open and safe! Bahrain was an environmental haven then with fresh water springs and swamps everywhere. Walking down to Mahooz to catch little fishes and frogs in the fresh water streams was one of my greatest pleasures.

Schooling:
I was sent to the Sacred Heart School for the kindergarten years and elementary schooling. Our parents were strict disciplinarians and being educationists, we had our time planned for us. After school we rested and did our homework and later, in the afternoon we had a private teacher who tutored us in Arabic and the Quraan and helped us study all the syllabus of the Government Elementary School Certificate. I received two certificates, one from the School and the other was the Government Elementary Certificate (Manazel i.e. homestudy).

I was a hyperactive child, according to my mother and teachers, and when I was not forced to sit on a desk and concentrate, I was found running and playing with my friends during the breaks. We swept the floors on the playground playing with marbles. I was good at it and by beating them, I made an impressive collection of marbles. My mother, however, was not impressed with the state of my clothes when I got home!

Boarding School and College Lebanon:
I was sent to Brumana High School in Lebanon for my Secondary Schooling. It is a reputable English Boarding School which prepared us for the O-Levels and College.

Here I made lots of friends from all over the Arab World and we are still in touch through the Alumni which is very active. Other than Bahrain, the pupils in this special school came from Saudi Arabia, Kuwait, UAE, Oman, Jordan, Syria, Libya and of course Lebanon.
I had the opportunity here to participate in my favourite sport, football and also had time for Track and Field and Swimming competitions.

Having taken the High School Diploma and six O-Levels, I spent two Years at the American University of Beirut for my Freshman and Sophomore Years.

I was an active member of the Bahrain Society (Al-Ribita) and participated in most of their Cultural and Sports (football) activities.

University of Manchester Institute of Science & Technology (United Kingdom)

My proper training as an Engineer took place in the UK, where I studied for my A-levels in Physics and Maths and graduated from UMIST as a Civil Engineer (Honours) in 1977.

My love of Football was reinforced and my allegiance to the Manchester United Football Club was formulated during those years at College in Manchester.

To broaden my horizon after my training as an Engineer, I took a course on General Management and Finance at Dunchurch College of Management in the UK in 1981. This was done following a training course on Manpower Management which I greatly benefited from organised by the Government of Bahrain between 1979-1980.

Working Years:

The greatest challenge for any College Graduate is to take the first steps to gain that very important "work experience" and get on the career ladder.

I started my professional experience with Webb Al A’Ali, Bahrain. Between 1977 and 1979, I was appointed as a Site Engineer with the full responsibility of supervising the Cable and Wireless Building being constructed at Salmaniya, Manama, then. I also supervised the Riffa Power Station (Phase 1) and the UNITAG Building.

My early work experience between 1979 and 1984 was with the United Building Factories, Bahrain. I progressed gradually, moving upwards through the different types of operations and spheres of responsibility, gaining experience in the process, until I was made Factory Manager. Between 1979 and 1980, I was made the Site Engineer Liaison Engineer, responsible for coordination and quality control between the sites and factories and in 1981, I was appointed the Factory Superintendent, reporting to the Factory manager on day operations. In 1983, I was made the Factory Manager with the responsibility for overall operation including overseas marketing of UBF products. I dealt with all aspects of coordination, quality control, production and marketing of the product. The total number of manpower reporting to me, as Factory Manager, was 550 strong.

Starting MACE (Mazen Alumran Consulting Engineers) in 1985

Managing Director of MACE

My experience over the past seven years gave me adequate experience in the Contracting Sector and I felt that it was high time then, to establish my own consulting business. I believed I could add my expertise in the field to the existing small number of consulting businesses that were practicing in Bahrain at that time, hoping that it would be beneficial.
My consulting business dealt with a wide variety of Projects both residential and commercial including Multi-Storey Towers, Showrooms, Television Studios, Health Buildings, Recreational and Industrial facilities. We dealt with contractors and sub-contractors of varied capabilities servicing Clients from the Private Sector and Government Ministries, including Information, Health, Housing Industry and Development as well as Tourism and Archeology.

The principal resource of MACE is their qualified dedicated and experienced team of Engineers and Architects. The technical team also enjoy the backing of a full range of administrative staff supporting the various departments.

Our motto is “Clients Satisfaction” and my team and I at MACE are proud of all our completed projects but specifically the Almoayyed Tower, the Gulf Air Simulators and the Gulf Hotel Convention Centre and the Bahrain Specialist Hospital.

**Professional Membership:**

My profession made it necessary that I become a member of a number of professional Institutions and Organisations that enhanced and reinforced our work. It was also a great opportunity to interact with professional and business people from all sectors of the society. In summary they included the following:

**Professional Institutions**

- Fellow Member - Bahrain Society of Engineers (FMBSE).

  I was an active member of the society since 1976 when I was still a university student and served under the presidency of HE Dr Hassan Fakhro at the time. I was later elected as Board member and served under the presidency of Eng. Jameel Kadhim Alalawi as the Director of Conferences chairing several of them myself, I was also a member of the Committee of the society Journal "ALMOHANDIS"

- Associate Member - Institute of Civil Engineers (AMICE) U.K.

- Associate Member - Chartered Institute of Arbitrators (AMCIArb.) U.K.

- Chairman - Association of Consulting Engineers in Bahrain.
Board Membership in Companies

- Board Member of Universe Environment Company (since 2009)
- Board Member of Sakana Holistic Company (2007 – 2013)
- Executive and Board Director of BLICO (1991 - 2001)
- Executive and Board Director of M/s. CHEMTECH (1997 – 2003)

Membership in Business Forums

- Board Member in Bahrain British Business Forum since April 2013
- Board Member (Treasurer) of Bahrain German Friendship Society since May 2013
- Member of Bahrain French Business Club

Community Service:

I have always felt it necessary to give part of my time to serving the Community in whatever capacity I had. I joined the Rotary Club with the aim to be of service since 1983 and participated actively in all their welfare activities. I also became the President of Rotary Manama in 1989.

I was appointed as a Board Member of Hope Institute for Handicapped Children in the years between 1987 and 1997 and a Co-Founder of the Bahrain Parents’ Care Society in Muharraq since 2010.

However, it is my love of sports, specifically Football that made me dedicate a lot of my spare time in developing and promoting this Sport in Bahrain for the Private Sector.

I have been a founder and active member of the Industrial Football League since 1981 and became the Chairman in 1984 for around thirty years. I worked hard to provide the opportunity for company and industry employees from the private sector to participate in friendly competitions of this much loved sport to enhance networking and comradeship. I have also been the Treasurer of the Bahrain Football Association in the years between 1992 and 1996.

My Family:

I am the youngest child of H.E. the late Mr. Ahmed Alumran and Mrs. Salwa Al-Anouti Alumran. My father was the first Minister of Education of Bahrain after Independence in 1971 and the Advisor of HH the Late Amir of Bahrain Sheikh Issa bin Salman Al Khalifa, He was a pioneer whose services to Education in Bahrain spanned over half a century and was better known as the “Father of Education” in Bahrain and the “Educator of Generations”. He was one of the cornerstones in the development and progress of Bahrain in the period between thirty and seventies of the past century and was the man behind the development of “Formal Education” in the country. He was honoured and received many Awards of the highest degree from the Heads of State of Bahrain, Saudi Arabia, Sultanate of Oman (representing the GCC Countries), Kingdom of Jordan, Egypt and Iraq.
My mother was one of the pioneer educationists in Bahrain in the forties and fifties of the past century and a decorated social worker. She dedicated her life to social work for around forty years and was one of the well-known first pioneers and leaders of social work in Bahrain. She took the first steps to establish the "Children and Mothers’ Welfare Society" in cooperation with other Bahraini women in 1960. She was honoured and received many awards for her pioneering work, her dedication to social work and service to humanity at the highest levels in Bahrain and the Gulf States.

I learned the importance of work, discipline and carrying responsibility to the full from them. They were great parents and were our role models in their dedication to serve their community and their county. While my mother surrounded us with love and showed us how to integrate with society, my father also taught me his hobbies of fishing, boat building and sea-faring, which I shared with him till the day he died.

I have an elder brother, Ambassador Dr. Dhafer Alumran, who is in charge of Bi-Lateral Relations at the Ministry of Foreign Affairs, and a sister, Dr. Hala Alumran, who is a Media Specialist and was the past Assistant Undersecretary of Radio and Television at the Ministry of Information, Bahrain.

