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A sense of control

The CIBSE Employee of the Year Award has been awarded to InTandem Systems, a controls specialist from Hampshire. They may only have 16 employees but the importance of the work being done by InTandem to educate the next generation of engineers on building controls cannot be underestimated.

The increasing sophistication of building controls and the amount of HVAC equipment now built with onboard intelligence means the role of the integrator has become key to the successful operation of buildings. ‘Fine-tuning’ the controls on one component can have a knock-on effect on other systems, something that John Bradshaw, head of engineering at the Co-operative Group, knows all too well. At Build2Perform Live he described how maintaining control systems at one major Co-op building is the equivalent of painting the Forth Bridge – the work is never-ending.

On page 52, InTandem managing director Jon Belfield explains why updating the control files of one piece of equipment can conflict with the BMS, rendering plant invisible to operators.

The fractured nature of the industry means that it’s hard to know who to call when equipment goes wrong, says Belfield, as different HVAC equipment may be served by different contracts. The answer, in part, is to educate the supply chain about controls, so they can explain to end users how to operate their building at handover, says Belfield.

Encouragingly, one contractor currently being trained by InTandem is now planning to monitor all the buildings it’s responsible for maintaining, so it can alert building owners when there are issues with building performance.

One of the most sophisticated new buildings in the UK is the Bloomberg European headquarters in London. Extensive airflow modelling was undertaken to ascertain whether the building – which has a deep plan – could be naturally ventilated. Modelling revealed that the heat from Bloomberg’s offices would disrupt the airflow, and so the air had to be cooled by the chilled ceiling to ensure the building could be ventilated as the designers intended (see page 28).

The water bath modelling was explained in detail by Breathing Buildings’ Jon Belfield on page 20. The event was rich in content with 80 sessions and more than 175 speakers across both days. We will endeavour to bring you some of the best case studies, research and new technology in the months to come.

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**CONTRIBUTORS**

**Hywel Davies**
CIBSE’s technical director on why European directives will still be influencing UK policy post-Brexit

**Jon Belfield**
InTandem managing director on why the supply chain needs more education on controls

**Liza Young**
Our deputy editor on how accurate billing is helping tenants understand energy use

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Fire chiefs raise alarm about lack of industry competence

London Fire Brigade (LFB) chiefs have highlighted a ‘general lack of competence’ and poor training among building designers and construction companies – and have warned of ‘an increase in serious building fires unless the construction industry starts to take fire safety more seriously’.

In its submission to Dame Judith Hackitt’s review into building regulations and fire safety, in the wake of the Grenfell Tower blaze, the LFB said responsibility for ensuring buildings are constructed with proper fire safety measures sits with the construction industry.

It added that fire officers regularly noted ‘significant construction defects’ – such as flawed compartmentation between flats – that can allow fire and smoke to spread. They also saw ‘critical fire safety systems’, such as mechanical smoke ventilation, not installed as per the original design, poorly designed, or simply not working.

‘It took a tragedy for everyone to take fire safety seriously and listen to what the Brigade has been saying for years about skills,’ said assistant commissioner for fire safety Dan Daly. ‘Urgent action is needed to better regulate those who are responsible for ensuring a building’s design, construction and maintenance are fit for purpose. There are countless points where a dangerous decision can be made about a building’s design or upkeep, and hardly any measures to ensure the people making those decisions are properly qualified.’

Housebuilders cheating the public, says Deben

British housebuilders are failing to meet energy efficiency and air quality standards in new homes, according to the chairman of a powerful parliamentary committee.

As the Chancellor prepared to unveil measures in his Autumn Budget to force a steep acceleration in house building, Lord Deben – who chairs the Committee on Climate Change – accused the country’s top firms of ‘cheating the public’ by leaving homeowners and tenants with higher bills than they should be paying.

‘The biggest issue in the future will be the retrofitting of buildings that we’ve already got,’ he said. ‘If we’re going to have to do that, for goodness sake, stop making the problem worse.’

