

The **Professional** ENGINEER

Issue 84



The Greater Fort Lauderdale Broward County Convention Centre

Council & Officers 2014

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Presidents Briefing

Dear Colleagues

I am a man with a happy smile! The last 3 months have been dynamic. I want to mention 3 words; collaboration, affiliation and membership!

Your Council has been proactive in its review of the Societies practice and procedures with a view to streamlining its administration and promoting its member involvement. This has seen a range of activities both within the Council, the UK and overseas.

The activities range from electronic communication to face to face meetings with both individuals and organisations alike, many are ongoing and this issue of the Professional Engineer provides a reflection of the goals being pursued. I am always impressed by the support provided by fellow organisations and in particular the hospitality afforded by John Hooper and his team at the CABE Annual Conference. The event provided ample opportunity to meet with fellow professional Building Engineers exhibitors and guests raising both the profile and membership base of the Society.

The SPE AGM was most successful and the revised Articles and supporting documents will be placed on the website



in due course along with the activities proposed for 2015.

As members I seek your support, it is your Society. If you have colleagues, talk to them about membership. If you have news or articles that may be included within the journal share them with your peers.

The Society is prepared, where possible, to attend events, present technical papers, introduce people to the Society and enhance the process of collaboration. At the risk of being premature I will take this opportunity to pass on seasonal greetings, to you and your families, and look forward to meeting with many of you during the coming months.

**J. Malcolm Parker P.Eng
President.**



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Travel News



Antony Wedge Vice President International

Antony has combined his work experience with activities both within the UK and overseas.

Autumn sees the next step as he is headed to Colombia to participate in research and development initiatives.

In his role as Vice President International, he will be the Liaison Director for South America and seek to promote the Society through the processes of Affiliation and Collaboration.

He takes with him a 'fluid agenda' and is looking to meet with both the Society of Colombian Engineers and the Asociacion

Colombiana de Ingenieros (ACIEM) and liaise with their Presidential teams in Bogota. Antony will be providing updates within the newsletter, Professional Engineer and of course, "linked-in"

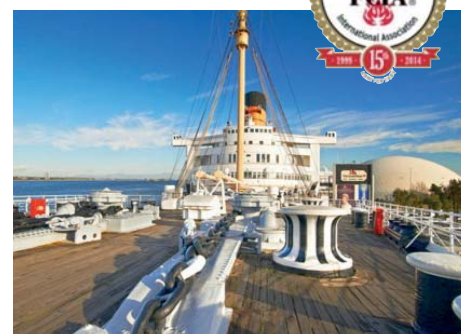


FCIA Barrier Management Symposium: Long Beach, CA

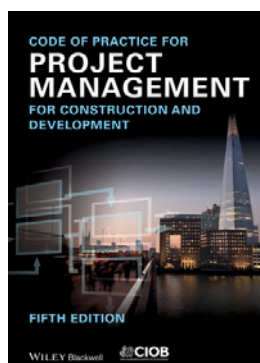
The Joint Commissions #1 and #2 Survey Violations are penetrations and door issues in fire and smoke barriers. Fire and smoke barriers are there to protect healthcare building occupants and staff, and if the barriers are compromised, your end user is relying on an unreliable system.

After seeing the staggeringly high number of violations, FCIA and The Joint Commission, along with the American Society of Healthcare Engineers (ASHE)

and Underwriters Laboratories created The Barrier Management Symposium to better educate healthcare building engineers, Building Officials and Fire Marshals on how Barriers are Designed, Installed, Inspected and Maintained (DIIM). The Barrier Management Symposium took place in Long Beach, CA at the Queen Mary, and was sponsored by the California Society of Healthcare Engineers (CSHE). www.fcia.org



Code of Practice for Project Management for Construction and Development, 5th Edition



Chartered Institute of Building
ISBN: 978-1-118-37808-3
September 2014, Wiley-Blackwell

Good project management in construction relies on balancing the key constraints of time, quality and cost in the context of building functionality and the requirements for sustainability within the built environment. Thoroughly updated and restructured to reflect the challenges that the industry faces today, this edition continues to drive forward the practice of

construction project management. The principles of strategic planning, detailed programming and monitoring, resource allocation and effective risk management, widely used on projects of all sizes and complexity, are all fully covered. The integration of Building Information Modelling at each stage of the project life is a feature of this edition. In addition, the impact of trends and developments such as the internationalisation of construction projects and the drive for sustainability are discussed in context. The Code of Practice will be of particular value to clients, project management professionals and students of construction, as well as to the wider construction and development industries. Much of the information will also be relevant to project management professionals operating in other commercial spheres.

e-Plan Soft

ePlanCheck™ is a comprehensive, web-based plan review system that enables individuals/organisations to upload plans to be reviewed digitally by Government or 3rd party agencies. It allows agencies to securely store and organize data electronically in a system that facilitates collaboration, letting reviewers work together faster and more easily. Our company was founded by architects, engineers and construction industry experts with decades of experience behind them. Their input has enabled the addition of unique features not found in other legacy products. Since EPC is web-based, there is no bulky desktop software to load. ePlanCheck integrates with most permitting systems and can work with your town/city to develop a public access portal and e-permitting system if needed.
Larry Zaret Vice President of Sales & Marketing
lzaret@eplansoft.com
www.eplansoft.com

Looking Forward Expo 2015

Milan's New Downtown



Dott. Eur Ing Saverio Iuzzolini PEng (UK)FSPE, CEnv MSEE(UK), MIET(UK), IPF(F)

After a decade of real estate values variation, Milano is ready to host EXPO 2015 with a huge renovation building project in Porta Nuova and Porta Garibaldi town areas.

Porta Nuova Project is a redevelopment, urban and architectural, plan on the large downtown areas of Isola, Varesina and Garibaldi old town districts. The plan started in 2005 and will be finished at the end of 2014, just for the starting time of EXPO 2015.

Porta Nuova Project lays over 340,000m² of total surface divided into three main part with independent building site named after an old original district name:

- **Porta Nuova Garibaldi**
- **Porta Nuova Varesine**
- **Porta Nuova Isola**

The Porta Nuova Project is the bigger building site in Europe. A total amount of asset value of two billion Euros, two thousand employees, twenty of the most famous architectural firms. More than twenty new buildings: skyscrapers, office complex, cultural premises, urban villas. Currently in progress are underground tunnels (as for Underground line M5-Metro 5) and various underground car parks. The remarkable architecturally designed scheme, featuring a high building, will be encompassed by large residential green spaces, esplanades and cycle paths. The principal aim of the project is to "recompose the urban framework", developing the existing neighborhoods that will be connected to the new district by a continuous pedestrian network incorporating squares, footpaths, pedestrian and cycle bridges (such as that built on the Melchiorre Gioia Road linking the new Porta Nuova Gardens). The Porta Nuova Project covers 340,000m² and includes 57,000m² of office buildings,

11,000m² of commercial premises, 160,000m² of pedestrian areas, 20,000m² of cultural and amusement spaces, 4000 car parking places and 370 luxury apartments.

The main buildings are:

Unicredit Tower

A development of sustainable buildings in steel and glass, designed by Argentinian architect Cesar Pelli, "around a circular square". The square named "podio" (podium) with a diameter of 100m is a pedestrian area raised 6m above street level. The office blocks are constructed over 50,500m² while the commercial area spreads out over 6370m² providing two floors of shops.

The 231m tower is the highest in Italy and incorporates an 85m top antenna.

A footpath between the buildings designed from Munoz & Albin and Cino Zucchi Architetti connect the podio with Corso Como, Milan's famous "fashion street".

Corso Como Houses

These residential buildings are designed by Muñoz & Albin from Houston, in collaboration with Italian engineering and architectural firm Tekna Spa, and have underground parking for 77 cars.

The buildings surrounding the connecting street between Corso Como and Torre Pelli Square.

Diamond Tower

Designed by Kohn Pederson Fox Associates provides the Project's main skyscraper.

140m high with 30 floors located between Liberazione Avenue and Galilei Street, close to Repubblica Square and the underground station.

The pattern, as an irregular prism and the glass windows, give the building the shape and iridescent colour of a diamond. The main building is connected with other small buildings named diamantini, (small diamonds), these are an integrated part of the building and with the nearby buildings on Liberazione Avenue the project creates an office complex of 61,500m² area

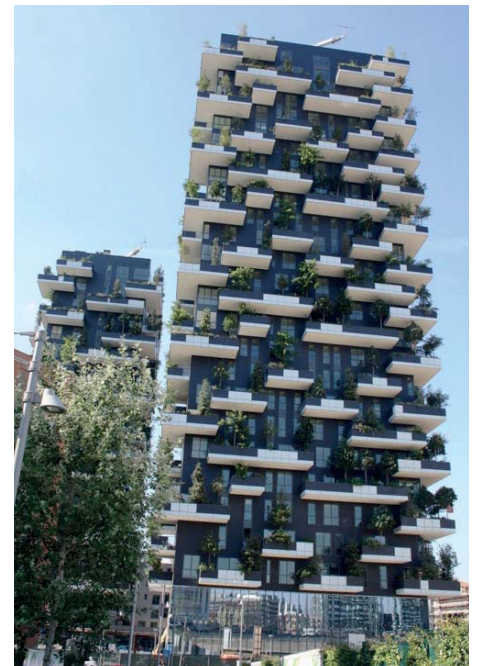
Solaria Tower

Solaria Tower (simply called SOLARIA) is also one of the most important architectural works of Progetto Porta Nuova at 143m it is the tallest housing building in Milan and in Italy.

Designed by Arquitectonica di Miami and Dolce Vita Homes

Vertical Woods

Designed by Stefano Boeri. Two housing buildings: Tower E, 110m high, 24 floors and Tower D, 76m high with 17 floors. The significant feature of these buildings will be the 900 trees planted on 8,900m² of terrace. Providing 6300m² of offices within the building the scheme also includes public spaces, pool and gym. The building includes 500m² of PV roof and geothermal heating equipment.



The building reinforces and emphasises the historic Isola neighborhood, standing between Via De Castillia and via Confalonieri, providing a backdrop, allowing the creation of a wide footpath.



Lombardia Palace

A building complex 33,700m² placed within Melchiorre Gioia, Restelli, Algarotti and Galvani Streets. Designed by Pei Cobb Freed & Partners from New York and by Caputo Partnership and Sistema Duemila from Milan.