In 1978, I married Amal Yusuf Almoayyed, the youngest daughter of the late honourable businessman Mr. Yusuf Almoayyed. Being an astute business-lady in her own right, we started together building our lives one block at a time! We have three children, Mariam, who studied Fine Arts at Chelsea College, University of London, UK and is now running her Boutiques. Ahmed, who studied Mechanical Engineering MEng, at Sheffield University, UK and is now getting his work experience at MACE. While Mai, the youngest, is still at Boston University, USA studying Psychology.

My Hobbies:

A lot of people fear retiring as they do not know what to do with their time! I have no problem with that and my gratitude goes to my late father! I love Football and Fishing.

However, I am not only a Fisherman. My father taught me how to be a "Nokhatha", that is a sea-farer and a captain of the seas. He took time to teach me about the best fishing spots in the Gulf and how to read the maps and guide the boats to get there. He taught me all about the climate of the Gulf, the fishing seasons, the Winds and the Tides. As my father built a number of old boats (Bawaneesh) with up to date equipment himself, as a hobby, he taught me, not only how to drive them, but fix them and maintain them and to keep them running smoothly in the Gulf choppy waters!

Finally, I would like to thank the President, Board Members and Editing Team of the Bahrain Society of Engineers Journal for this opportunity to share my experience with fellow members of the Society.
One of the challenges that we face in our engineering practice is working with a virtual team on projects or initiatives. For example, BSE is a member in GCC and Arab engineering Association. Many initiatives are generated and need to be planned and executed through virtual teams. Another example, Local Engineering Consultants works with other regional or international consultants to implement a project in a different region.

In this Al Mohandis issue, we would like to introduce a useful project management tool used to manage virtual teams in collaborative way.

ActiveCollab (similar to Web base Air Control Centre) can offer to help you manage your projects more effectively:

- Organized projects and task management: helps you to organize and monitor many projects and tasks within each project.
- Centralized and open communication: bring people (contractor, sub-contractors, suppliers, consultants, clients) to a common place called a virtual office. With effective access control, this gives you an excellent communication tool.
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- Billing your clients for the work you’ve done

This application can be used by designers, IT, in construction, publishers and education institutions.

To learn more about this application visit the web site https://www.activecollab.com/ and download a free copy.

Abdul Nabi Al Sabah
Mrs. Mona Jasim Al Mutawa
The Assistant Undersecretary for Construction Projects and Maintenance at the Ministry of Works

The Environment Conservation Responsibility became the concern of countries governments and not only individuals represented by their daily behavior towards the surrounding environment. Also, The Environment Conservation became an International obligation that is governed by agreements and conventions to guarantee achieving healthy environment throughout the universe by reducing the global warming, and the ruining effects on the environment and the ozone layer.

In a developing and changing world, it is necessary to keep abreast with the development, particularly in the field of green and renewable energy and the use of sustainable construction technology in any building design or planning. Legislators and Specialized Corporations are required to establish international obligatory conditions so projects are examined and gaged against specific health criteria to ensure the environment protection.

The Ministry of works put forward actively many initiatives concerning sustainable green buildings; these initiatives were originated as a reflection of the Ministry mission as a leading government organization to provide infrastructure services with high quality, and to contribute in the development of the construction boom in the Kingdom.

The following interview with Engineer Mrs. Mona Jasim Al Mutawa (The Assistant Undersecretary for Construction Projects and Maintenance, Member of the Gulf Committee for the Green Building Standards) will highlight the various aspects of the Green and Sustainable Buildings:

How would you define the Green Buildings?
Green Buildings are buildings friendly to the environment. Due consideration should be taken in their design, construction and operation by using proper engineering solutions, materials and technologies in order to save energy consumption and natural resources, to protect the external environment from pollution, and to ensure a healthy, pure, and safe internal environment.

The Green Buildings could be defined as a complete system of procedures and solutions that are applied to buildings in order to reduce energy consumption and the emissions that pollute the environment which include: saving energy and water, saving construction materials and depending on local natural renewable resources without harming the environment, reducing the emissions of harmful gases, improve the internal environment of the building, increase the life span of the building, and increase the productivity and support the economy in the different sectors.

Could you highlight on the Ministry of Works initiatives in the field of Green Building?
The Ministry of Works has created many initiatives in this context; the first one is the formation of a work team from...
different specialized disciplines. The team studied various systems and international criteria in assessing buildings on the basis of which the team established a standard list of specifications for the Green Buildings. These include the essential elements of the building envelop (Roofs, Walls and Glazing), strategies for saving energy and water consumption, friendly materials to the environment to reduce the emission of CO2 gases, and the quality of the internal environment (ventilation and natural lighting).

Both Ministries of Works and Education have a close cooperation and coordination to implement the standard list of specifications on the schools projects. In this context Ministry of Works conducted many awareness campaigns and programs with regard to the Green and Sustainable Buildings concept. The Ministry of Works involved different specialized experts in the fields of environment, energy saving, and sustainable building to enhance the implementation of the Green Building concept. Also the Ministry continues to develop the expertise of the engineers to excel their professional and practical skills. Additionally, there are many other initiatives to include: review the general standard specifications of the Ministry of Works, and follow up its obligatory aspects, energy audit to the Ministry of Works Building to obtain the GOLD LEED Accreditation, assess the government buildings that fall under Ministry of Works responsibility for maintenance to qualify them and raise their efficiency, participate in the Tanweer Project that is evolved from the Government Initiative for the Efficient Utilization of Natural Resources and Energy.

Could you enumerate the Ministry of Works Concerns beside the Green and Sustainable Buildings through the Ministry’s projects?

Due to the importance of the Green and Sustainable Buildings in today’s world, they became a necessary objective and not an option. This concurs with the opportunities for improvement identified by the Bahrain Center of Excellence in their workshops during 2009, and with the 2030 Bahrain Vision. Also it became one of the Ministry Corporate and Sector strategic objectives under the title “High performance Green and Sustainable Buildings”. Thus the Ministry of Works effectively participates in the Government initiative to optimize the use of the natural wealth and available resources, and in the (Standards and Energy Committee) and (Environment Affairs Committee) in addition to the Government Buildings Performance Assessment Committee chaired by the Electricity and Water Authority.

Are there any Statistics on the effect of (Green Buildings) on the environment?

It may be unknown to many people, the big effect buildings leave on environment, as these buildings and structures consume natural resources and energy; also they contribute to the pollution of the environment through the construction disposal and polluters during construction and operations. On the other hand Green Building provide a lot of positive aspects that include achieving: 26% reduction in the energy consumption, 13% reduction in the operation and maintenance costs, 27% users’ satisfaction and 33% average reduction in the carbon emissions.

What are the Friendly Environmental Initiatives that are initiated by the Ministry of Works?

In fact a number of initiatives have been established; the most important of these is implementing the principals and basis of the green buildings to ensure the sustainability during the complete life span of the building. High performance buildings can be achieved by the effective implementation of the green buildings technologies throughout the life span of the project with the clear understanding of the green buildings practices and their special specifications that could produce effective designs solutions with economical and social revenues.

In this context the Ministry has many different contributions, the latest of these, was the participation in the Bahrain International Exhibition for Green Technologies. The Exhibition witnessed participation of many Arab and foreign countries. The Ministry of Works presented its initiative of the green
and sustainable buildings through some of its projects. Also the Ministry is working on a number of internal awareness programs such as: recirculation of consumed materials and stationery in the ministry buildings by providing special containers for this purpose, encourage the correct practices among the employees and reward them, use the expertise of the experts in the field of green building to provide technical support for the engineers and develop their skills and expertise in this field, send staff for specialized training courses and programs that qualify them for professional certificates, and review the general standard specifications of the Ministry of Works to include the Green Buildings Specification within them regularly.

The Ministry of Works implements the Green Buildings Specification and Standards in the design of the modern schools projects as a result of its Friendly Environmental Initiatives. Also, environmental friendly materials, fixtures and systems are used in the ministry projects such as: air-conditioning units and ducts, high efficiency lighting fixtures units, insulated roofs, walls and ceiling, and reflected glass. Monitoring and controlling air-conditioning and lighting systems are conducted through the Building Control Management System which has a great role in saving energy consumption.

The Ministry of Works always emphasizes its adherence to the Green Buildings Specification and standards, as the Kingdom is eager to conserve the water and electricity resources. In this context, the Material Engineering Directorate of this Ministry encourages the contractors to use locally manufactured materials to limit carbon emissions during construction works by reducing the need for material to be transported for long distances.

**What about the Construction Projects Directorate direct contributions to support the Environment?**

In general the Construction Projects Directorate continues to activate its Green and Sustainable Buildings initiative that is cascaded from the Ministry and Government initiative, also the Directorate is always keen to enhance its participation in optimizing the use of energy, as one of the Government programs that was launched by His Royal Highness Prince Khalifa Bin Salman Al Khalifa, The Prime Minister to optimize the use of natural wealth and available resources.