He said many of the [approximately 200,000] homes being built every year were ‘crap’ because they ‘did not meet the standards which they could meet’.

‘If they did meet them, they would reduce the cost of housing for everybody who lives in them,’ Lord Deben told the Policy Exchange thinktank.

‘If you pay a bit more – and it is a very small amount – to produce a house to Passivhaus standards, and then you add the energy costs per month to the slightly increased mortgage cost, you will find you are better off to build it that way,’ said the former Environment Secretary.

In his Budget on 22 November, Philip Hammond promised planning reforms and £204m to fund innovation and skills in construction, including funding for training workers building homes. See page 9 for more.
2018 to be ‘year of engineering’

The government has designated 2018 as the ‘Year of Engineering’, and has launched a year-long campaign to help the sector recruit a new generation of engineers.

The campaign is aimed at the seven to 16 age group – along with their parents and teachers. It will offer ‘fun and innovative ways’ to reach groups currently under-represented in the profession, as well as ‘paint a more positive picture’ of engineering.

One of the proposed projects is a series of curriculum-based resources, developed by the Design and Technology Association, to help motivate more young people to consider careers in engineering.

Visit www.dft.gov.uk/year-of-engineering-2018 and see #inspireanengineer.

Profit margins fall as costs bite

Many construction firms saw their profit margins fall in the third quarter of the year, according to the latest Construction Products Association (CPA) trade survey.

The drop in the value of the pound since the EU referendum has pushed up the cost of raw materials, but few firms are increasing tender prices to compensate. As a result, 31% of main contractors told the CPA their margins had shrunk compared with the same period last year.

However, the industry still experienced its 18th successive quarter of growth, according to the CPA’s figures, contradicting the Office of National Statistics’ claim that the industry had fallen into recession during the period ending in September.

Consultancies consider Brexit exit

Nearly a quarter of large consultancy and engineering firms are considering moving jobs out of the UK because of Brexit, according to a report by the Association for Consultancy and Engineering (ACE). Its findings suggest 22% of large consultancy firms may move jobs out of the UK if freedom of movement is not preserved and this could have a serious impact on major infrastructure projects.

The Effect of EU Migration on the UK Consultancy and Engineering Sector Post-Brexit paints a ‘worrying picture’, according to ACE chief executive Nelson Ogunshakin.

It repeats the government’s own warning that the construction sector could lose more than 175,000 European Union workers – 8% of the sector’s workforce – if the UK does not retain access to the single market.

‘We will be using its contents in our discussions with the independent Migration Advisory Committee to help strengthen our arguments with hard data from member firms,’ Ogunshakin said.

‘It is essential that we highlight the difficulties the sector will encounter in recruitment and retention in a post-Brexit world.’

Campaign set to name and shame unsafe cable suppliers

Exposed copper conductor strands could cause serious electric shock or death

The electrical and data industry is increasingly alarmed about the amount of substandard and non-compliant electric cable being supplied to UK building projects.

Industry working group Approved Cables Initiative (ACI) has named one manufacturer whose cables failed safety tests, and is preparing to name others, in a bid to bring the issue out into the open.

ACI director Peter Smeeth told a meeting of the CIBSE Patrons that the amount of unsafe cabling on the market posed a serious threat to life and could undermine thousands of businesses. His organisation wants to ‘stamp out’ the practice of under-specifying cable to cut costs at the expense of safety.

ACI has named Italian company Triveneta Cavi as one supplying flexible cables into the UK that failed British and European Standards flex tests. ‘The exposed copper conductor strands, which penetrated the PVC insulation and sheathing during the test, could cause serious electric shock or even death,’ an ACI statement said. The manufacturer was contacted ‘to request a voluntary withdrawal of the affected product from the marketplace’ and ACI said it understood Triveneta Cavi was ‘investigating the matter’.

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HVAC Systems Group has performance gap in sights

New SIG aims to unite supply chain in improving buildings

The CIBSE HVAC Systems special interest group (SIG) was launched at Build2Perform Live, at London Olympia, and aims to bring together all elements of the supply chain to improve the performance of buildings.