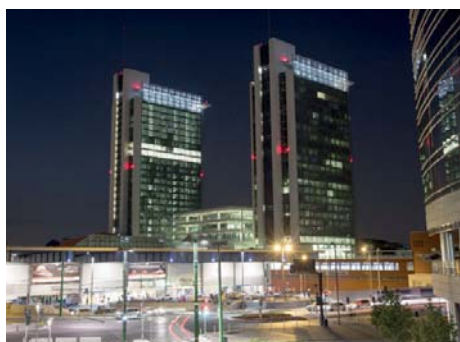
Located within the Isola neighborhood in front of Porta Nuova Gardens. The tallest tower is 161m forming part of the modern cluster of the latest skyscrapers in Milan.



Garibaldi Tower

Constructed between 1984 and 1992 by the Ferrovie dello Stato (National Railways), is currently owned by Maire Tecnimont, the period between 2008 and 2012 saw the recladding by CMR Space Partners.

The tower rises on Sigmund Freud Square and stands above Milano Porta Garibaldi Railways Station, becoming part of the new cluster of skyscrapers in Milan.



Pirelli skyscrapers

The Pirelli Tower or Pirelli Building, commonly known as the "Pirellone", is the location of the headquarters of the Lombardia Regional Council. It stands on the southwest corner of Piazza Duca d'Aosta, alongside the Milan Central railway station. Pirelli held the record for the tallest building in the European Union from 1958 to 1966 (127,1m), the year the South Tower in Brussels was constructed.



On April 18, 2002, a light aircraft piloted by the Italian-Swiss Luigi Fasulo, 67, crashed into the 26th floor of the building, severely damaging the external structure and gutting two floors. The collision resulted in three victims: the pilot and two women employees of the Regione Lombardia. Today, the 26th floor is home to the "place of memory" dedicated to the two women who died, Anna Maria Alessandra Santonocito and Rapetti.

Volturno 33 - V33

The building is located in Isola - Porta Garibaldi, the district was affected by various urban redevelopment and architectural schemes that renewed the Centre of Milan. In the Porta Nuova Project, the V33 is located on Volturno Street, contextualised in the overall project,



whilst not a formal part. Designed by the Vudafieri Saverino Partners. It is a transfer of volumes that incorporated the renovation of the building, reaffirms its development in height.

This is an existing building with 8 floors, raised floors with 7 others, and consists of a total of 15 floors above ground, 50.26m high, 2 underground floors and 1 basement.



In this project Mr. Saverio Iuzzolini was and is the Chief Engineer Health and Safety Manager, delivering high surveillance, management and organization of security for the renovation and expansion.

The features of the residential building include the high energy savings, the gross floor area of 2,300m² [including attached garages in 33 Volturno Street].

The existing building structures incorporate columns and beams with reinforced concrete floors and masonry. These structures have been properly reinforced, as required, after static verification. They have been constructed in accordance with the new design requirements and distribution, with new parts (walls and columns) of steel HEA and lightweight floors with polystyrene blocks type PLAST-BAU.

The project incorporates a centralized system for domestic hot water that was constructed on the flat roof in conjunction with a Solar thermal collector integrated with PV panels.

Milan has experienced a dynamic period and EXPO 2015 will provide many opportunities for individuals and organizations to share in and enjoy both the structure and culture of the environment.



By Dott. Eur Ing Saverio Iuzzolini PEng(UK) FSPE, in collaboration with Mr. Roberto De Girardi PEng (UK) MSPE

Breaking the “Code”



Bletchley Park Mansion

As Engineers we are always faced with figures, their manipulation and use. Over time it has been a case of fingers, abacus, slide rule, scale rule and the “ipad” – security often being the overriding factor as to how to “engineer safety”.

The 1930's presented a mixed social and economic environment within the UK. A period of tension, societal differences and difficulties linked to developments within the UK and Overseas in particular, Europe. Bletchley Park Mansion set within rural Buckinghamshire provided a place for rest and relaxation for parts of society and the

accompanied by one of the best chefs at the Savoy Hotel to cook their food. Appearances were deceiving, the small group of people who turned up at Bletchley Park were far from relaxed. A complex team, members of MI6, and the Government Code and Cypher School (GC&CS), a secret team of individuals including a number of scholars turned Codebreakers. A team with a purpose - would Bletchley Park work as a wartime location, well away from London, for intelligence activity by GC&CS as well as elements of MI6. Their mission was to crack the Nazi codes and ciphers. The most famous of the cipher

systems to be broken at Bletchley Park was the Enigma, not forgetting the large number of lower-level German systems to break as well as those of Hitler's allies. At the start of the war in September 1939 the codebreakers returned to Bletchley Park to begin their war-winning work in earnest. The “Poles” had originally broken Enigma in 1932, when the encoding machine was

undergoing trials with the German Army, however, the cipher altered only once every few months. The advent of war saw the cipher change at least once a day, giving “159 million, million, million”, possible settings to choose from. The “Poles” informed the British in July 1939 that they needed help to break Enigma. The invasion of Poland was imminent..

Demands on the mansion increased significantly as more and more people arrived to join the codebreaking operations. They were moved into large pre-fabricated wooden huts set up on the lawns of the Park. For security reasons, the various sections were known only by their hut numbers. The first breakthrough, into Enigma, came around the 23 January 1940, when the team working under Dilly Knox, with the mathematicians; John Jeffreys, Peter Twinn and Alan Turing, unravelled the German Army administrative key that became known at Bletchley Park as ‘The Green’. Encouraged by this success, the Codebreakers managed to crack the ‘Red’ key used by the Luftwaffe liaison officers co-ordinating air support for army units. Gordon Welchman, soon to become head of the Army and Air Force section, devised a system whereby his Codebreakers were supported by other staff based in a neighbouring hut, who turned the deciphered messages into intelligence reports.

Secrecy shrouded the fact that Enigma had been broken. To hide this information, the reports were given the appearance of coming from an MI6 spy, codenamed Boniface, with a network of imaginary agents inside Germany. While this was pure fiction, there was a real network monitoring the Germans' every move. The ‘Y’ Service, a chain of wireless intercept stations across Britain and in a number of countries overseas, listened in to the enemy's radio messages. Thousands of wireless operators, many of them civilians but also Wrens, WAAF personnel and members of the ATS, tracked the enemy radio nets up and down the dial, carefully logging every letter or figure. The messages were then sent back to Bletchley Park (Station X) to be deciphered, translated and fitted together like a gigantic



Code Breakers in action

arrival of “Captain Ridley's Shooting Party” provided a major talking point. ‘Captain Ridley's Shooting Party's’ arrival at the mansion house in late August 1938 was to set the scene for one of the most remarkable stories of World War Two. A visible aura, friends enjoying a relaxed weekend together at a country house



Enigma Machine



Lorenz Machine



Bombe display

Breaking the “Code” (continued)

jigsaw puzzle to produce as complete a picture as possible of what the enemy was doing. The Germans were not the only targets for Station X - by breaking Japanese ciphers, the Codebreakers were able to monitor the Japanese preparations for war. The suggestion that they knew of the imminent attack on Pearl Harbor but kept quiet in order to ensure America joined the war is nonsense. But their expertise undoubtedly gave great assistance to the American codebreakers. Perhaps Bletchley Park's greatest success was still to come with the breaking of the Germans' strategic ciphers. These complex ciphers were used to secure communications between Hitler in Berlin and his army commanders in the field. The intelligence value of breaking into these was immense. Initial efforts were manual and successful, but

could not keep up with the volume of intercepts. Under Professor Max Newman the 'Newmanry' started to devise machines to mechanise the process. This ultimately led to the design and construction by the brilliant General Post Office (GPO) engineer Tommy Flowers of 'Colossus', the world's first semi-programmable electronic computer. The process of breaking Enigma was aided considerably by a complex electro-mechanical device, designed by Alan Turing and Gordon Welchman. The Bombe, as it was called, ran through all the possible Enigma wheel configurations in order to reduce the possible number of settings in use to a manageable number for further hand testing. From that moment on Bletchley Park began receiving a huge influx of resources and a major building programme ensued to create the space necessary to house the ever

increasing workforce. The Bletchley Park Trust has been investing an £8 million Heritage Lottery grant as the initial phase of a restoration programme. This exciting project has seen the transformation of the formerly derelict wartime Codebreaking building, Block C into a vibrant Visitor Centre opening for the enjoyment of visitors. In addition, the iconic, but currently derelict, Codebreaking Huts 3 and 6 are to be sympathetically restored and fitted with light-touch interpretation for visitors to experience how it was to work in wartime Bletchley Park. Finally, the landscape will return to its 1940's appearance enabling visitors to step back in time. Contact: Katherine Lynch; klynch@bletchleypark.org.uk Images: Shaun Armstrong; www.mubsta.com www.bletchleypark.org.uk

GTC Launches Advanced Satellite Asset Tracking Solution using SPOT Trace and GTCTrack

Cost-effective cloud based mapping solution

Global Telesat Communications Ltd (GTC), specialists in satellite tracking, today announced



the launch of their most cost-effective satellite asset tracking solution to date. Utilizing the new SPOT Trace Satellite Tracker and their GTCTrack mapping portal users can track vehicles, motorbikes, caravans, motorhomes and any other assets they wish to monitor.

Tracking systems may use GSM networks however SPOT Trace transmits using the Globalstar satellite network ensuring no loss of coverage throughout the UK, Europe and the majority of most other land masses around the world.

"Asset tracking is becoming more and more sought-after and customers have shown great interest in our SPOT Trace solution – not only does it provide near global coverage but it is also offered at a price to rival traditional tracking providers" said David Phipps, Managing Director of GTC.

UK Consultation – Technical changes to the Housing Standards & Building Regulations

Legislation and the supported guidance within the UK is always under review. The politicians talk about regulation, over-regulation, de-regulation and better regulation within the Local, National, European and International setting. As Professional Engineers we are all looking for legislation and regulation to be "simple" in content and "deliverable" in context.

The latest consultation seeks to provide an opportunity for all those affected and involved within the design, construction and use of the built environment to respond to the latest initiatives.