The Construction Projects Directorate organized within this framework many activities and programs to emphasize its concern to environment. Many awareness campaigns were conducted to cover various aspects of the green and sustainable buildings concept, where a number of lectures were delivered to originate and cultivate the culture of the green and sustainable buildings. Representatives from the Construction Projects Directorate and a delegate specialized in the green and sustainable buildings field from the Construction and Buildings Cooperation of Singapore, held a meeting to exchange views and to learn from the Singaporean experience in this field, particularly in establishing the green and sustainable buildings design standards. A memorandum of understanding was signed between the Ministry of Works and the Singaporean delegate.

Furthermore, the Construction Projects Directorate issued a standard typical check list for the green and sustainable buildings design guidelines implementation. This check list was applied on two projects one of them is a typical school and the other was the Ministry of Works new building that was completed. The engineers of these two projects will conduct research and studies on them in order to benefit from the results for future other projects.

It is worth mentioning here that enhancing a sustainable environment at this stage did not come by accident, but it was the outcome of one of the workshops that were conducted in the ministry by the Bahrain Excellence Center to identify value added activities, that the Directorate can excel in them through design innovation and creativity.

**What is The Ministry of Works Vision in going ahead?**

The Ministry of Works vision is characterized by being (a leading organization providing high quality technical consulting services in the field of sustainable buildings and construction).

Also the Ministry of Works professional mission is represented by providing high quality technical consulting services in the field of sustainable buildings and construction.
The Ministry depends on achieving its vision that is evolved from the Kingdom Comprehensive vision 2030, which takes into consideration the economic, social and comprehensive development prospects through attaining the three main perspectives that are contentious learning and growth, internal processes development and customer’s satisfaction.

Are the Ministry’s contributions in the economic development in Bahrain restricted to technical aspects?

The Construction Projects Directorate contributes in achieving the economic development in the Kingdom by adhering to produce buildings designs, specifications and delivering projects as per high quality standards. The Directorate provides technical and engineering consultancy services to Government Ministries and parties by planning, designing, studying and developing their buildings projects, thus contributing in implementing the Government work program. Also the Directorate works on ensuring the safety and quality of these projects. Value engineering is applied on large projects to optimize the use of resources and achieve best engineering effective solutions.

To What extent the Government Educational Buildings are benefited from your consultancy services?

In our consultancy services due care is given to the design of the new schools by incorporating sustainable building technologies and solutions not limited to, but include the following items: use of double glazing reflected windows, insulated roofs and walls, natural lighting and appropriate ventilation, use of environmental friendly materials that provide safe and healthy internal and external environment, proper orientation of the building, suitable landscaping, shading, in addition to high performance systems and equipment that can be controlled by a centralized management system. In addition to the schools buildings our consultancy services extend to cover projects for many government sectors that include the health sector (hospitals and health centers), educational sector (institutes and colleges), youth and sports sector (clubs and youth centres), social services support sector (occasions halls, social centres, administrative buildings, and post offices).
Introduction

Construction is a process that consists of assembling of materials for making durable structures and buildings for varied uses like residential, commercial, industrial, recreation, healthcare etc. It also includes development of infrastructures and amenities like roads, highways, electricity networks, water and waste water services, pumping stations and treatment works etc.

Construction utilizes cement, sand, aggregates, concrete, steel, plumbings, conduits, electrical fittings, HVAC systems, wood work, painting, finishes etc. to make a dedicated structure which is utilized for some specific purpose. All construction activities require natural resources which are to be harnessed to obtain the product for utilization by users. The construction accounts for around 50% of non-renewable resources, making it one of the least sustainable industries in the world but has to be undertaken to provide shelter to the ever increasing population and accommodate related commercial and industrial activities.

Due to the industrial revolution, fast population growth and urbanization since past three decades, the world is witnessing rapid construction and development in the developed as well as in developing countries whereby the cities and towns are expanding both horizontally and vertically greatly straining the natural resources.

While the construction is a continuing phenomenon, the current green construction growth began in the 1970s and was spurred by the oil crises and associated environmental movement. The desire for environmental friendly construction, building practices and energy efficiency led to continued experiments and studies which ultimately led to ‘green construction’ and the creation of the U.S. Green Building Council (USGBC by which LEED certified buildings cropped up.

Green construction techniques are used to create structures and buildings that use finite resources in an environmentally-friendly manner. Historically, green construction has been focused primarily on pollution and waste reduction. Today, the concept of green construction has expanded to reflect a building’s sustainability, as well as its impact on occupants’ health, productivity and energy bills.

With the fast depletion of our fragile environmental resources, the onus is now on adopting green planning and using green materials. The green building industry has grown with time since last decade. Now green construction and green building is the future in all construction projects.
Building and Construction Activities and Resources Consumption

Building and construction activities worldwide consume huge natural resources. Around 3 billion tons of raw materials or 40% of total global use of natural resources occur each year. No other industry in the world uses more materials by weight than the construction industry. Construction contributes around 10% of the global Gross Domestic Product, yielding an annual output of around US $4.6 trillion.

On an average we spend 90% of our time in buildings be it our accommodation or offices or shopping malls. Often we think that the air quality inside these buildings are better than the outside environment, but actually it is 2-5 times worse than outside air. Globally, buildings are responsible for around 40% of our total energy consumption, 25% percent of wood consumption and 15% of water consumption.

Buildings consume major global resources. Almost 50% of global energy is consumed in buildings, while 50% water, 60% materials for buildings, 80% land loss to agriculture, 60% timber products, 90% hardwoods are all directly linked with building construction. Indirectly, 50% of coral reefs destruction and 25% of rain forest destruction are all attributed to buildings and construction. In USA, buildings are responsible for 72% of U.S. energy consumption, 38% of GHG emissions, 13.6 % of all potable water or 15 trillion gallons per year, 136 million tons of building-related construction and demolition debris. So there is a huge environmental footprint associated with the construction activities.

Environmental Impacts of Construction

The construction activities have many severe environmental impacts and it stretches often to decades creating pollution of many kinds and into the lives of many generations. The construction activities are straining the limits of the Earth’s “carrying capacity” or its ability to provide the resources required to sustain life while retaining the capacity to regenerate and remain viable.

We need to understand that our planet cannot support the current level of resource consumption associated with the construction. The construction business in many countries is responsible for nearly a third of all industry-related pollution incidents. The global pollution attributed to buildings is 23% air pollution, 50% climate change gases, 40% drinking water pollution, 50% landfill waste and 50% ozone depletion.

The major impact of construction is excessive energy use, global warming and climate change as well as waste generation and resource depletion. Material extraction of the primary resources causes major environmental impact through loss of habitat and ecosystem, damage to the landscape, potential subsidence problems, release of methane, transportation of material, generation of construction and demolition wastes and its disposal.

Energy is consumed when extracting raw materials, producing, manufacturing and transporting materials, transporting workforce, building structures, powering and maintaining structures, using and demolishing. In addition, energy is also required for operation of all building structures.

The other major impact is due to pollution and hazardous substances in the natural and built environment whereby the built environment generates sewage, solid waste, pollution caused during the manufacture of materials and products, pollution and hazards from the handling and use of materials and actual construction and site related activities.

Green or Eco Friendly Construction

Considering the future population projects, utilization of resources, pollution and unstable climatic conditions, we all have a leading role to play in adopting a holistic approach and green thinking for the construction. Green or eco-friendly construction can only be achieved if there is awareness on the ‘green concept’, green procurement of all material, green planning, utilizing green construction techniques, green operation, management, maintenance, repairs and dismantling.
We need to understand that Legislations and Governmental authorities alone cannot solve this issue. It is the change of our behavior and approach which is required. We have to improve our ‘vision’ first for construction rather than ‘making or adopting green buildings’ or following foreign codes, standards and certifications.

**Concept of Sustainable Construction**

Green, sustainable, smart, environmental friendly, eco-conscious has now become famous buzz words and denotes environmental compliance which creates a healthy impression on clients, business and work. When it comes to construction, building, erection, repair or renovation, all these words describe the same thing i.e. making better planning and taking well informed decisions.

The concept of sustainable construction and green development incorporates and integrates a variety of strategies during the design, construction and operation of building projects. The use of green building materials and products represents one important strategy in the design of a building. It needs to be understood that sustainable construction techniques are different than ‘good practices’.