It will focus on the ‘core issues’ that mean HVAC systems are ‘not designed as well as they could be and don’t perform as well as they should’, said group chairman Tony Day, of the Tyndall National Institute, Cork.

‘We need to be thinking about our designs as complete systems – not individual products – and in terms of lifetime performance,’ Day told the launch event. ‘Collaboration across the whole supply chain is crucial.’

Property management specialist Phil Draper, of Broadgate Estates – a member of the group’s committee – said building managers were often left with the impossible challenge of making ‘incomplete systems’ work with no money. ‘We end up asking people, who don’t have the right skills, to fix the problem without upsetting the client – and they often make it worse,’ he said.

Membership of the HVAC Systems Group is free and its first event is on 24 January. Visit: www.cibse.org/Networks/Groups/HVAC-Systems

Housing gets a boost from the Budget

The Chancellor has pledged more money, loans and policy changes to help deliver 300,000 new homes per year in the UK by the mid-2020s.

In his Autumn Budget statement on 22 November, Philip Hammond announced a £4.4bn housing package, including £1.3bn of new money. He also promised planning reforms, to ensure more land is available for housing and that better use is made of underused land in cities and towns. In addition, £204m of funding will be allocated to innovation and skills in the construction sector, including £15.3bn of new money. He also promised planning reforms, to ensure more land is available for housing and that better use is made of underused land in cities and towns. In addition, £204m of funding will be allocated to innovation and skills in the construction sector, including £15.3bn of new money.

Offsite construction also received a boost, with the Chancellor stating modern methods of construction would be favoured for public infrastructure schemes from 2019.

Alongside the Budget, the government released its plans to develop the Cambridge-Milton Keynes-Oxford corridor, to create a UK Silicon Valley based on hi-tech industries. It could result in up to one million new homes being built by 2050.

Current infrastructure commitments for the project include an East-West Expressway of roads between Oxford and Cambridge, while Network Rail has funding to deliver the East-West Rail from Bicester to Bedford and Milton Keynes to Princes Risborough. New stations are also under consideration at Cambridge South and Cowley.

Editors pay tribute to Andrew Brister

The industry has been paying tribute to CIBSE Journal freelance writer Andrew Brister, who died last month.

Brister was a regular contributor to the Journal and many other magazines in the building services sector. Between 1989 and 1996, he spent six years as assistant editor, and then deputy editor, of Building Services Journal (BSJ), the forerunner of CIBSE Journal.

Former BSJ editor Rod Bunn, who worked with Brister for six years, said: ‘Andy was a terrific journalist, a wonderful colleague, utterly professional, and made me a better editor.’

Brister went on to edit Electrical and Mechanical Contractor, the predecessor to ECA Today. ECA director of business Paul Reeve said: ‘He was a prodigious and high-quality journalist and author. Andrew will be greatly missed by those who knew him, and who benefited from his journalism and articles, across our industry.’

Alex Smith, CIBSE Journal editor, said: ‘Andy was a brilliant writer and a pleasure to work with. He had the ability to put people at ease and get the best out of the most reluctant interviewee.’

Industry suffering from ‘credibility problem’

Too many professionals involved in building services projects ‘rig the results of design calculations to meet Building Regulation targets’, last month’s BSRIA Briefing heard. As a result, the industry undermines its own credibility by adding to the performance gap, said speaker Chris Twinn.

‘We game Part L compliance… and nobody checks actual energy use,’ said Twinn, principal of TwinnSustainabilityInnovation, who criticised the practice of tweaking software solutions to achieve compliance without looking at the likely impact on the end user.

‘Domestic boilers are getting bigger, but our homes are better insulated… we have doubled heat outputs when they should have been cut in half,’ he told the BSRIA event. ‘A rebalancing of the global economy requires us to do far more with far less… and that needs us to stop gaming the system and refocus on the end user.’

BESA launches new knowledge forum

The Building Engineering Services Association (BESA) has set up a forum for public sector employees in London and the South East involved in the specification, maintenance and management of building equipment and services.