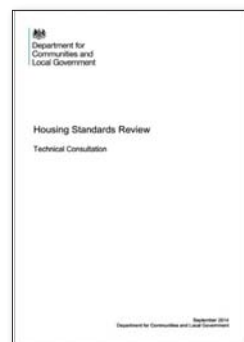
The consultation is open for comment and closes on 7th November 2014 at 11.45pm

The consultation addresses the:

- Housing standards review: technical consultation
- Draft Approved Document G: water efficiency
- Draft Approved Document H: solid waste storage standard
- Draft Approved Document M: access standard
- Draft Approved Document Q: security standard
- Draft nationally described internal space standard

The intent within a consultation is as stated below; "These new standards will underpin the delivery of high quality housing whilst ensuring that the overall cost of development is reduced. This includes for the first time the introduction of Building Regulations for security standards to ensure homes are better protected from crime; and optional Building Regulation requirements, which can be introduced where justified by need and viability for age friendly and wheelchair user housing standards to meet the needs of older and disabled people, and for higher water efficiency to ensure that new development is sustainable.

In addition, we will have published a national space standard for new dwellings to enable local authorities, communities and neighbourhoods to influence the size of development in their local area". www.gov.uk/government/consultations



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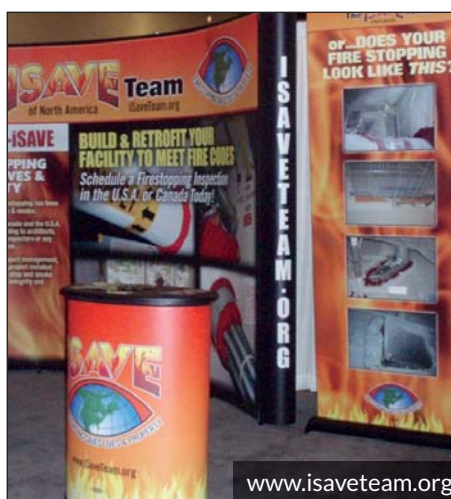
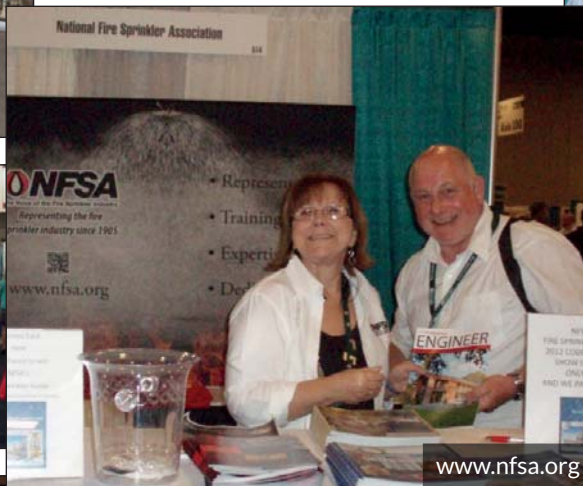
News, engineering, technologies; Share it with us!

Please forward articles up to 1000 words to: david@tdrg.co.uk (Vice President International)

ICC Conference & Exhibition 2014, Fort Lauderdale USA



The event provided the opportunity for Building Officials to increase their current awareness of materials, technologies, engineering developments and their application throughout the USA and Overseas.



Travis Perkins Group Communicates Self-Build Expertise Through Buildstore Partnership



**Paul Joyner,
Managing Director
of SBS**

Leading brands from the Travis Perkins Group now have a permanent presence at the BuildStore Trade Village in

Swindon to clearly communicate the whole package solutions it offers to the self-build and renovation market. The brands, which include Travis Perkins, Plumbing Trade Supplies (PTS), Sustainable Building Solutions (SBS), and City Building Supplies (CPS) have joined

together with suppliers Solfex, Panasonic, and Uponor to create the informative stand. The space will inform BuildStore visitors about the complete self-build solution that the Travis Perkins Group offers, from ground assessments to roofing materials.

SBS is promoting the unique support services it can provide to self-builders including its series of specified technical drawings for brick and block construction, using everyday building materials and techniques, in addition to specific Part L solutions.

Paul Joyner, Managing Director of SBS, said: "We are in the unique position of being able to provide a complete end-to-

end solution through the vast array of services and products that the leading brands of the TP Group offers. SBS is a central resource for self-builders wanting to ensure effective building fabric and efficiency which is of growing importance when creating a high-quality, new-build property."

The BuildStore National Self Build & Renovation Centre is a 67,000 sq ft facility which features over 250 suppliers, each with a permanent presence at the Swindon-based centre.

Find out more at:

www.buildstore.co.uk.

For further information on SBS and call the SBS helpline on 0800 688 8388 or email helpline@tpsbs.co.uk

For further information please contact Rose Kilby or James Sherriff at

Willoughby PR on 0121 456 3004 or email travisperkins@wpragency.co.uk



PROMOTE YOUR SOCIETY - TIES

Ties are available in Silver Grey, Navy and Maroon with the Society Logo picked out in gold

£11.50 (including postage and packing)

email: enquiries@professionalengineers-uk.org


SUPPORT YOUR SOCIETY -

Lapel Badges

Lapel Badges are available from the Society, £3.00 each (inclusive of postage)

email:

enquiries@professionalengineers-uk.org



Firestop Contractors International Association
4415 W. Harrison St., Suite 436
Hillside, IL 60162
Ph: 708.202.1108 Fax: 708.449.0837
www.fcia.org

This year's Conference will be held at the Naples Beach Hotel & Golf Club in Naples, FL. The Conference kicks off Tuesday, November 4, 2014 and wraps up Friday, November 7, 2014. The Draft Agenda is as follows:

Tuesday

- FM and UL/ULC Accreditation Firestop Exams and Prep Courses

Wednesday

- Session with the International Accreditation Services (IAS) on Special Inspection Agency Accreditation and Firestopping
- Annual Ray Usher Golf Outing, benefitting the Bob LeClair scholarship fund which funds scholarships for Fire Protection Engineering Students

Thursday

- Education sessions led by The Joint Commission, the American Society of Healthcare Engineers, the University of Minnesota and others, covering a range of topics from FM and UL/ULC Accreditation updates to code updates, ICC/NFPA codes and standards to infection control in buildings
- Newly-formatted Awards Luncheon
- 15th Anniversary Beach Party

Friday

- Sessions covering Effective Compartmentation and Firestopping's role in smoke control from the National Research Center of Canada & Fire Testing and social media strategies and what it means for contractors
- Open Microphone session where attendees can ask questions of, voice concerns to and express interest for future Conference topics with current and past Board Members

The Firestop Contractors International Association is a worldwide professional trade association of contractors, manufacturers, consultants, distributors and manufacturer's representatives dedicated to the installation and maintenance of life safety firestop systems. Through active participation in the FCIA and related forums, members contribute to the advancement of the Firestop and Effective Compartmentation industry, as well as maintain exceptional knowledge of this specialized trade. Media Contact:

Lindsey Donley, FCIA Associate Director - lindsey@fcia.org
Bill McHugh, Executive Director - bill@fcia.org
<http://www.fcia.org>



LSA launches new Leadworker Register

The Lead Sheet Association

Industry Leaders Providing Technical and Training Support

Benefits

Apply

Why choose a Registered Leadworker?



The Lead Sheet Association has been developing and running successful training and qualification initiatives for many years. Now, due to an increasing demand from the industry it has created a new Register of Leadworkers to enable craftsmen to be quickly identified and enhance their professional status.

For many years employers and clients have been asking the LSA to recommend good quality, appropriately trained leadworkers - the LSA believes the Register is the best way of doing this.

The Register has a dual benefit:

- Leadworkers will be able to demonstrate the level of skills they have when asked to take on work and when promoting their businesses
- Construction employers and the general public will be able to make sure the person they are selecting has the right level of competence for the job






The Register has four levels of competence depending on the qualifications gained and there will also be a number of **benefits** on offer to those on the Register including a 20% discount on LSA training courses and publications. The LSA aims to grow the range of benefits as the Register becomes established so please check out the website for an up to date list of benefits available.

To find out more about the Register, **subscription details, levels of competence required and the wider benefits** please visit www.leadsheet.co.uk/register

Application of the Wisdom of Scientific Feng Shui (Chinese Geomancy) and Environmental Sustainability



Feng Shui is a very ancient knowledge. The archeologists in China has discovered that in some ancient graves as early as 6,000 years ago, there were some symbols of the "Green Dragon (青龍)" on the left and "White Tiger (白虎)" on the right, these pictures signified that the practice of Feng Shui already existed as far back as 6,000 years ago.

Feng Shui is an ancient Chinese knowledge about the environment. It studies how the environment will affect human well being in terms of prosperity and harmony. The knowledge originated at least 6,000 years ago as accumulated experience and observation of primitive people in finding a good dwelling location where it is safe from severe weather, fierce animals, as well as convenient in finding source of food and water. This developed into a body of knowledge about the configuration of landscape, mountain and water contributing to a safe and prosperous site to live. As such Feng Shui is considered the main criteria in deciding whether the landscape is auspicious for burying Chinese ancestors or building a house or even a city.

The body of Feng Shui knowledge was first called "Kan Yu (堪輿)"- meaning observing the heaven and earth. Such "Kan Yu (堪輿)" knowledge and practice have been commonly adopted by the Chinese community, from Emperors, noble man to common people, in building their house and palaces as well as selecting a good site for burying their ancestors.

Wind and water (Feng and Shui) were important matters in the early Chinese era. Gentle winds meant good harvests and healthy live-stock. Springs and rivers provide food and ensure the survival of a settlement against drought. On the other hand, harsh winds destroy

crops, stagnant waters cause disease, and wild waters are a poor source for food. Wind, water, rain, fog, sun, and clouds were believed to be the energy of heaven and earth. Energy that moves is nourishing, and energy that is stagnant is destructive.

Under the living environment of good Feng Shui (i.e. gentle winds and constructive energy flow), people are equipped with constructive energy such that they can pursue their goals and perform better. With good Feng Shui living environment, there easily flourishes successful people and great man.

In around 250 A.D., a scholar called "KWOK Po (郭璞)" wrote a book called "The Book for Burial (葬經)" in which he described the shape of various auspicious mountain and water configurations in the landscape which could have powerful energy and are suitable for burying ancestors. In this Burial Book, Master KWOK Po (郭璞) described an auspicious site in a very important sentence: **"The energy of the dragon will be dispersed by wind, and will stop at the boundary of water (氣乘風則散，界水則止)"**

The above sentence from Mr. KWOK mentioned the "wind" and "water" as two key factors in determining an auspicious landscape. Since then, the subject was commonly known as "Feng Shui" – meaning "wind and water".