Green building materials are environmentally responsible because its environmental impacts are considered over the ‘life of the product’. These materials offer specific benefits like reduced maintenance/replacement costs over the life of the building, energy conservation, improved occupant health and productivity, lower costs associated with changing space configurations and greater design flexibility.

Using green building materials and products promotes conservation of dwindling nonrenewable resources. In addition, integrating green building materials into building projects can help to reduce the environmental impacts associated with the extraction, transport, processing, fabrication, installation, reuse, recycling, and disposal of these building industry source materials.

We need to radically reduce our demand on haphazard and un-planned construction and constructing buildings only for beneficial uses. We need to change the way we consume such building materials. This is particularly as regards how we build. It means using less of these materials by building more simply, with more local and plentiful (i.e. sustainable and renewable) materials and generating less waste.

By making smarter choices about how to select, build and use the products, one can significantly contribute to the health, cost saving and well-being of the residents, users, families, community and the world.

Green construction will later lead to green building. It signifies applying new thinking to the way we plan, procure materials, construct, remodel, renovate and develop our residences and communities. It requires an understanding of the relationships between building site, design, mechanical systems and other factors. Finally, it mandates a mindset that enables healthy, mutually beneficial relationships between human, technical and natural systems. Though Green construction and building is mainly targeting towards reducing energy use and improving indoor air quality but actually it’s about addressing the entire planning, construction and utilization system.

Conventional building methodology views each project in terms of its component parts like the insulation, wiring, plumbing, landscaping, weather, building orientation, interior finishes etc. but green construction looks at the interactions between everything that is involved with a holistic approach that benefits builders, buyers, users and the environment.

In terms of cost, it seems that more expenditure is involved in terms of planning and manpower resources but at the end the sustainable projects were at least 25% more profitable than conventional construction project.

For green construction, we need to select materials after the establishment of project-specific environmental goals. The environmental assessment process for building products involves three basic steps of Research, Evaluation and Selection. For green building material and product selection, main factors to be considered include resource efficiency, impact on air quality, water conservation and energy use.

The material and products should be selected based on identifiable recycled content, materials harvested from
sustainably managed sources, products manufactured with resource-efficient processes, building materials, components, and systems found locally or regionally saving energy and resources in transportation to the project site and affordability. Select materials that can be easily dismantled and reused or recycled at the end of their useful life and selecting materials that are durable and longer lasting.

Benefits of Green Construction

The U.S. Department of Energy, Building America Program highlight that in green development, everyone is a winner. The benefits for builders include reduced repair and maintenance works, lower material and labor costs during construction, reduced purchase cost of mechanical equipment, less construction waste and higher quality structures/homes. The benefits for owners/users include lower utility bills, greater comfort, better indoor air quality, durability of structures and higher resale prices. For the country, the benefits include less dependence on fossil fuels, reduced greenhouse gas emissions, more affordable homes, lower medical costs due to healthier, safer living conditions etc.

Green construction is gaining people and governmental attention all across the globe. In USA by 2015, an estimated up to 48% of new non-residential construction by value will be green, equating to a $120-145 billion opportunity. As per October 01, 2013, more than 2.7 billion square feet of building space in USA are LEED-certified. The aspect can be assessed from the fact that 41% of all non-residential buildings in 2012 were green, as compared to 2% of all non-residential buildings in 2005.

The construction market in gulf and in Bahrain accounts for major GDP. This includes all commercial, residential, industrial and infrastructure construction. With energy efficiency financing growing, more jobs and employment opportunities will be created in the next coming years.

Recommendations

We have to adopt a sustainable and green approach that meets the needs of the present without compromising the ability of future generations. Green construction is to meet the needs from planning till construction, operation till its end use. By considering our building choices, we can easily increase the comfort, safety, and efficiency of our buildings without putting undue stress on our natural resources.

Government, industry and the Environment Agency all have a role to play in promoting environmental improvements and reducing the environmental impacts of the built environment, both in terms of construction and during the life of buildings.

But more than anything else, more awareness on green and sustainable construction is required by individuals and especially small and medium sized Contractors. The urge to adopt ‘green building codes’ and constructing ‘green buildings’ should be made as a second priority with the main aim of inculcating green awareness amongst the constructors and users.
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<td>PMP/CAPM - Project Management Professional (PMP Exam Preparation Course)/CAPM Certified Associate in Project Management</td>
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<td>Environmental Impact Assessment</td>
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Email: bsetraining@barcelco.com.bh / Website: www.mohandis.org
The protection of the climate and the environment requires from everybody contributions to minimize the detrimental effects of the industries and societies turned to always-higher consumption! Urgent action is needed due to high inertia in human, economic and natural systems. Societies can adapt their habits and behavior to mitigate the impacts of human activities on the climate.

IPCC Climate Change 2007: Fourth Assessment Report

Climate

According to scientists the earth today is as hot or even slightly hotter than any time in the past 120,000 years (maccott 2013). IPCC (intergovernmental Panel on Climate Change) has reported that the three decades from 1983 to 2013 were likely the warmest 30-year period of the last 1400 years in the northern hemisphere where most of earth’s land mass is located.

Earth’s mean surface temperature has increased by 0.85°C with about two thirds of the increase occurring since 1980. Most experts agree that over the next few decades, the world will undergo potentially dangerous changes in climate, which will have a significant impact on almost every aspect of our environment, economies and societies.

More than 90% of scientists today are certain that increasing concentrations of greenhouse gasses causes this increase in temperature. Carbon dioxide emissions count for 75% of the warming effect from human created greenhouse gasses. (Climate change challenge)

There are both natural and human sources of carbon dioxide emissions. Natural sources include decomposition, ocean release and respiration. Human sources come from activities like cement production, deforestation as well as the burning of fossil fuels like coal, oil and natural gas.

The use of fossil-fuel-derived energy in the production of materials, during the construction process, and by the occupants or users of the building or structure throughout its life time is a source of significant quantities of carbon dioxide.

Earth’s oceans, forests and other ecosystems continue to soak up about half the carbon dioxide emitted into the atmosphere by human activities, however, it is not expected to continue indefinitely as per Pieter Tans the climate researcher with...
National Oceanic and Atmospheric Administration in the United state. (NOAA, 2012) If the percentage of absorption were reduced, it would cause a faster-than-expected rise in atmospheric carbon dioxide and projected climate change impacts.

It is estimated that at present, buildings contribute as much as one third of total global carbon dioxide (CO2) emissions. This means that architects and investors have a major responsibility towards society. This has caused scientists to put pressure on governments to incorporate emissions from buildings into global strategy on climate change.

**Natural resources**

About 50% of all the non-renewable resources mankind consume are used in construction such as:

40% -50% of world’s energy use is consumed in buildings during their operation. (WBCSD, 2009)

80% of lands suitable for agriculture use are lost for construction. (Dixon, 2010)

50% of the world’s fresh water is consumed in buildings. (Dixon, 2010)

**Pollution**

50% of landfill waste in the world is related to construction material, which can contribute to air and water pollution.

**What is sustainable Architecture?**

The most famous definition of Sustainable developments is the Brundtland definition: “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987)

Inline with sustainable development, Barnet and Browning in their book: A Primer on Sustainable Building published by Rocky Mountain Institute defined sustainable architecture, which is also referred to as: green architecture or eco-housing, as: “taking less from the earth and giving more to people” Sustainable architecture is not a new design style but rather a revolution in the way we think about design, construct and operate buildings. (Barnet and Browning, 2007) It is a movement associated with environmental awareness and consciousness. (Kremers, 1995)

Sustainable design aims to lessen the damage caused by poorly designed buildings by combining the best of ancient
building approaches with the best of new technological advances. (Barnet and Browning, 2007)

Some buildings, which are claimed to be sustainable, are designed to respond to energy consumption and CO2 emissions while neglecting other important factors such as embodied energy in the construction material, water consumption, the use of renewable construction materials or using environmentally friendly material to avoid pollution.

To overcome the negative effects of buildings a more holistic approach should be applied. Sustainable design should produce buildings that will accomplish the followings: (Gould, Day and Organ)

• Responsive to site and climate
• Cost effective and long-term affordability
• Provide a healthy, comfortable and functioning environment
• Energy efficiency
• Constructed with low energy, sustainably produced materials
• Resource efficient and minimize waste
• Durable, strong and adaptable
• Provides indoor air quality
• Aesthetics
• Responses to transport and population density
• Considers the entire life cycle of the buildings and its components.

In short, it is an environmentally friendly building

How to approach sustainable construction projects

Green buildings design should be mainly based on maximizing resource efficiency with regards to energy, land, water and materials. (Haris, 2009)

The design should be an integrated process incorporating all the professional expertise necessary from the beginning.