It is in response to demand from estates, facilities and property managers for expert advice and technical support to improve the performance of their building services and meet energy efficiency and sustainability targets.

BESA will start a series of meetings on 22 February. Contact: kevin.kingaby@theBESA.com

www.cibsejournal.com December 2017 9
UK among first to ratify Kigali amendment on use of HFCs

Global-warming gases to be cut by 10% in 2019 and a further 40% in 2024

The UK was one of the first European nations to ratify the Kigali amendment to the Montreal Protocol, which aims to curb the use of HFC gases, widely used in air conditioning and refrigeration. It is committed to reducing the amount of these gases by 85% between 2019 and 2036.

The Kigali amendment will come into force on 1 January 2019 and should result in 44 million tonnes of CO₂ equivalent in emissions being saved, according to the Department for Environment, Food and Rural Affairs.

It commits developed countries to cutting global-warming HFCs by 10% in 2019 and by a further 40% in 2024. Developing countries will have to freeze their HFC consumption by 2024 and then start to reduce it.

Refcom demands tighter F-Gas rules

The UK’s largest register for safe refrigerant handling has called for F-Gas emissions rules to be tightened in the wake of the Brexit. Responding to an inquiry by the parliamentary Environmental Audit Committee (EAC), Refcom called for the UK to close a number of ‘loopholes’ that allow some operators to circumvent British laws in place as a result of the European F-Gas Regulation.

“In particular, sellers of split air conditioning systems should be required to keep records of who the purchaser is and who will be installing the equipment,” said Graeme Fox, senior mechanical engineer at the Building Engineering Services Association, which manages Refcom.

Sellers are not required to hold records, but Refcom said a mandatory register of individual operatives should be set up to work with the company register, which was made compulsory in 2009.

Graffiti Tunnel gets lighting makeover

The regeneration of Leake Street Arches, in London’s Waterloo area, now includes lighting for 300m of dramatic street art. Made famous by artist Banksy, Leake Street – also known as the ‘graffiti tunnel’ – is one of the few walls in the UK where artists can legally express their creativity in public.

The lighting design, by Nulty, working with developers LCR, boasts a theatrical truss – suspended through the underpass. It features a series of spotlights with gallery-quality lighting, to pick out the colourful artwork.

Linear uplights have been mounted on top of the truss to illuminate the arched ceiling, with a wash of white light to enhance the architecture. The uplights have a colour-changing function that can create various moods for different events.

IN BRIEF

Fossil-fuel burning hits record high

A record amount of fossil fuel will have been consumed globally in 2017, with a 2% rise in carbon emissions, according to climate scientists. This follows three successive years when emissions remained flat.

Professor Corinne Le Quéré, director of the Tyndall Centre for Climate Change Research at the University of East Anglia, said that emissions should be decreasing by now, to get the world on track to meet reduction targets set by the 2015 Paris Agreement.

The data in the 2017 Global Carbon Budget, published in November, is compiled by 76 of the world’s leading emissions experts from 57 research institutions.

A 3.5% rise in emissions from China was the biggest factor behind the global increase, according to the researchers. This rise was a result of an increase in industrial activity and poor rainfall, which reduced the country’s hydroelectric capacity. India is thought to have experienced a modest rise, but carbon emissions are expected to have decreased in the US and the EU this year.

Wireless lighting could cut energy by 70%

Philips Lighting has launched a wireless-connected lighting system that it believes could cut energy used for office lighting by up to 70%.

Sensors embedded in light fixtures feed back data on light level, occupancy and energy consumed to energy managers. The system allows lighting to be modernised without major capital outlay by using existing cabling.

As lighting is responsible for around 15% of the global electricity supply – and public and commercial buildings account for 60% of global lighting-based electricity – Philips believes this approach can help the UK halve emissions from the built environment by 2025.

Local MP opens new Colt factory

Contractor, manufacturer and maintenance specialist Colt International has opened a new factory in Havant, Hampshire.