Feng Shui is an Ancient Science of Chinese Geomancy. The practice of Feng Shui may be defined as the science of putting human habitats and activities into harmony with the visible and invisible world around us, and it was at one time universal.

There are various definition of Feng Shui. Literally "Feng (風)" means "wind" and "Shui (水)" refers to "Water".

Feng Shui (風水) means "Wind and Water." In its literal sense this refers to the topography of the earth, mountains, valleys, and water

courses, in which their shape and size, direction and levels are created by the continuous interaction of these two powerful forces of nature.

Actually "Feng (風)" does NOT merely refer to "wind" and "air", but also to an abstract and intangible energy. Winds travels along the contour of the landscape and dissipates in water. If this energy is positive, it will interact with water to give "Sheng Qi (生氣)" (i.e. positive and constructive energy field), or benign energy. In contrast, "Sha Qi (煞氣)" (i.e. negative and destructive energy field) travels in straight lines and is detrimental because it "kills" your luck.

Wind carries energy into our house through doors, windows, chimneys and air vents. In the modern world, "Shui (水)" includes water NOT just in rivers and seas, but also in mad-made reservoirs, pipes and drains. In modern cities, "Shui (水)" also refers to roads, streets, highways, underground transmit, and railway lines. Thus it encompasses the tangible, physical aspect of our environment.

The traditional Chinese had discovered that wind and water carry the invisible life energy (they named it as "Qi" (氣)). These natural forces exist in our surroundings and have a significant impact on our habitat. These abstract forces move dynamically to a predictable pattern. They can influence us in positive and negative ways.

Traditional Feng Shui has always been treated as superstitious and NOT scientific. The science of Feng Shui (Chinese Geomancy) is a study of the effects of environmental energies, the operating principles of these energies, and the steps that can be taken to improve circumstances by harmonizing environmental forces and incorporating the environment's inconspicuous forces into architectural and landscape design.

The awareness of energy or power flowing through the land is hardly restricted to Asiatic cultures. In the Celtic tradition, the earth is diffused with spirit, and its power is present in the rocks, caves, hills, springs, rivers, wells, and trees. When energy moves, it travels through the ley lines, or the Old Straight Tracks. When it is still, it is concentrated in grottoes, springs, and groves. The ancient people of Europe experienced these energies directly and understood that they were the source of power that renewed the earth. If the places of power were damaged or destroyed, then life on earth would NOT be renewed and everything would wither and die.

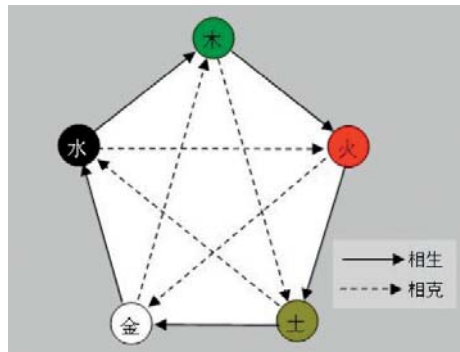
The sense that there is power in nature was central to the ancient Greeks as well. From the poetry of Hesiod we get the impression that nature is alive and that this power is



“generous.” It gives freely to nourish all things inter-twined with it, and its power is primarily concentrated in caves, streams, and mountains.

Even when Celts and the Greeks settled in towns, the architecture that was built in places of power was a linkage between earth spirit and human existence. Any incorrectness in orienting such structures or errors in selecting the site would bring uncontrollable disaster.

The land has become real estate that can be



bought and sold, and is no longer being felt as a source of energy and nourishment. Our modern temperament has a tendency to dismiss the indigenous and ancient views of the environment as primitive and the product of illiterate minds, just as many “objective” and “detached” observers have regarded Feng Shui as superstitious belief. To recover the meaning of the environment, people should see the land in a radically different way. Some geographers and ecologists have already called for a change in our geographical experience of the environment to include the entire realm of feelings, and the acts and experience of individual in which one should apprehend oneself in a distinct relationship with environment. It is required to conceive the environment as a network of potential places

capable of inviting and sustaining a complex of physical, emotional, intellectual, and spiritual interactions.

In the ecologically centered approaches to the environment, “landscapes” take on the very character of human existence. They can be full of life, deathly dull, exhilarating, sad, joyful or pleasant. Feng Shui can help us recover this experience of nature.

To experience the power of land, people should set aside their views that the nature is composed of inanimate objects. In the world of Feng Shui, the land is alive and filled with energy. It breathes, it feeds, it sleeps, and it frolics. It is sometimes playful, sometimes mischievous, and at times it can even be malicious and angry.

Apart from a sense of openness to nature, we need to work on the relationship between the natural landscape and the structures we build on it. When we build our buildings in the environment, we need to ensure that a harmonious relationship exists between the natural and the built. In this regard, Feng Shui can give us guidance. Some buildings blend with the environment, while others clash with it. In Feng Shui sense, buildings with irregular shapes and sharp features are NOT conducive to both people and environment. Buildings that have long, dark corridors stifle those who inhabit them because they shut out the “Yang (陽)” energy of the sun. These ancient guidelines from Feng Shui are similar to the ecologically oriented approaches in modern architecture.

Actually Feng Shui advocates living in harmony with the universal environment and its energy field, so that there is a proper balance between the forces of nature. Feng Shui contends that the environment is crowded with invisible but powerful energy fields (some auspicious and some pernicious) and that these energy fields carry with them

either harmony or discord, health or sickness, prosperity or poverty.

The practice of Feng Shui is concerned with harnessing the energy fields that are auspicious (i.e. what the ancient Chinese refer to as “the Dragons’ cosmic energy lines” or “Sheng Chi (生氣)”). Auspicious energy fields travels in a meandering manner. Feng Shui is also about avoiding inauspicious energy fields that represent “killing energy lines” or “Shar Chi (煞氣)”.

Feng Shui practitioners strenuously warn against sleeping, sitting, working, eating, and living in places that are hit or attacked by the pernicious and invisible killing energy lines. Generally, killing energy lines is caused by the presence of sharp, pointed objects or structures that convey bad Feng Shui. Individuals are inadvertently harmed if killing energy lines point directly towards main entrance, bedroom, beds where people sleep, and desk where people sit.

Our destiny and luck cycles can be influenced by the Feng Shui. Luck refers to variations in our fortune – the ups and downs in our life. If we address the factors that control our luck, we can moderate the downs and maximize the ups and even transform a poor fate into a successful one.

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Fire Safety – FILL THAT GAP!

Fire safety provides a key focus when buildings are designed, constructed and used. It is recognised that critical elements identified within the design process should be the focus of site inspection and the owner/occupier of a building must be provided with a full fire strategy relating to both the design and use of that building. The problems associated with workmanship and quality are recognised by all and the Firestop Contractors International Association of America acknowledges that Life Safety affects everyone, whether aware or not. It is a universal concern, and Firestopping and Effective Compartmentation are the tools to ensure Life Safety by restricting fire from spreading and structural collapse in buildings. Healthcare building occupancies are some of the most compartmented, regulated

occupancies. Staff and Patients in healthcare occupancies need many services from water to gasses. The large amounts of piping, cables and air handling ductwork needed to bring those services to patients mean holes in walls - which means holes in the Fire and Smoke Barriers intended to protect the occupants and stop the spread of fire and smoke. Constant changes and new piping penetrate walls and floors, making managing fire and smoke barriers a monumental task.

In order for Firestopping and Effective Compartmentation to work, the holes need to become fire resistance rated and smoke resistant, just like the walls. Specific design standards, rigorous FM 4991 and UL Qualified Contractor Program installation protocols, systematic and thorough inspections and comprehensive ongoing maintenance are required to keep a tested

and listed Firestop SYSTEM working for the life cycle of the building. One detail missed, one step skipped and the system is voided and the occupancy has the potential for breach.

To support the need for compliance the Firestop Industry Conference which is a week-long “educational conference” focusing on educating contractors, healthcare building professionals, as well as specifiers, building code officials, special inspection agencies, architects, general contractors and building owners on several critical aspects of the Firestop and Effective Compartmentation industry, including the essential need for the SYSTEM protocol to be strictly adhered to. The conference is to be held November 2 – 7 in Naples, Florida.

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When Wetter May Be Wiser - Designing for resilience in areas subject to flooding

Recent storms of force and impact far greater than previously imagined possible have been devastating. The latest estimate in the wake of last year's Hurricane Sandy, which breached barrier islands and swept inland into the Mid-Atlantic States, is closing in on \$70 billion. In the fall of 2011, the double hit of Hurricane Irene and Tropical Storm Lee caused widespread disaster and distress, even extending inland in New England. In 2005, the Gulf Coast reeled under the dual impacts of Hurricanes Katrina and Rita within a month.

While protection of human life is always the highest priority, design/construction, Professional Engineers must also be concerned with protecting immovable property in the face of flooding disasters. The power of water can overcome buildings, pushing them from their foundations, deforming and even buckling their walls. This article provides an introductory focus on protecting non-residential structures housing businesses, emergency care services, government agencies, water treatment and power generation facilities, and other essential components of our lives. SmartVent will be presenting at the Flood Defence EXPO in London UK, 4/5 December 2014. www.flooddefenceexpo.co.uk

Identification of regulated areas

The National Flood Insurance Program (NFIP) is the nation's primary unifying approach to protecting lives and property from flood hazards. Created by the 1968 National Flood Disaster Protection Act, it is now under the oversight of the Federal Emergency Management Agency (FEMA). Although NFIP was meant to create a large national pool of policy-holders to lower flood insurance premiums, it was not long until it became evident there needed to be some kind of standards for building in floodplains to encourage wiser use of those risky areas and minimize payouts on federal flood insurance claims.

NFIP's primary approach to reducing flood risks is through adopting minimum standards for placement and design of structures located within identified 'one-percent annual-chance flood-hazard areas'. It is significant the goal is to reduce, rather than eliminate, those risks. Hazards can be minimized, but not completely eliminated without simply avoiding those areas. Even outside identified floodplains, there are mounting damages as development translates to increased impervious surface within a watershed, making the area less able to absorb surface waters.