From the ground up and from cradle to grave (or cradle to cradle) every element of a construction project has an effect on every other. All aspects of the design should be invested in at an early stage setting aside a budget for post-occupancy monitoring and publication of results.

Cost implications decisions should be based on whole life costing rather than just initial capital costs. The sustainable design of a project must consider all relevant elements that go into location, orientation, structure, systems, construction, use and eventual demolition of the project in addition to how each decision at each stage will affect all of the others.

This complexity explains how difficult it can be to set out a definitive approach to sustainable construction. The information and values on which they are based are in a state of constant change and development. Only through peer review from one project to another can real progress be made to improve sustainability of buildings. There is no one single solution.

Example of best practice in response to land use, energy consumption and CO2 emission:

• The iconic Media-TIC building in Barcelona, designed by Spanish architects Cloud 9 won the grand award as building of the year 2011 in World Architecture Festival (WAF).

This project was commissioned by the Consortium of the Zona Franca CZFB and 22 @ of Barcelona. It represents a digital city model based on ICT (information and communication technology), where what matters is knowledge, added value and patents. It’s unique architectural design syncs with the end users’ values.

The building volume forms a cube of 44m x 44m x 37.82m high; the site is 3,572.45 m² in which the basement occupies the entire area, while above ground the occupation is 54.20%. In total, the Media-ICT has 16,000 m² above ground and two floors below ground (7100 m²) with capacity for 200 parking spaces.
The upper floors (from eighth to fourth) are rented for big companies, the second and third floor have small spaces for emergent companies and the first floor with the Cibernariun and an auditorium offers a course program open to all the city residents.

The ground floor does not have pillars; public space invades the building with 36m x 40m of free space. The lobby of the building can host exhibitions, workshops, events... construction is built from the top and moves downwards, becoming transparent, anti-gravitational, and almost liquid at the bottom. Thus, its impact on the street is minimal, about 8% mass with respect to the 1500 m2 floor surface area.

The main design concept of Media-ICT is to deliver a building that generates and optimizes energy efficiency by using advanced innovative systems.

- **SIMULATION ENERGY**: The energy simulation of the building adjusts the indoor climate based on the demands of heat and cold, minimizing the dimensioning of installations.

- **ENCLOSED BUILDING**: The façade, made of inflatable ETFE cushions oriented south, act as a variable sunscreen, opening in winter to gain solar energy, and closing in summer to protect and shade. In the south west façade, Nitrogen based fog is introduced in the cushions, that by increasing its particles greater opacity
is produced, thereby reducing heat gain and maintaining comfortable indoor temperature with minimum need for air conditioning.

- **MONITORING:** Both the façades and offices have been equipped with multiple temperature sensors, humidity or pressure that collect exterior information to adjust the interior conditions and thus control energy consumption.

Media-ICT targets and achieves:

1- 20% CO2 reduction due to the use of District Cooling, clean energy.

2- 10% CO2 reduction due to the photovoltaic roof.

3- 55% CO2 reduction due to the dynamic ETFE sun filters.

4- 10% CO2 reduction due to energy efficiency related to smart sensors.

Total 95% CO2 reduction, the Media-ICT is a NET building almost a net zero building.

Cloud 9 were committed to achieve these targets by monitoring and recording energy consumption and savings for the first year at full occupancy.

**Example of best practice in response to the site and climate, using local natural material and naturally ventilated:**

Hand Built Sra Pou Vocational School in Cambodia, Photo by Architect Enric Ruiz-Geli
During their visit to Cambodia in spring of 2010 as part of an Aalto University design studio class, Hilla Rudanko and Anssi Kankkunen designed a school to help the community of Sra Pou who was relocated from the city to the countryside. The community had no sustainable means of income, their new location was lacking in basic infrastructure and a safe environment. This motivated the duo to pursue the project and what had started as a school assignment ended up as a unique architecture project solving a social-economical issue for the community. Coming from a context-relevant function, the architects intended the building system itself, the materials chosen for construction, and the workforce that constructed the building to be all from the context and kept all their resources local. The two-story school was built from locally sourced, handmade, sun dried red bricks reflecting the color of the surrounding landscape. Natural ventilation and light came through the hole pattern in the brick walls. Open able wooden colorful handmade louver shutters were fixed on windows for shading when required.

Local laborers were trained on site to build the project. A local non-profit operates out of the building and is teaching villagers to earn a living.

One can appreciate the wide options in approaching sustainable, green, eco friendly architecture. Innovation, willingness and mostly awareness are the main driving factors that will encourage responsible architecture towards humanity and their environment. It is mainly the architect’s responsibility to educate their clients and demand suppliers of building materials to create green solutions. Legislations by decision makers are essential to expedite the process to achieve targets in a short time. Continuous efforts and research with open debates shall develop a solid base for a revolutionary thinking towards our planet and human needs. Holistic approach to sustainability is a basic need at present for a better future.
Promoting Green Buildings

Abstract

Green Buildings became the new trend in building technology around the world due to the increasing interest in environmental issues from the public. Nevertheless, the Middle East is having trouble catching up with the trend especially after the Market Crisis. There are two main reasons for developers’ lack of interest in Green Buildings. The first is that the cost of designing and building green buildings is perceived to be high and the second involves an apparent lack of interest in environmental issues. As a result, a few questions are posed by Project Managers regarding the incorporation of “Green Decisions” in their projects. How would a project decision-making process differ when the environment is taken into consideration? How to increase the developer’s awareness of environmental problems? Is it possible to promote Green Building Design to a developer? The paper will introduce the knowledge required for a Project Manager to approach Green Design including identification of the main Green Buildings Rating systems: LEED, BREEAM, and Pearl. In addition, it will discuss the approach to change the developer’s prospective of Green Buildings by eliminating the myths and increasing the awareness of environmental issues. Case studies and figures will be provided as support for the topic. In other words, this paper will discuss a strategy to market Green Building Design to a prospective developer.
Introduction

The purpose of this paper is to inform the project manager of the current situation in terms of electrical power in the Middle East and North Africa (MENA) and is intended to pave the way to understanding Green Buildings and to build a foundation integrating Green Building into design. In today’s turbulent world, people are becoming ever more concerned with the environment and the effect of human beings on it. And as was said in Natural Capitalism: “If they’re not designed to work with one another, they’ll tend to work against one another.” This brought a rise to the concept of Green Buildings, which help lessen the damage created by mankind on the environment.

Green Buildings provide a sustainable solution to traditional building design and construction practices. The main aims of designing a green building are to save energy and water on a long-term basis and on materials on a short-term basis. Energy savings are achieved through energy-modeling, selecting building orientation, or planting native trees that provide shade to the building. In addition, water can be conserved through installing water-efficient facets. A construction waste management plan helps conserve materials on site.

Despite the sustainable aspect of green buildings, they remain unpopular in the Middle East due to myths regarding the costs associated with such buildings. This myth can be refuted through research of successful projects in the Middle East. The challenge of designing green buildings with minimal cost can be tackled using Green Project Management.

The Current Situation

The clichéd answer to the common question “why should I care about the environment?” is “Because the impact current projects have on the future of our children.” While this is not far from being true, it is arguably understatement. A look at current utilities supply statistics can make anyone realize that it is not our children’s future we need to worry about, but ours. From power outages to water shortage, this region cannot sustain its way of living. This understanding of the current situation in the Middle East is a doorway to “Promoting Green Buildings” for a Project Manager.

Power

Last summer, the region’s major cities, without exception, suffered from power outages. Despite the fact that the rise of power consumption in the GCC is due primarily to the rise in usage of comfort cooling and other power hungry equipment; one should not neglect the lack of “power saving” habit in the Gulf Arabian consumer. Nevertheless, power is going to turn into water in the desert; a scarce resource.

MEED published a “power survey” in its special edition, which detailed the power situation in the region. Although this survey’s results are expected, they are nevertheless startling as it illustrates that the demand for power is continuously rising. The following graph shows the percentage of increase in peak power demand. This figure shows how serious is the need for MENA to evaluate a plan to cope with this increase. Generating more power is not a simple, quick or cheap solution. An estimated $2.7B is required for Bahrain alone to sustain its growth demand (MEED). There is no doubt that this number is an indicator of the rest of the region’s power investment needs. It needs to be considered whether MENA can successfully sustain its growth ambitions without robust power infrastructure growth and investment plans.
Ambitious solutions have been proposed to solve this problem. One was the introduction of solar power plants. Algeria, Morocco, Egypt, and Iran are leading the way as their projects are being built. Kuwait was considering this move and hired Toyota Tsusho to conduct a feasibility study. According to MEED: “Japan’s Toyota Tsusho conducted the study in 2008 and concluded that by using solar thermal energy to supplement steam generation, the 280MW plant would save 21.1 million cubic meters of gas a year.” (Thompson) These savings are significant as 21.1 million cubic meters of gas powers approximately 60,000 houses and amount in total savings of approximately 6.6M USD. Another solution was wind farms and turbines. Bahrain’s World Trade Center was an example of an attempt to use this source. However, due to the difficulty of installation and vibration caused by the wind turbines, the turbines run only in a few occasions annually.