The 85-year-old firm has moved from its original premises in the town, and the opening ceremony for the new 50,000ft² facility was led by local MP Alan Mak.
WrapTec measures up to refurbishment challenge

When Colin Boulwood, Head of Service at GEA Refrigeration’s Sittingbourne branch, was asked by a client to provide a 10-year warranty on a contract to refurbish pipe insulation for a cooling and refrigeration plant, he was loathed to provide it unless certain conditions were met.

“We had been maintaining the pipe work for some time but it was a bit like painting the Forth Bridge. No sooner had a section of insulation been completed, then another section would reveal itself to be in need of repair. It was foil-backed insulation that had seen better days and it was clearly time to suggest that the whole lot be replaced. The existing insulation was full of water, had been hacked at and was basically collapsing on itself,” he explains.

Colin and the client eventually arrived at a solution that the warranty for the work on the plant would be granted as long as the entire refrigeration system was re-insulated, vessels and valve stations included.

“There was a great deal of work to be done when you consider we had the main plant room, an external facility, eight valve stations, two additional evaporators and hundreds of metres of pipe work to inspect, prepare and insulate,” explains Colin, adding for good measure that his team used over 450 flap wheels to rid the pipes of rust before painting.

For the insulation Colin called in specialist contractor, Thermotel, with whom he had worked previously. Within the company’s tender was a suggestion that the pipe insulation be clad in WrapTec, a self-welding polyisobutylene material rather than traditional PIB or metal.

Amongst the cladding challenges facing the Thermotel team were three horizontal surge drums measuring 1.5m in diameter and 2m in length, eight valve stations serving the chill room and freezer, two additional evaporators in the freezer and hundreds of metres of pipe work. If this weren’t challenging enough some of the pipe runs measured 280m in length and were 15m in the air, posing the additional question of access in what was already a tight time frame for the project.

In the event WrapTec proved its worth beyond simply meeting the required cladding specification. For Colin Boulwood the best and most surprising outcome has been the reports from the client that since the contract was completed, the refrigeration plant has been performing better. “We’ve heard that the compressors have been shutting down, not because of malfunction, but because the coolant temperatures have been stable, even on hot days as a result of the plant working more efficiently.”

Perhaps the biggest plaudit for WrapTec is that Colin is now actively seeking to introduce the product across the business. “Originally I was of the opinion that as long as WrapTec met legislation it would do, but on closer inspection and working with the product, it does a lot more than I initially thought.”

■ COLIN BOULTWOOD is head of service branch Sittingbourne - United Kingdom

For further information visit www.wraptec.net or call Mike Barsby, UK Sales Manager on 07702 952087

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IN BRIEF
North West revival
CIBSE’s North West Region will be hosting a dinner for the first time in seven years on 26 January. The region is celebrating its 90th year in 2018, and is hoping this relaunched event will honour its past achievement. The dinner, at the Midlands Hotel in Manchester, will have Eddie ‘The Eagle’ Edwards as guest speaker. For details and to book visit www.cibse.org/events

Guide update
Two corrigenda have been issued this month, correcting errors in Guide A, Table 6 B (Average efficiencies for electric motors) and Guide G, Table 13.3 (Conversion factors for pressure). They can be found on the CIBSE Knowledge Portal against the relevant guide www.cibse.org/knowledge

Green design contest
The third annual Green Infrastructure Design Challenge – which seeks to highlight the role of building-level green infrastructure in creating sustainable urban environments – was launched by CIBSE and UKCIP at Build2Perform Live in November. Entrants must consider what constitutes a healthy, productive and sustainable urban environment, in terms of building performance and improving surrounding public spaces.
Shortlisted entrants will give a three-minute presentation at Ecobuild 2018. For details and to enter – by 19 February 2018 – visit www.cibse.org/GICChallenge