Floodplain management basics

The decision-making process of determining how to reduce risks when we cannot avoid them is termed 'floodplain management,' and can include both structural methods to try to hold water at bay, such as dams and levee systems, and non-structural methods that modify how humans interact with their environment. Non-structural approaches include zoning, subdivision, health, and building codes to safeguard lives and property from direct and indirect harm associated with inundation events.

Mitigating against flood risks

Mapped areas within SFHAs [Special Flood Hazard Areas] include both A- and V-type zones—the distinction between them being the absence or presence of a defined extent of wave action and storm surge. The various means of attempting to reduce losses from flooding disasters are referred to as 'mitigation measures,' and the appropriate mitigation approach varies with the identified flood zone in which a building is located.



Floodproofing

In general, floodproofing is the implementation of structural and non-structural methods to reduce flood damage to a structure, its contents, and related utilities and equipment. The object is to minimize both hydrodynamic and hydrostatic pressures of floodwaters against the walls of a structure—'hydrodynamic' referring to the force of moving water and 'hydrostatic' to the weight and pressure of still water.

Building standards

Building standards established in Chapter 16 of IBC [International Building Code] and in ASCE [American Society of Civil Engineers] 24 reflect and support the minimum floodproofing and construction criteria established by FEMA's [Federal Emergency Management Agency] regulations and Technical Bulletins.

Dry floodproofing

Among considerations in deciding between dry and wet floodproofing is the limitation of how much additional hydrostatic pressure will be exerted against the structure's walls, being the load of floodwaters as mentioned in IBC. Dry floodproofing is limited by what the structure can bear; formulas are supplied by FEMA in Technical Bulletin 3 for lateral hydrostatic forces, buoyancy, hydrodynamic forces, and debris impact.

Dry floodproofing requires extensive emergency operation planning, some of which is related to site selection. Areas subject to rapidly rising high velocity floodwaters do not allow adequate evacuation warning time.

Wet floodproofing

Wet floodproofing, also known as flood-venting, requires automatic entry and exit of floodwaters during one-percent annual chance flood events. This technique may be employed without a variance in fully enclosed areas below a structure's lowest floor when those enclosed areas are used solely for parking, building access, or limited storage. Such construction must employ flood-resistant materials, as must any facilities in these locations. For the best protection and lower insurance rating, mechanical and electrical systems, heating and ventilation equipment, and liquid storage containers should be located above BFE, which can entail placement on platforms or suspension from the enclosed area's ceiling. In contrast to dry floodproofing, wet floodproofing is considered a passive approach because it involves no human intervention to be activated—flood vents must open automatically to relieve hydrostatic pressure on the walls of the enclosure as flooding occurs. While safety and evacuation planning are still necessary, no one must stay behind to ensure building protection.



Non-engineered and engineered wet floodproofing openings

Any opening allowing for automatic entry and exit of floodwaters may qualify as an appropriate flood opening. For example, simply leaving a block out of a foundation wall could be acceptable. Communities often require screening over such openings to limit entry of insects and rodents—this may still be a serviceable flood opening if the screen does not impede water from entering and exiting, and there is no covering preventing water from entering or requiring human presence and active involvement to open or remove it. This is an example of a non-engineered flood opening.

Engineered openings fall into two categories:

- those unique and specifically designed and certified for an identified structure by the appropriate licensed design professional as meeting design and regulatory requirements;
- those mass-manufactured and issued an Evaluation Report by the International Code Council Evaluation Service (ICC-ES).

For individually designed engineered openings, the responsible design professional must provide a certification including the individual's name,

address, signature, type of license, license number, the state in which the license was issued, and the individual's signature and seal.

Design professionals may find a benefit to specifying mass-manufactured engineered openings in the ability to rely on the manufacturer's certification. Alleviation of individual liability requires proper installation of the appropriate number of ICC-ES evaluated flood openings in the proper locations. By visiting the ICC-ES site, all manufacturer claims can be checked to ensure the products are in fact certified and listed. Testing must account for and evaluate debris clogging, automatic opening, and the opening's size to relieve hydrostatic loads. Certified products are identifiable in the field



by a label containing model number and ICC-ES certified coverage.

Conclusion

Wet floodproofing methods reduce structural stresses caused by hydrostatic pressure during flooding. When installations comply with building standards and floodplain management regulations, this approach may offer reduced construction costs and increased public safety. Engineered openings provide the additional benefit of certification regarding performance.

Tom Little, CFM, CGP, studied the science of flood mitigation for eight years with a concentration in proper flood-venting techniques. As Vice President of Smart Vent Products, he is responsible for the education programs training architects, engineers, code officials, and other trade professionals on the importance of proper flood mitigation techniques. Tom works directly with design professionals to ensure floodplain projects comply with local, state, and federal requirements. He is a Certified Floodplain Manager (CFM) through the Association of State Floodplain Managers (ASFPM).

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A comprehensive paper supplementing and expanding on the above focus will be placed within the article section on the SPE website

What can be learnt from the Somerset flooding events?

Representatives from government, the water industry, local authorities, large land owners and NGOs gathered at the Environmental Water Management Conference, in September. The event was organised by UK water industry business journal, Water & Wastewater Treatment (WWT). Following the Somerset flooding events that dominated headlines earlier this year, the conference was organised to address the challenges of balancing economic and environmental decisions. Dominica Andrews, conference content manager at Faversham House, said, "UK water utilities are facing conflicting pressures of trying to maintain an affordable service, attract investment and deliver on environmental responsibilities. Collaboration, innovation and integrated solutions are essential to move forward. The Environmental Water Management Conference has been developed to break

down barriers and help stakeholders move towards an integrated approach to land management and multi-functional solutions."

The conference formed part of WWT's flagship event, Sustainable Water, which is in its third year. Speakers and panellists included: Lord Chris Smith, chairman of the Environment Agency; Tony Harrington, environment director at Dŵr Cymru Welsh Water; Dr. Tony Ballance, director of strategy and regulation at Severn Trent Water; and Dr. Diane Mitchell, chief environment advisor at the National Farmers Union.

Topics included: sustainable implementation of the Water Framework Directive; linking qualitative value with quantitative financial data to develop wider metrics for decision



making; 21st century catchment management; integrating flood risk management with resilience to climate change; water supply system resilience; and integrated approaches to land management and multi-functional solutions.

The Environmental Water Management Conference was sponsored by The Met Office with support from the Environment Agency; British Water; CIWEM; Institute of Water; SBWWI; SWIG; Knowledge Transfer Network; Water & Sewerage Journal; Global Water Intelligence; Utility Week; WET News and edie.net.
www.sustainable-water.co.uk

Canal Engineers

The men who helped mould the industrial world

The canal boom in this country lasted about 50 years. During that time the civil engineering seen was on a scale unheard of previously. Huge works were undertaken and carried out successfully. Where did this engineering ability and aptitude come from?

The boom started seriously in the middle of the 18th century. When it began the term "civil engineer" was unheard of, quite simply there was no such animal! Probably the two most important types of engineer at the time were the military and mining engineers. Mining engineers had the problematic job of digging the mines and at the same time devising a means of getting rid of the ground water that threatened to flood every single mine dug. One of the definitions of a mining engineer at the time was "engineers make engines for raising water by fire". Craftsmen such as millwrights were used to working with water as a means of providing power. So, despite there being no "civil engineers", there was plenty of brainpower, and a fair amount of muscle available to develop the canal system. The boom created hundreds of engineers who got involved in literally thousands of projects. Most of these projects did not develop beyond the surveying stage. It was during this period that some men came to the fore, their names being linked with so many of the projects of the time.

JAMES BRINDLEY 1716 – 1762

James Brindley was born to a well-to-do family in Leek, Staffordshire. The family were Yeoman farmers and craftsmen. Brindley received little formal education and at 17 he was apprenticed to a millwright in Macclesfield. His abilities were immediately recognised and once his apprenticeship was completed he set himself up in business as a wheelwright.



He designed and built an engine to assist the mine engineers in draining a particular difficult mine, the Wet Earth Colliery in Clifton, Lancashire. Three years later he built a machine for a silk mill at Congleton. He became well versed in the repair and improvement of mine equipment. His reputation grew rapidly and he came to the attention of the Duke of Bridgewater, a landowner and mine owner. He commissioned Brindley in 1761, to construct a canal to improve the transportation of coal from his coal mines at Worsley to Manchester. The canal was opened in 1761. This canal is often regarded as the first "modern" British canal although the Sankey Canal also has a good claim to this title. Recent research suggests that Brindley acted more as an assistant to Bridgewater's resident engineer, one John Gilbert. Gilbert used Brindley to overcome any knotty problems he encountered. One such problem was the need to lift the canal over the River Irwell at Barton. The Barton aqueduct carried the canal at an elevation of 39 feet over the river. This was a real engineering wonder and quickly became a tourist attraction. During the construction of the Manchester Ship Canal in 1893 the aqueduct was replaced by the Barton Swing Aqueduct which in itself also became a tourist attraction. As his fame spread Brindley became involved in work on 363 other canal projects. He had assistants obviously, and some of these men became well known in their own right. When Brindley died in 1762, only the Bridgewater, the Droitwich and the Staffordshire and Worcestershire canals had been completed. He set the standards for the majority of work that followed, primarily the dimensions of England's narrow canals and the craft that plied their trade on them. His canals have become known as "contour" canals, they

followed the contours of the landscape thus avoiding too many rises and falls in canal levels. Later engineers created the "cut and fill" system, creating embankments and cuttings to shorten the lengths of canals by using a more direct route. Perhaps his greatest contribution to the canal system was the method he devised of clay puddling to make the bed of the canal watertight. Brindley set the standard. Narrow locks became standard. Locks being 72 feet 7 inches long by 7 feet 6 inches wide. Each boat on the

Bridgewater canal was drawn by a single horse. This again became the standard system throughout. Brindley determined that one horse could tow a boat with 30 tons of coal as cargo, this, "one horse" system became the yardstick that was to become our standard method of determining the capacity of all engines, even to this day. These standards limited the size of boats obviously. Boats became, then, and are still called today, narrowboats. This standard limited the weight of cargo that a boat could carry, generally around 30 tons. Brindley, and his calculations would, in later years, make the canal system an uneconomical means of transporting freight. It is ironic that the practical creator of the then, modern canal system would be the very person that in the mid 20th century caused the decision to be made that it was impossible to work a 30 ton load economically, thus sealing the fate of the whole English canal system.