Although the proposed solutions are a step in the right direction in terms of generating clean power, they are not adequate as a mean to sustain the growth on their own. For instance, the UAE’s peak demand was 15,426MW in 2009 with a 6% increase in demand, which indicates that 470MW solar power plant would be only a small piece in the plan of generating power. Accordingly, more power plants will have to be built regardless of the green initiative.

**Introducing Green Buildings**

There is a universal acknowledgement that “Green Buildings” are buildings that are environmentally friendly. Technically, Green Buildings are buildings that have a resource footprint that is less than the resource footprint that would result if the buildings were designed according to traditional standards. In essence, Green Buildings do not “save” the environment, but they are a step in the right direction that helps to reduce the impact of the construction and the building industry on it. They help reduce the rate of consumption of depleting resources. For example, a building designed according to any of the green standards would have lower power consumption than one traditionally designed. The cumulative effect of green buildings can reduce energy and water infrastructure requirements drastically. Accordingly, the world will not need as many power and desalination stations.

### LEED, BREEAM, and Pearls

Individuals involved in the design of green buildings from developers to project managers and architects, need a significant understanding of the different tools available to design green buildings. This is due to a number of reasons including the difference in emphasis between these tools, the certification process, and the location and environment of the project.

The most common design aids in the industry are LEED and BREEAM. Buildings all over the world have been certified using these two rating systems. LEED, which stands for Leadership in Energy and Environmental Design, was developed by United States Green Building Council (USGBC). It is popularity is gaining momentum quickly, and cities in the United States, including Washington and Los Angeles, are mandating LEED rating for their buildings as a part of their sustainability initiative.

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<tr>
<th>PEARLS</th>
<th>BREEAM</th>
<th>LEED</th>
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<td>Site selection and Natural systems</td>
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<td>Site selection and Ecology</td>
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<tr>
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<tr>
<td>Energy</td>
<td>25%</td>
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</tr>
<tr>
<td>Materials</td>
<td>16%</td>
<td>Materials</td>
</tr>
<tr>
<td>Indoor Environmental Quality</td>
<td>20%</td>
<td>Indoor Environmental Quality</td>
</tr>
<tr>
<td>Innovation</td>
<td>2%</td>
<td>Innovation</td>
</tr>
<tr>
<td>Integrated Design Process</td>
<td>7%</td>
<td>Facility Management</td>
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Table 1 — Comparison between Pearls, BREEAM, and LEED in Criteria Percentage (Elgendy)

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1. Based on 13.5 kWh generated per cubic meter of gas and 4,800 kWh electricity consumption per household.
2. Based on the subsidized gas rate in Kuwait City 82cents/gallon
The Challenges

There are many challenges facing the application of all three rating systems in the Middle East. These challenges include:

- The lack of financial reward for LEED buildings. The building owner’s financial reward from reduced running costs is minimal due to energy, water, and fuel subsidization.
- The lack of legislation and incentives that introduce Green Buildings as a financial feasible alternative to traditional design and construction.
- The developer’s interest in LEED as a marketing tool rather than a long-term investment as developers will not be operating the asset.

The good news is that the Middle East and the GCC in particular, is taking bold steps towards green design. Projects around the Middle East are seeking certification, with a few developers overcoming the fears and challenges and leaping forward. Masdar, KAUST, and Dubai International Academic city, are the largest projects in the GCC seeking LEED certification. The success of these projects might boost green building design in the region. But, to build these successes into a solid future for green design, the lessons from these projects needs to be learned and coupled with a governmental interest and legislations with regards to green buildings.

One cannot dismiss the experience of the Green Initiative in the Middle East despite its relative novelty. The lessons learned from this experience are valuable. They defy the common fears and myths circulated by developers and prove Green Buildings to be a viable alternative to traditional design.

The TECOM Experience

The Green Building initiative in the Middle East started in Dubai. From Dubai Educational City to OMD Building at Dubai Media City, TECOM is leading the way for Green Buildings in the Middle East. Their experience is invaluable as it provides tangible results to the accomplishments that can be done in the region with regards to green buildings.

For example, OMD Building at Dubai Media City has accomplished a LEED Silver Rating. This building had predicted savings of approximately 61% reduction in water consumption compared to local standards and approximately 17% reduction in energy consumption compared to local standards. Astonishingly, the additional capital for LEED was approximately 0.11% of the project’s cost. This cost is minimal considering the project cost 42M AED. The estimated annual savings were approximately 75,000 AED. (TECOM)

These numbers refute the fear that LEED certification is attainable only with associated magnificent costs increases. Introducing these numbers to a developer might change his view towards green buildings.

Green Project Management

As a project manager, you are promoting an opportunity. To date, there has not been enough development in the Green Initiative or Government legislation for developers to either request a green approach or for it to be required by legislation. So, at the moment, Green Buildings have to be sold. Not only does a green building prove your commitment towards sustainability, but also due to the integrated design approach, it will provide a high-end product to developers. Green buildings are an investment in the future and in the quality of life. Equipped with the information above, developers can make an informed decision on the inclusion of Green design in their project.

Because of the iterative nature of engineering design, elements of Green Building design can be incorporated over and over again. The developer will always be inclined to “pull the plug” on the green building design, in the instances of an increase in costs or delay in the project. Project managers need to constantly remind their clients of their commitment to sustainability. In addition, if the Project Manager can embed a green, integrated design approach early on, the benefits will remain with the project. However, that conversation alone is not sufficient. It has to be supported with practices and processes that ensure the integration of green building design in the project management cycle and the decrease in costs associated with it.
As a result, the challenges mentioned can be tackled. The concept is to provide green building design through the incorporation of green design practices with project management. This leads to the term Green Project Management, which is an area in project management currently under development. Green Project Management is a way of considering the design of a green building in addition to the company and client's commitment to sustainability. Through green awareness and an understanding of the importance of incorporating green building design in the planning phase of a project, the challenge related to cost can be overcome.

**Green Awareness**

While a company might have a written sustainability policy, it is not always applied in reality. Green Project Management encompasses more than a commitment to sustainability statement. It is a true commitment through certain practices that help decrease the effect of businesses and management on the environment.

These sets of practices are best described within the ISO14001:2004 and ISO 14004:2004. These two standards were developed as a result of the Rio Declaration on Environment and Development and they are concerned with Environmental Management Systems. According to ISO, the following are the external objectives of those standards:

1. Provide assurance on environmental issues to external stakeholders – such as customers, the community and regulatory agencies
2. Comply with environmental regulations
3. Support the organization’s claims and communication about its own environmental policies, plans and actions
4. Provides a framework for demonstrating conformity via suppliers’ declarations of conformity, assessment of conformity by an external stakeholder - such as a business client - and for certification of conformity by an independent certification body.” (International Organization for Standardization)

These practices are at the heart of green project management. They can be as simple as issuing Adobe Acrobat Files instead of sending paper. But as simple practices do, they add up with time creating an environmentally-aware company, and an idealized execution of green project management.

**Green Buildings and the Project Management Cycle**

Green awareness is an inseparable part of Green Project Management. However, there are other components that pertain to project management in the case of Green

![Figure 3 – Green Building Project Cycle](image-url)
Buildings. In order to overcome the challenges of managing a Green Buildings Project, the project manager needs to focus more on the integration of Green Building Design in the project management cycle rather than the components of the design itself. This was observed through lessons learned from developers and consultants that were involved in such projects.

The process of submitting a Proposal to a Request for Proposal can become a way to attract developers to the idea of Green Building as opposed to traditional design. Figure 3 – Green Building Project Cycle shows the simplified process of engineering design with the integration of “Green.

It is vital to emphasize that Green Buildings Design is not a major feat for an architect nor an engineer nor a Mechanical Electrical and Plumbing Engineer. The guidelines provided in most rating systems, including LEED, BREEAM, and Estidama, are broad, simple and direct. For example, LEED Sustainable Sites Credits involve the existence of facilities within the site, as well as alternative transportation. The text provided in the manual can be understood and translated into documents easily.

The key benefit that a green approach to building design will provide is an integrated design approach, whereby the client, project manager, designers and engineers engage in dialogue early in the design process and maintain the dialogue throughout the design and construction stages. This leads to better coordinated and more efficient buildings; this approach is recognized and rewarded within the Estidama system.

Green Cost Management

Designing Green Buildings does not have to be extremely complicated or costly. However, major costs can be associated with team inefficiencies, late integration, and poor integration of the Green Design in the process. In addition, construction costs might suffer a severe impact because of the lack of knowledge in green practices and lack of organization and documentation from the contractor’s part. All these major issues are attributed to the massive “green” costs that reach up to approximately 7% of Building cost.

Neither project managers nor developers need to be disheartened by this information. By conducting a full integration of “Green” into the project processes, project managers can develop a “green mindset” which will help them through the hurdles of Green Building Certification.

The Early Integration

The first component that needs to be addressed by the project manager is early integration. Starting the integration as early as possible provides not only a sense of stability and consistency throughout the project but also helps in the development of the “green mindset” in all team members. Certain components of rating systems can have, if planned early, negligible cost to the project. Figure x shows the processes involved in early integration of Green design.

- Team Knowledge Assessment: It is important to know how much information the design team has on Green Design and the Rating system used. A quick assessment also paves the way for a team member to become the “green person”. This person’s responsible for the integration of the rating system’s components and overseeing the documents and deliverables. It is beneficial if the “green person” is an Accredited Professional. However, they do not need to be. Adequate research will provide the “green person” with necessary information. In addition, communication with the rating system’s awarding entity is crucial to the success of the project’s rating.

- Activities Definition and Sequencing: The Green Design manual provides a list of guidelines for design that the project manager can choose from. Choosing the activities to integrate Green Design in is vital as the team member responsible for the design component can refer to the criteria of the design before initiation.

- Highlight Areas Impacted by Green Design: Early integration provides a way for the task to be performed once rather than twice. Otherwise, the team member will have redesigned his component. Highlighting project components impacted by Green Design reduces the redundancy of work and saves time.

- Quality Expectations for Submittals: An important
understanding of the quality expectation of the company as well as the awarding entity is important to the success of Green Building Project. For example, USGBC provides a set of expected deliverables within its LEED Manuals. However, more information is often required. Thus, the project manager needs to tackle the expectations early and inform his teams.

- Provide Tasks Information for Team: The tasks would be defined differently if they were related to Green Building Design. This might cause confusion to the Team. Therefore, a clear set of definitions combined with tasks information will help the team understand the process of the integrated design well.

- Provide Access to Green Design Requirements: Every member involved in the project, even if not impacted directly by Green Design, needs to have access to Green Design Requirements. A full understanding of the requirements and submittals eases the design process.

This early process of organization and preparation helps the team as its members will be clearly informed and have an accurate understanding of the tasks. More time will be spent on preparation and organization, but it is time worth spending.

**Conclusion**

The debate will go on for a number of years on whether Green Buildings are sustainable or not or whether they actually help the environment. However, there is a need for change in this part of the world, and this change is evident by power consumption data. Despite the fact that Green Buildings are facing many challenges and rejection, developers such as TECOM provide valuable experience in this field and prove that Green Buildings can overcome obstacles and be successful. As a project manager, promoting Green Buildings is a mission. It is a commitment to sustainability that helps the developers to see the investment in Green Buildings in a different light. Green Project Management is at the heart of Green Building Design, and by implementing certain guidelines, a project manager can reduce the cost of the Green Design.
Supervision and Managements of Sub-Contractors

The Problem of Payment to Sub-Contractors

Introduction:

The Employer, after passing through all processes and procedures required by the Tender Law and approvals of the Tender Board, awards the Works to be executed to a Contractor. As the Contractor may not be knowledgeable and expert in all aspects of the awarded works, he is allowed to enter into Sub-Contracts with Sub-Contractors.

The procedure of selection and contracting with sub-Contractors is governed by Clause 3.2, 3.3, 3.4 and 3.5 of the Building & Engineering Works, of the Standard Contract Agreement and Conditions of Contract Part I. These Sub-Clauses must be read with Clause 59.1 of the same Conditions.

It may be appropriate to mention that the above Sub-Clauses are synonymous with the similar Clauses in FIDIC / JCT Clauses, which were generally used in the Government’s Agreements in the Kingdom of Bahrain till the year 2009 when Bahrain adopted and applied its own Standard Conditions.

However, generally speaking the Bahrain Standard Conditions, originally initiated by the Ministry of Works, follow FIDIC and JCT. The principles and contractual frame are more or less the same. The main difference is that the Bahrain Standard Conditions are structured for Government’s contracts.

Sub-Contractors:

Sub-Contractors are generally classified into two categories:

1- Nominated Sub-Contractors: here the Employer nominates, selects or approves who will perform a Sub-Contract. The Contractor is not bound in all cases to accept the Employer’s nomination. If he rejects the nomination, which is rare, then he must have good reasons.

In case the nomination is accepted by the Contractor, then he must enter into a contract with the Sub-Contractor on the same bases of his contract with the Employer.

The Employer is not a party to such contract.

2- The other category of Sub-Contractors is the Domestic sub-Contractors or what is known in the Bahrain Standard Conditions as specified Sub-Contractors. In this category the Employer plays no part other than giving consent which shall not be unreasonably withheld.

Relationship of Employer with Sub-Contractor

The following points have been observed:

a) The main Contractor alone remains responsible for the performance of his Sub-Contractors. He is responsible towards the Employer in executing the awarded works and at the same time is strictly responsible for paying the entitlements of the Sub-Contractors.

b) Supervision of the Sub-Contractors is the sole task of the Contractor. The Engineer may not deal directly with a Sub-Contractor. If he discovers defaults in the Sub-Contractor’s performance he may draw the attention of the main Contractor to such defects. The main Contractor remains fully responsible for the faults and...
defaults of his Sub-Contractor as if such faults and defaults are committed by himself, and the Employer applies the terms of his contract with him in relation to the discovered defects.

c) The Contractor remains fully responsible for fulfilling his obligations towards his Sub-Contractors. A Sub-Contractor may not seek reparation from the Employer in case of the main Contractor failing to pay his entitlements.

Direct Payment to Sub Contractor:

According to the contract of the Sub-Contractor with the Contractor, the Sub-Contractor extracts his entitlements from the Contractor. However, to avail the nominated Sub-Contractor a remedy against a Contractor who does not pay his Sub-Contractor his deserved entitlements rightfully earned under his contract with him, then, according to Clause 59.4 of the Conditions stated in Part II, the Engineer shall be entitled to demand from the Contractor reasonable proof that all payments (less retentions) included in the previous certificates in respect of the work or goods, materials or services of a nominated Sub-Contractor have been paid or discharged by the Contractor, failing which the Employer shall be entitled to pay such nominated Sub-Contractor directly, upon the certificate of the Engineer, all payments (less retentions) due to the Sub-Contractor and to deduct by way of set off the amount so paid by the Employer from any sums due or which may become due from the Employer to the Contractor.

However, such direct payment may not be made in case the Contractor:

i) informs the Engineer that it has reasonable cause for withholding or refusing to make such payments and

ii) produces to the Engineer reasonable proof that it so informed such nominated Sub-Contractor.

It is to be stated here that such direct payment to the nominated Sub-Contractor might cause contractual difficulties to the Employer in view of the fact that payments to the Contractor are made in accordance with the terms of his contract with the Employer and the payment by the Contractor to his Sub-Contractor is made in accordance with his contract with the Sub-Contractor. Neither the Employer is a party to the Sub-Contractor’s contract nor the Sub-Contractor is a party to the Contractor’s contract. Here the principle of the privacy of contract comes into play.

Moreover, the phrase “reasonable” in both exceptions from payment in Clause 59.4 is vague and means that payment is a discretion of the Employer depending upon the judgment of the Engineer. The Contractor may always attack and dispute the direct payment and the Employer may find itself in a critical position in case the matter is taken to arbitration or to a Court of Law.

In all cases this leads to delay for which the Contractor is contractually responsible and bears its consequences financially in the form of liquidated damages and in extreme cases expulsion from the works altogether.

By paying directly to the Sub-Contractor the Employer may give the Contractor an excuse for the Contractor’s delay in view of the fact that the Sub-Contractor’s relationship with the Contractor is the same enjoyed between the Contractor and the Employer, i.e. based upon the contract obligations of the Employer to the Contractor are the same as those owed by the Contractor to the Sub-Contractor.