JOHN SMEATON – 1724 – 1792

Smeaton is the Englishman who coined the term, "civil engineer". Needing to talk to like minded people, he formed the Society of Civil Engineers in 1771. He began his working life as an instrument maker but became interested in wind and water mills as well as other sources of power. He was well known and respected and was a fellow of the Royal Society at the age of 29. He was the man that undertook the reconstruction of the Eddystone Lighthouse. He then became heavily involved in canal and river surveying. His most successful work was in Scotland (the Forth and Clyde canal) and in Ireland (the Grand Canal). In retrospect, his most important contribution to the canal system has to be the help and assistance he gave to William Jessop on the death of Jessop's father.

WILLIAM JESSOP 1745 – 1814

William was the son of a naval shipwright. Josiah (his father) worked with Smeaton on the Eddystone lighthouse project and they became good friends. On the death of Josiah, John Smeaton undertook the care and education of William Jessop. He trained him as an engineer. With this high class training behind him Jessop found plentiful employment on the many canal and river navigations that abounded at that time. He is regarded by many to be the greatest expert on canals and river navigation systems of his era. He was the engineer on the Grand Junction canal, now known as the Grand Union canal, in practical terms, the M1 motorway of the canal system. He also designed the East India Docks in London and huge dock improvements in Bristol. A man of great talent, Jessop was not as prolific as Brindley but it has to be said, his work has stood the test of time magnificently. The Grand Union canal has been almost unchanged from the time of its creation to present day. His son, educated by his father went on to design and create the famous floating dock system in Bristol; a design that is used throughout the world.

THOMAS TELFORD 1757 – 1834

Telford, like so many of his contemporary pioneering engineers, came from a very humble background. He started his working life as an apprentice stonemason. He was first noticed and came into some fame as a stone hewer working on Somerset House in London. Some of his ideas for improving established methods of working were looked at with great interest. As a direct result of this work he was given the task of reconditioning Shrewsbury Castle. It was while this work was ongoing that he was given the post of Surveyor of Public Works for Shropshire. He became assistant engineer to William Jessop on what was to become the Llangollen canal. The amazing cast iron aqueducts at Pontcysyllte and Chirk are his creations. There can hardly be a person in this country that is unaware of the Pontcysyllte aqueduct, it has become an icon of the canal age. The two aqueducts still remain standing and in everyday use because Telford postulated that the cast

iron troughs would be less likely to suffer from frost damage and leakages than the aqueducts designed by Brindley that used moist earth and clay as a lining. History has proved him correct. He was the engineer on what is now known as the Shropshire Union canal, making use of long embankments and cuttings. The spoil from the cuttings was used, in part, to create the embankments. Using this “cut and fill” system meant that canals no longer had to follow the contours of the landscape, they could take a more direct route. The cost of the cuttings and embankments was offset by the reduced mileage of the canal. An additional bi-product of the “cut and fill method is an improved road system, created to transport the spoil from one location to another. As freight increased on the canals certain bottlenecks were found. Telford undertook the engineering on the new Harecastle tunnel as the original, Brindley designed, tunnel was proving insufficient to keep up with the increased traffic. Both tunnels ran hand in hand for many years. For the same reasons he was asked to look at the mainline from Wolverhampton into Birmingham. He used the “cut and fill” system to eliminate the contour meanderings of Brindley’s design and reduced the travel time by over 40 percent and also the congestion caused by boats travelling in opposite directions having to manoeuvre past each other in the tight confines and bends of the original contour canal. Almost as a postscript to his working life, Telford worked on canals and canalised rivers in Europe, worked on the road and traffic systems in England and Wales as well as designing the Menai Suspension Bridge linking Anglesey with the North Wales mainland.

JOHN RENNIE 1761 – 1821

Rennie was very much the first of the “new breed” of engineer. He was university trained as an engineer. At that time this training covered a wide spectrum of work. In his vacation time he worked as a millwright. As an engineer, his first real commission was to design steam powered mills for the Albion Flour Company. He established his business in London at the time when science and engineering were



becoming the “buzz” words in London society. He became a well-known figure both within the business and social circles of London life. He started work on the Kennet and Avon canal as the senior surveyor. He then took over the job of engineer. The K&A is one of England’s most impressive canals in architectural terms, classical bridges and aqueducts stand alone as pieces of architectural splendour. Perhaps it was him concentrating on the “splendour” aspect that allowed Rennie to forget the most basic tenet of canal building. This is the need to ensure there are sufficient supplies of water at the summit level of the canal. This basic fact, Rennie seemed to overlook, causing the need for steam pumps to be installed to return the water to the summit that had been used by boats travelling downhill. He was also an engineer on the Rochdale and Lancaster canal, both also benefitting from this Rennie’s speciality of creating the impressive feeling of scale and class that typifies his engineering style. Rennie designed docks and was also heavily involved in designing and experimenting with diving bells.

It has to be said that although the “cut and fill” systems works, it does have its failures. The embankments on the Llangollen canal are prone to leaking, causing massive damage, as do other canal embankments and cuttings. Although a great improvement on the contour canal system, it is not perfect. All the embankments and cuttings built on canals that survive today are still there as testament to the engineers and the work crews involved in their original construction. In the same way that “civil engineer” became a term created by the canal boom, so did the term, Navvy. The teams of men, many from Ireland, went from one job to the next, creating navigations as they went. Hence the term navvy. It is an interesting fact aside that when the Regents canal was proposed, the original route went through Regents park. The route was altered as it was felt that the language and general behaviour of the navvies would cause alarm and upset to the local population. Something I’m sure today’s civil engineers also have to take into account.

Christopher Betteridge



Pontcysyllte Aqueduct

Planet Solar – A Venetian experience



As Professional Engineers a key goal is sustainability and linked to this is the maximization and use of renewable energy sources wherever possible. The following article by Luciano Bacco brings together the information contained within the “Planet Solar and lomocean websites” linked to his experience of visiting “Planet Solar” within the Venice setting.

Planet Solar was launched on April 13 in Boulogne-sur-Mer (France), PlanetSolar’s 2014 campaign came to an end in Venice, the boat’s last stop and prestigious winter home.

The 9,000 kilometer trip, spanned over 5 months of navigation, featuring stops in Atalayoun (Morocco), Monaco, and then Greece, where the ship was transformed into a scientific platform as part of the “TerraSubmersa” archeological expedition, led by the University of Geneva (UNIGE). This mission explored the prehistoric landscapes that had been swallowed up by the waters of the Kiladha Bay, with a view to their reconstruction and the identification of any potential traces of human activity.

The largest solar-powered ship ever built showed she could be used for concrete goals, reaffirming her position as a scientific platform, a multi-functional tool and formidable communication platform.

Thanks to a partnership with Vento di Venezia (VdV), the organization responsible for promoting the Island of Certosa (Venice), PlanetSolar will spend the winter in the Serene Republic.

During this period, which will last until May 2015, VdV and PlanetSolar will jointly organize public visits and private events.

The MS Türanor PlanetSolar adventures reflected the passions of the Stroehrer family (boat owner), in respect of solar technologies.

The goal was to conceptualize an idea that could prove the effectiveness of solar technology, and promote and develop that sector. The project demonstrated that the ship could exhibit technical prowess whilst providing concrete, useful goals for the benefit of society.

“The MS Türanor PlanetSolar, winner of 6 Guinness World Records™, not only completed the first solar-powered voyage around the world, but has also successfully carried out two unique scientific missions in 2013 and 2014, both of which were punctuated with prestigious stops during which countless visitors were able to visit the interior workings of the ship!

Today, we are very proud to note that after the success of her voyage around the world, PlanetSolar has undergone a perfect transformation, carrying out not only scientific missions, but also serving as a powerful tool of communication thanks to the enthusiasm she generates at each stop. Our expectations have been exceeded, and it is time for us to retire, and pass this unique ship on to a new owner.” Immo Stroehrer

Technical characteristics

The MS Türanor* PlanetSolar is the largest solar boat in the world. This catamaran operates solely on solar energy captured by its 512m² of solar panels. It took several months of research to finalise the vessel’s dimensions and ideal design whose primary purpose was to cross the blue planet from east to west.

The engineers had to optimise the collection and storage of the energy, as well as the boat's aerodynamics, its propulsion and choice of materials. The carbon structure of this power-driven futuristic vessel is lightweight and durable. The 512m² of photovoltaic panels supply 6 blocks of lithium-ion batteries, to date the largest mobile civilian battery in the world. This technology provides maximum power and energy density for a new type of autonomous navigation. When the batteries are full, the boat can navigate for 72 hours in complete darkness! Trials and testing brought about changes, the most significant being the replacement of the surface propeller propulsion system with a fully immersed system and changing the steering system for one that made it easier to manoeuvre the vessel.

Facts:

Construction – 64,000 hours
 Weight – 89,000kg total unladen weight including 20,600kg carbon fibre and 23,000kg of epoxy resin
 Height – 6.3m
 Length – 35m
 Width – 23m
 Draft – 1.5m
 Propulsion – 2 propellers with 5 tapered blades; 81cm diameter, maximum speed 600RPM
 Maximum speed – 14knots, 26km per hour
 Average speed – 5 knots, 9.25km per hour
 Photovoltaic cells – 512m²; 29,124 cells at 22.6% output
 Batteries – 8.5 tons lithium-ion
 Electric motors – one per hull; 60kw per motor
 Electric consumption – 20kw
 Gasoline – zero
 CO2 emissions – zero

During the project's launch, the boat's first design was a catamaran capable of accommodating two skippers and a photovoltaic area of approximately 180m². The purpose of the project was to complete as quickly as possible the first world tour using exclusively solar energy.

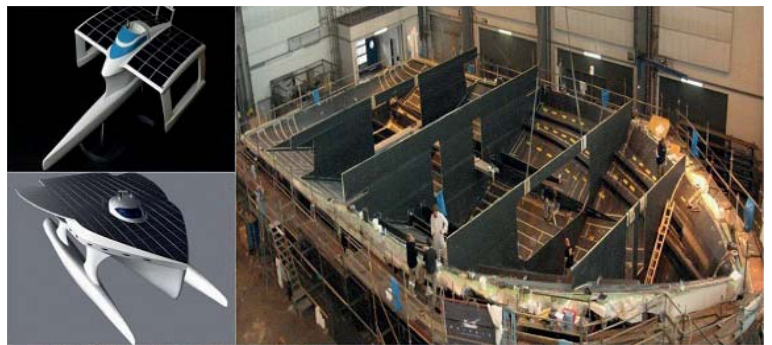
Under the impetus of Immo Stroeher, the principal investor and owner of the boat, the project took shape and the vessel the form that it has today. He wanted the boat, after she completed her world tour, to have a second life and be exploited for practical purposes. Achieving this vision required the vessel to undergo a more ambitious redesign to accommodate a growing number of people aboard and to be able to navigate all the oceans.

New Zealander, Craig Loomes upgraded the boat's design. As a naval architect he had already designed numerous innovative boats throughout the world. Loomes' design of the MS Türanor PlanetSolar was based on the "wave-piercing" concept so that the catamaran could cut through the waves, requiring less energy than traditional designs where the boat "rides" over the top of the waves.

The vessel was built in Kiel in the north of Germany, an impressive construction project lasting 14 months and requiring more than 64,000 hours of work! At a cost of about €12 million.

Luciano Bacco, Electrical & Electronics Engineer - PEng (UK) (Rtd)

www.planetsolar.org, www.lomocean.com



Transportation – An engineered service

Change is a continuum and as individuals we have an expectation that 'access and instant communication' should be freely available. These expectations are applied in all areas of life not least the process of getting from A – B and letting everyone know where we are and when we will arrive.

These matters have been placed under review by Wrightbus and developments have seen the introduction of the 'StreetLite Micro Hybrid' as the newest addition to Wrightbus' StreetLite range. The developments provided a focus on achieving Low Carbon Emission Bus standards in all vehicle lengths, the reduction of fuel consumption, reduced emissions (in the interests of sustainability) and the provision of a cost of ownership that was sharply reduced compared to other comparable buses.

In terms of engineering technology the StreetLite Micro Hybrid uses the same engine, transmission and rear axle as the conventional StreetLite, but overhauls the auxiliary systems to give the vehicle smart control of energy generation and usage on the vehicle.

A standard bus driveline has 'three auxiliary units' powered by the engine:

- 1. Air compressor -**
Runs continually while the air tank pressure is below a given set point
- 2. Alternator -**
Runs continually with a load proportional to the electrical load on the bus
- 3. Hydraulic pump for cooling fan -**
Runs continually with a load proportional to engine speed.

A driver operating a 'standard bus' presses the brake pedal and the kinetic energy of the vehicle is converted to heat in the retarder and foundation brakes. This heat is then dissipated to the environment.

In operation the 'StreetLite Micro Hybrid overhauls these systems' to run primarily on waste energy.

The bus contains two energy stores:

- **the 24V battery, and**
- **the compressed air tanks.**

In the StreetLite Micro Hybrid, the three auxiliary systems are overhauled as follows:

- 1. Air compressor** - intelligent control of valves mean the compressor is only loaded when the driver presses the brake pedal. Waste energy is stored in compressed air tanks.
- 2. Alternator** - the alternator is only loaded when the driver presses the brake pedal.

Waste energy is stored in 24V batteries.

3. Hydraulic pump for cooling fan - the cooling fans are electrically driven, eliminating the hydraulic pump entirely.

The air compressor and alternator may both be brought on at additional times if required by the vehicle duty cycle, but testing at the Millbrook test track has shown that, on typical city cycles, this is not required.

In this way, the load on the engine is significantly reduced, and the auxiliary systems are powered by waste energy that would otherwise be lost. This has the additional benefit of reducing the load on the retarder and brakes, which will also reduce the load on the cooling pack and extend the life of the friction brakes.

The overall efficiency gain when Micro Hybrid is added to a conventional StreetLite is around 9.2% and this additional fuel saving is enough to place

the vehicle comfortably below the threshold for Low Carbon Emission Bus Certification.

A 'demountable skid' slides out from the rear of the vehicle to provide rapid access to the engine, gearbox, cooling pack, air filter and exhaust. The main electric centre is in a single and easily accessible position inside the vehicle, providing a clean environment for diagnostic checks and other maintenance.

Outside the vehicle, the engine air intake is positioned at height for longer operational life, whilst the top mounted wiper system is deliberately placed outside of the crash zone. Should accident damage occur, the removal of exterior panels for replacement or repair is simple, thanks to quick release panels and the Wrightbus Aluminique™ body structure.

The new bus with its two-tone grey E-leather seating and brighter interior lighting creates a pleasant environment in which to travel

The Sapphire buses also feature free on-board Wi-Fi, with power and USB sockets at each seat and audio-visual displays that announce the name of the next bus stop.

Arriva examined its route profile in Bedfordshire and identified the popular 321 service that provides important links across North Hertfordshire and to Luton, running every twenty minutes for the main part of the day on Mondays to Saturdays and hourly during the evenings and on Sundays.

Luton serves as a dynamic hub providing direct train access to London, via both motorway and rails service, and at Luton Station it connects with Arriva's frequent 'Flyer' service to London Luton Airport.

Arriva's Marketing Manager, Linsey Frostick, said "We are delighted to have invested a significant amount of money to upgrade the service we can offer our customers on the service between Luton and Watford.

The free Wi-Fi on these new buses will allow people to make the most of their time while on the move, giving the opportunity to chat with friends, catch up on emails, browse the internet or do some online shopping. The buses even have power sockets adjacent to each seat to allow mobile phones, laptops and other devices to be charged. The further new feature on each bus is the audio-visual display that will announce the next bus stop to be called at as the bus moves along the route, giving reassurance to those who might be unfamiliar with the area and being a great help to the visually impaired."

For more information please contact Linsey Frostick, Regional Marketing Manager, on 01622 697000



Health and Safety – an engineered process

Professional Engineers provide a key focus point in respect of health and safety which is of prime importance in their day to day activities, whether in or external to their workplace or integral to the services they and their clients provide.

Within the UK they are aptly supported by the Health and Safety Executive who not

only provide material relating to both products and processes but are willing to address questions and problems encountered on a day to day basis. This can go from advice to inspection, prohibition and enforcement as appropriate. The information, much of which may be downloaded free, is contained within their

website: www.hse.gov.uk. The information whilst providing direct linkage to the UK may equally be applied to similar process around the world or form the basis for development and control.



Evacuation of People with Disability & Emergent Limitations: Considerations for Safer Buildings & Efficient Evacuations



Evacuation of People with Disability & Emergent Limitations: Considerations for Safer Buildings & Efficient Evacuations

Lee Wilson P.Eng MAIPM MWBOB
C.Buide MCABE Building Consultant,
Melbourne, Australia

The Guide has been developed from a post graduate "Thesis" into the current format. Whilst undertaking the research for the "Theses" it became evident that;

Building owners, Building Managers and Employers need to take a holistic and proactive approach in ensuring they have met the needs of all building occupants and have plans in place for the evacuation of their building; and
A significant proportion of people entering these buildings could be exposing themselves to an unacceptable risk everytime they enter – unless their needs have been considered and the necessary plans for their safe evacuation are in place

A positive report that will have potential in supporting Professional Engineers in their design, inspection and management of the Built Environment

The guide is available as a download from;
<http://leewilson.co.au>
<http://accessibleexitplans.com>
<http://egressgroup.net>

Sustainable Solutions Guide



Sustainable Solutions Guide
CCF is one of the UK's leading distributors of interior building products and insulation to the construction industry. They are committed to the protection of the environment and the improvement of environmental performance. In conjunction with their partners; Sustainable Building Solutions (SPS) and PPL Training they are able to offer an integrated approach in respect of builder services including acoustic and airtightness testing with associated practical training courses.
www.ccfltd.co.uk
www.sustainablebuildingsolutions.co.uk
www.ppltraining.co.uk

PROMOTE YOUR MEMBERSHIP -

Self Inking Personal Stamps

A Stamp for use on notepaper and drawings containing the name of the Society and the name and Registration Number of the Member.

The Stamps are self-inking in an enclosed case. Available from the Society at the price of £30.00 (inclusive of VAT, postage and packing)

email:
enquiries@professionalengineers-uk.org

Zero Carbon Homes - Too Soon? and Your Complete Guide to Part L



The ongoing changes within the legislation that supports sustainability and energy use and the minimisation of pollution puts all Professional Engineers to the test.

To support them Sarah Fenwick Managing Director of Energist UK and her team seek to provide guidance documents and

on the ground support wherever possible. Sarah recognises that; "in construction one size never fits all. Every region has its own concerns, its own way of working and its own regulations. Energy efficiency and sustainability may be global responsibilities but the work to make change is local".

Details of their publications and the services provided may be viewed at;
www.energistuk.co.uk
email: info@energistuk.co.uk

Sarah Fenwick,
Managing
Director of
Energist UK





Lee Wilson
P.Eng MAIPM
MWOBO
C.Buide
MCABE

Lee is a Building Consultant in Melbourne Australia and has an extensive background in engineering access for people with disabilities, general building compliance and project management. He is experienced in Federal and Local Government and private consultancies specialising in risk management, building compliance and access for people with disabilities.

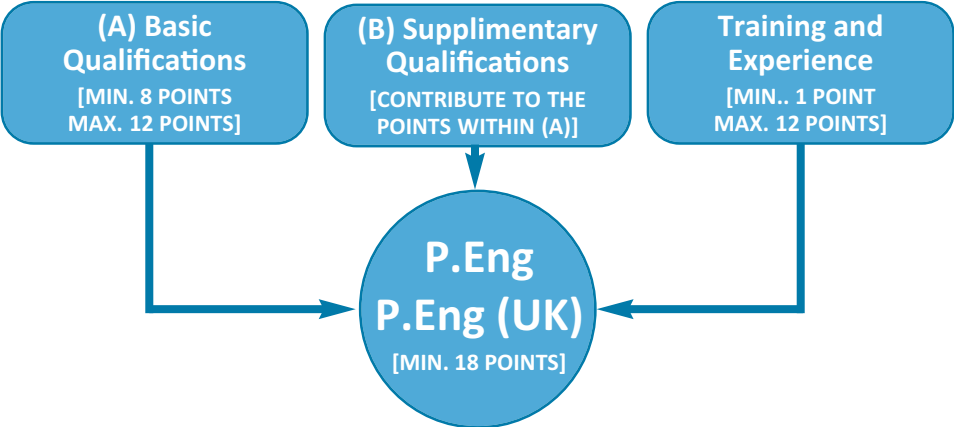
Lee is a Professional Engineer and an Accredited Member of the Association of Consultants in Access Australia and a Chartered Building Engineer. He is also qualified in building surveying, risk management and performance based building and fire codes. Lee is passionate about spreading the word about the need for an accessible means of egress from all buildings, for all occupants.