Conclusions:

1- The appointment of Sub-Contractors is inevitable as the Contractor is not expected to execute the diverse branches of works in a contract by himself. He is allowed to Sub-Contract some, but not all of the works.

2- The management of a contract in which part of the works are executed by Sub-Contractors needs careful attention in view of the fact that the Sub-Contractor is responsible towards the Contractor and the Contractor is responsible towards the Employer.

3- Cash flow from the Employer to the Contractor and from the Contractor to his Sub-Contractor is vital to the execution of the Works.

4- Most of delays are caused by the disputes between the Contractor and his Sub-Contractor.

5- Although paying directly to the Sub-Contractor may appear a practical solution it may involve the employer into contractual disputes with the Contractor. So the agreement of the Contractor must always be sought and obtained.
Knowledge Management

The objectives and the benefits

Introduction:

Knowledge management (KM) is one of the modern management developments, where a greater role in achieving competitive advantage in large institutions, whether commercial or governmental through knowledge as main asset when compared to the capital asset.

This is crystallized by the emergence of strategic initiatives in knowledge management and new organizational structures to reflect how to build a culture of knowledge, and encourage learning, change, and innovation.

Knowledge is the result of mixing the invisibility of information and experience to be able to use it effectively. Knowledge can exist in the brains of individuals or are stored in the in modern systems by the KM tools.

First Knowledge Versus Information Versus Data

We must make a distinction between “knowledge” and “information”. The information is the result of data processing that breed in the environment which increase the level of knowledge for those who get it. This means that knowledge has higher levels than the information. We strive to get the information so that we know (or increase our knowledge) as shown in the following figure:

Types of knowledge:

Knowledge can be two types:

1 - Tacit knowledge is based on the knowledge of individuals. With related skills “Skills - Know how” exist within the mind of each individual as it is subtle and based on experience and can not be transferred or converted easily to others.

2 - “Explicit” knowledge is expressed in drawing, writing, speaking, and through technology can be converted, which is found in the archives of the institution; where it can be accessed, used and shared with all employees.
The iceberg that floats on the water is an appropriate explanation for the difference between explicit and tacit knowledge in organizations. The big challenge is how to transfer tacit knowledge from the minds to written in order not to disappear.

Classification of knowledge:
1 - "Know-What”. They know what kind of knowledge is required.
2 - “Know-How”. They know how knowledge should be dealt with.
3 - “Know-Why”. They know why there is a need for a certain type of knowledge.
4 - “Know-Where”. They know where to find certain or specific knowledge.
5 - “Know-When”. They know when there is a specific need to know.

Methods of generating knowledge:
Creation of new knowledge in terms of its importance when markets are constantly changing and then to generate new knowledge. Researchers such as (Nonaka, & Takeuchi, 1995) suggested the following methods to generate and expand knowledge:
First: convert tacit knowledge to explicit knowledge.
Second: transfer of knowledge from the individual level to the collective level.
Forward four ways by the knowledge generated through the interaction and transformation between tacit knowledge and explicit knowledge, namely:

- **Socialization**: which includes the conversion of tacit to tacit.
- **Externalization**: implicit conversion to the explicit through dialogue become tacit knowledge to explicit through collective meditation, such as computer documentation.
- **Combination**: a transfer of knowledge to explicit as in schools and colleges.
- **Internalization**: which emphasizes the transfer of explicit knowledge to tacit knowledge through the repeat of task becomes explicit knowledge which incorporate such tacit knowledge.

KM implementation benefits:
Among the benefits of knowledge management in organizations are: It helps to maintain the knowledge assets from being lost forever and to facilitate easy access to experts and specialists as well as to make critical and accurate decisions. Also it helps to document the lessons learned from projects and complex operations in order to avoid repeating them if they are harmful or re-apply if useful. It thus promote the spirit of cooperation through the exchange of knowledge and thereby competitiveness and innovation.

Summary:
The application of knowledge management in the enterprise requires a awareness of its principles and drafting a strategy based on the type and size of the institution, as well as taking into account the challenges and success factors to implement its objectives at the lowest cost.
The book or booklet we review is the type of publishing that has been flourishing in the book market now a days. The reason is that with more social network usage and smart phones in hand, people tend to get more adapted with simple, concise, summarized and straight forward information facilities, than the long, heavy, philosophical and complicated text books.

The high rise of twitter, instagram specifically reflects the users mood towards receiving easier and more amusing forms of information. At such reality, the author who’s an art graduate prefers to compile his A5 size book in a form of a “collage” that compromises of graphitic drawings, normal pictures, bolded twisted statements and funny cartoons embedded along with short paragraphs.

The book is a mosaic of ideas and personal experiences to come up with something new & innovative. The author believes that nothing is completely genuine. He defends that ideas, actions and master pieces always got some traces of a predecessors and is an accumulation of experiences. This idea is being stressed upon by two introductory remarkable statements as follows:

“Art is theft” by Pablo Picasso

“Immature poets imitate; mature poets steal; bad poets deface what they talk, and good poets make it into something better, or at least something different. The good poet welds his theft into a whole of feeling which is unique, utterly different from that from which it was torn,...” by T. S. Elliot

The core idea is to consume all your sensations and capabilities including the external atmosphere diversities of life (Virtual and real) with all its details to build upon your master piece where ever & what ever you’re doing. The book rebuilds ideas and revamps mind sets on the basis of all the new communication advance and data revolution that we see today . It draws attention to the new situation of personal innovation and productivity at daily life that needs more attention with all the distraction we have.
Ten mini chapters are the books content that might look contradictory at first sight:
1. Steal like an artist.
2. Don’t wait until you know who you are to get started
3. Write the book you want to read
4. Use your hands
5. Side projects and hobbies are important
6. The secret: Do good work and share it with people
7. Geography is no longer our master
8. Be nice
9. Be boring
10. Creativity is subtraction

The book has been one of New York times best seller, this announces a birth of a new type of books which has more dynamic means to promote new ideas by having non regular presentation mode that jumps away from rigid and stiff text & statistical graphs.

Finally, I recommend readers to own this book which I can only describe as simple, useful, delicious and easily digestible.

*To contact the reviewer : s_aliahashim@hotmail.com
المتلقى الهندسي الخليجي
السابع عشر
The 17th Gulf Engineering Forum
تحديات الموارد الطبيعية... استشراف المستقبل
The Resources Crunch;
Exploring The Future
02 – 04 February 2014
Al Bustan Palace, A Ritz-Carlton Hotel
Sultanate Of Oman
Introduction

Engineers are not only concerned with developing projects that are sustainable, but also with a wide variety of environmental management responsibilities impacting society and the environment. The long-term societal and economic health depends on a healthy environment. The WFEO Model Code of Practice for Sustainable Development and Environmental Stewardship defines and explains ten principles that guide engineering practice in the wider context of sustainable development (SD) and environmental stewardship (ES). It will support engineers in their professional practice, in dealings with other professionals and guide professional engineering organizations.

SD and ES Explained

Many professional groups, including engineering organizations, have developed specific, though often discipline-centered, SD definitions. Often such definitions fail to distinguish between discretionary wants and essential needs. The 1987 Brundtland Commission provided perhaps the broadest and most widely accepted SD definition in stating: “Sustainable development is development that meets the social, economic, and environmental needs of the present without compromising the ability of future generations to meet their needs.” The commission focused on the essential needs of the world’s poor, which deserve overriding priority. It also considered “limitations” the state of technology and social organization impose on the environment’s ability to meet present and future needs. Stewardship means taking care of something not belonging to you. Environmental Stewardship is more difficult to define. Often stewardship has been addressed narrowly as protecting an endangered species or preserving a threatened eco-system. The Model Code states: “Environmental Stewardship is the prudent use of the finite resources in nature to produce the greatest benefit while maintaining a healthy environment for the foreseeable future.” The engineering profession plays a significant role in economic development and in protecting the environment. It is ideally situated to play a significant role in SD and ES. For engineers to be relevant to current and future generations and provide guidance and leadership to society, a more proactive approach to sustainability, as outlined in the table below, is required.

The Interpretive Guide

The Interpretive Guide serves as an accompanying document to the WFEO Model Code of Practice for Sustainable Development and Environmental Stewardship. It provides further amplification and explanation to engineers and national engineering organizations on interpretation and implementation of the ten principles.

Next Steps

The Model Code and Interpretive Guide will be published in the autumn of 2013 and posted on the WFEO website (www.wfeo.net). In 2014 and 2015, in partnership with other standing committees, and national and international members, WFEO-CEE will undertake efforts to increase awareness and facilitate engagement of the principles by engineers.