New Members

Mr Athir Al Saadi PEng(UK) MSPE	UNITED ARAB EMIRATES	Mr Choi Shing Chan PEng(UK) MSPE	HONG KONG
Mr Man Hon Chan PEng (UK) MSPE	HONG KONG	Mr Peter Rothwell PEng MSPE	UK
Mr O T Ayegbusi PEng(UK) MSPE	NIGERIA	Mr David Taylor FCABE CBuildE MCIAI PEng MSPE	UK
Mr Yong Sheung Cheng PEng(UK) MSPE	SINGAPORE	Mr Edward H Phillips PEng MSPE	UK
Mr Sze Chuan Ng PEng(UK) MSPE	SINGAPORE	Mr Godfrey John Tarling MSc FRICS CbuildE FCABE PEng MSPE	UK
Mr Godwin Chidiebere PEng(UK) MSPE	SINGAPORE	Mr Stuart Samuels PEng MSPE	UK
Dr Achim Paul Eggert PEng(UK) FSPE	GERMANY	Mr Meng Kuong Leong PEng(UK) MSPE	HONG KONG
Mr Abdul Ghafur Abubaker Saheb PEng(UK) MSPE	UNITED ARAB EMIRATES	Mrs Jayne Hall PEng MSPE	UK
Mr Lee Wilson PEng(UK) MSPE	AUSTRALIA	Mr Jonathan David Peart PEng(UK) MSPE	FRANCE
Mr Keith Noel Sibthorpe PEng(UK) MSPE	UK	Mr Edward McGuire PEng MSPE	IRELAND
Mr Robert Wiltshire PEng MSPE	UK	Mr John Richard Payne PEng MSPE	UK
Mr Shun Wai Wong PEng(UK) FSPE	HONG KONG		

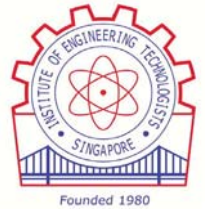


Membership



The achievement of P.Eng/P.Eng(UK) reflects an individual’s academic qualification and vocational experience. Full details are contained within the membership guide available on the website: www.professionalengineer-uk.org
Get involved – sign up a colleague!!

Jointly organised by
**SSTC Institute and Singapore Institute
 of Engineering Technologists (SIET)**



Professional Talk on **ENGINEERING - A RISKY BUSINESS**

A reflection on the roles and responsibilities of the Professional Engineer
 within the development and application processes

Date: Sunday, 30 November 2014
Time: 1.00pm – 3.00pm
Venue: SSTC @ Park Mall - Orchard 9 Penang Road #09-03, Park Mall,
 Singapore 238459. Tel: 65 6235 5685. [Nearest MRT : Dhoby Gaut]



Speakers: Mr David Gibson
 Vice-President (International),
 The Society of Professional Engineers, UK.
 [website: www.professionalengineers-uk.org]

1.00pm – 2.00pm: **ENGINEERING - A RISKY BUSINESS**

A reflection on the roles and responsibilities of the Professional Engineer within the development & application processes

2.00pm – 2.30pm: **Questions & Answers**

2.30pm – 3.00pm: **Refreshment & Networking**

For Registration

For SSTC Students: Mr Kiru. Tel : 6235 5685;

Email : kiru.kumar@sstc.edu.sg

For SIET Members:* Mr Cosar Liao , HP: 84881882;

Email: cosar.lwc@gmail.com

* A Certificate of Attendance will be issued to all SIET members who attend this talk as part of the CPD requirement for registration as SIET-CertET & SIET-CertTS.

For SPE Members: Dr Sam MK, HP: 96740515;

Email: sammk1951@gmail.com

The Society as part of the collaborative process will be delivering a technical paper “Engineering – a risky business”, in support of its members in Singapore and those of the collaborating organizations, the Singapore Institute of Engineering Technologists [SIET] and the SSTC Institute which is a private school registered with the Council in Singapore.

David Gibson is looking forward to meeting fellow members of the Society and the “Engineers of the future”.
SSTC: www.sstc.edu.sg **SIET:** www.siet.org.sg

Collaboration & Affiliation

The Society of Professional Engineers maintains a register that embraces all suitably qualified Professional Engineers of whatever discipline. The goal of the Society is to protect and enhance the status of the Professional Engineer. This is achieved through the promotion of this title throughout the world by establishing, maintaining and strengthening close links with collaborating and affiliated bodies. The process of collaboration and affiliation reinforcing and promoting the highest professional standards within engineering without restriction to any one particular engineering discipline. Collaboration is seen to be the action of working together to fulfil a task and to achieve shared goals with affiliation being the reinforcement of collaboration through formal agreement and memoranda of understanding.

Existing Members KEEP IN TOUCH

**YOUR REGISTER – YOUR DETAILS
NEW JOURNAL, NEWSLETTERS,
COMMUNICATIONS**

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– LET US KNOW!!!**

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– LET US KNOW!!!**

Please send your revised details to
enquiries@professionalengineers-uk.org

PROMOTE YOUR SOCIETY

- non-member colleagues?

Encourage them to join a membership information pack is available on-line
www.professionalengineers-uk.org
forward your completed application form to: email:
enquiries@professionalengineers-uk.org
or forward hard copy to:
The Society of Professional Engineers, Guinea Wiggs, NAYLAND, Colchester, Essex CO6 4NF

Fort Lauderdale USA

The Society of Professional Engineers as part of its promotion and development was pleased to have David Gibson, Vice President International, attend and participate at the International Codes Council [ICC] Conference and Exhibition in Fort Lauderdale USA and the World Organisation of Building Officials [WOBO] Board meeting that celebrated their 30th Anniversary.

The events provided the opportunity to reinforce current collaboration and explore the opportunities to develop further collaboration and participation.

The conference hosted the Global Forum where professionals from around the world presented on current difficulties, problems and their pursuit of new solutions linked to the "Role of Building Codes in Disaster Risk Reduction. [DRR]"

The presentations reflected on climatic events that had occurred, the learning and research developed in response to those events and how the building codes could provide the focus for the "Mitigation of the Disastrous Effects of Natural Hazards in Building Construction by Preventive Measures". It was apparent that the key focus was on "Engineered Solutions" and that there was a role for the Society in both participation and dissemination of skills and information.

The opportunity to meet with both the Chief Executive Officer of ICC, Dominic Sims and their President Stephen Jones provided scope for initial discussion and further scope for collaboration.

The Royal Institution of Chartered Surveyors were also present and presented on the creation of a "Global Building Standards Coalition". The presentation by Martin Russell-Croucher, Director, Sustainability and Special Projects in conjunction with Alan Cripps, Associate Director, Built Environment, focussed on the lack of consistency of Building Standards globally and their piecemeal development recognising that some countries lacked standards altogether and that even where standards existed the problems of enforcement could be extreme.

The goal of the coalition is to create a suite of high level principles that clearly sets out the minimum standards to be expected from the ownership, occupation and use of buildings. The principles reinforcing issues such as structural integrity, fire safety, accessibility, climate and environmental safety. The principles being supported by best practice standards and positive enforcement. Current discussions taking place within the UK Government sector, the World Bank, UNESCO, CEBC, WOBO and other interested parties.



Left to right – David Gibson; International Vice President SPE, Stephen Jones; President ICC, Tim Ward; Vice President WOBO, Harbi Arafat; Governor WOBO



Right to left – David Gibson; International Vice President SPE, Martin Russell-Croucher; Director, Sustainability and special projects RICS, Alan Cripps; Associate Director Built Environment RICS, Tim Ward; Vice President WOBO, Harbi Arafat; Governor WOBO



EXPO Milano 2015

The Society will be presenting at a joint seminar to be linked to EXPO 2015 in Milan.

The proposal will include presentations by SPE, ABEI, and IPF. The key theme being "Feeding the planet and energy for life" – sustainability. The EXPO takes place from 1st May to 31 October 2015.



Affiliation and Collaboration with Professional Bodies and Organisations



National Society of Professional Engineers®

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Website: www.nspe.org



中国土木工程学会

www.cces.net.cn CHINA CIVIL ENGINEERING SOCIETY

The China Civil Engineering Society (CCES)

Zhang Junqing, Director
Dept of International Contact, PO BOX 2500, 9, San Li
He Rd, Beijing 100835, China
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Website: www.cces.net.cn

Societe Nationale des Ingenieurs Professionnels de France (SNIPF) or (IPF)



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International Coordinator Dott. Eur Ing
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The Chartered Association of Building Engineers

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Fax: (01604) 784220
Website: www.cbuilted.com



Association d'experts du bâtiment et de la construction
Association of European Building Surveyors and
Construction Experts

Secretariat: Mr Martin Russell-Croucher Dip QS CertEd
MRICS
C/O The Royal Institution of
Chartered Surveyors, 12 Great
George Street, Parliament Square,
London SW1P 3AD
Website: www.aeebc.org



WOBO

World Organisation of
Building Officials
Governor: Mr David Gibson
Email: david@tdrg.co.uk
Website: www.wobo-un.org



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Website: www.flaming21.com



The Society of Professional Engineers

In collaboration with the SSTC Institute and the
Singapore Institute of Engineering Technologists (SIET)



ENGINEERING - A RISKY BUSINESS

A reflection on the roles and responsibilities of
the Professional Engineer within the development
and application processes

Programme

- | | |
|-------|--|
| 12.30 | Arrival |
| 13.00 | Presentation; Engineering a Risky Business
David Gibson Vice-President (<i>International</i>),
<i>The Society of Professional Engineers, UK</i> |
| 14.00 | Open forum |
| 14.30 | Refreshments and networking |

Venue: SSTC Institute, Park Mall - Orchard
9 Penang Road #09-03, Park Mall
Singapore 238459.
Tel: 65 6235 5685

Registration:

SSTC Students: Mr Kiru. Tel: **6235 5685**; Email: kiru.kumar@sstc.edu.sg
SIET Members: Mr Cosar Liao , HP: **84881882**; Email: cosar.lwc@gmail.com
SPE Members: Dr Sam MK, HP: **96740515**; Email: sammk1951@gmail.com