UAE Region hosts YEN Global Conference
A group of 22 CIBSE YEN chairs and vice-chairs, from seven countries, attended the CIBSE YEN Global Conference in Dubai in October. They were joined by Jacob Kopocis, from Young Engineers in ASHRAE (YEA), YEN mentor Andrew Saville, and CIBSE technical director Hywel Davies.
The event aimed to strengthen connections between YEN centres across the globe and with the young engineers of ASHRAE, as well as support newer centres in the Gulf and Australia. It was also an opportunity to explore the challenges of designing tall buildings in hot climates, learn from sustainable case studies, and gain an understanding of the history and culture of the United Arab Emirates (UAE).
The group joined the UAE’s first Technical Conference, which looked at the sustainability of tall buildings. Topics included cyber security, fire strategy and the challenges of designing hydraulic systems – such as chilled water and mains water – in super-tall buildings.
During a meeting at Dubai’s World Trade Centre, the group discussed the status of the network and a series of initiatives for the future. On a visit to Amity University, the delegates celebrated the launch of the university’s YEN chapter – the latest link between YEN and academia.
They were treated to technical site tours at the Etihad Museum, Cleveland Clinic and Masdar City. Paul Binns, Yorkshire YEN Centre chair, who worked on the Cleveland Clinic project, said: ‘The visit was very moving as I could see how my efforts during the design had paid off. The building, its services and staff were testament to the luxury reputation it holds.’
In Arabic, Masdar means ‘the source’, a clever name for a city set to become a source of knowledge and its own energy supply, largely through PV arrays. The arrays on site generate 1MW from rooftops and 10MW from a solar farm. The Masdar Institute of Science and Technology, in affiliation with the Massachusetts Institute of Technology, has invested in renewable energy across the world, totalling 2.8GW from wind, solar and waste-to-energy plants.
CIBSE’s UAE regional annual dinner wrapped up the week, with a keynote address from CIBSE President Peter Y Wong.
The event was only possible because of the hard work of CIBSE YEN’s UAE Centre Committee, the CIBSE UAE Regional Committee, and the support of CIBSE staff. Thanks go to all the people and companies that supported the conference, and the employers who enabled the young engineers to take part.

Team Dragon on fire at Ready Steady Light in Dubai
The Society of Light and Lighting (SLL) held the second Ready Steady Light Middle East (RSL ME) event in Dubai in October. It follows the success of the inaugural event last year, and coincided with Light Middle East – the largest lighting exhibition in the region.
SLL president Richard Caple, and secretary Brendan Keely, oversaw 45 competitors from organisations including Lightitude, Nathan Savage Lighting Design, Osram, Studio Lumen, Light Touch PLD, DPA and Nulty+.
Competitors were split into teams of seven, and allocated a site to be lit, at the back of the Dubai World Trade Centre. The teams had two hours to complete their designs and installations, before being judged.
Team Dragon – with members Jessica Munaf, Chayot Kiranatawat, Susann Sonnenberg and Satish Kumar – won a clean sweep of awards. Its installation ‘Dance of the Dragonfly’ scooped the Technical Award for its minimum use of energy and minimising light trespass. The team also won the Artistic Award for the most creative installation, and claimed the Peer Award – judged by the competitors.
RSL ME 2017 was supported by: acdc; Erco; Ecosense; Feilo Sylvania; Lightitude; Lumascape; Martin Professional ME; Osram; Targetti; Traxon; and Zumtobel. Not only did the organisations deliver a great variety of luminaires and controls, but they also supplied technical support on the evening of the event.
The Ready Steady Light competition started in the UK 15 years ago, with Rose Bruford College, and has been in the society’s annual events calendar ever since. It brings together people from all fields of the lighting industry, and gives them a set time to design and deliver an installation with selected luminaires and controls.
Bedocs and Brundrett scoop highest honour

London South Bank University and MidKent College also recognised

CIBSE members Lou Bedocs and Geoffrey Brundrett each received CIBSE Gold Medals – the Institution’s highest accolade – at the President’s Awards dinner in October.

Iain Carlisle gave the citation for Bedocs, highlighting his achievements in a 53-year career, as well as his extraordinary arrival in the UK. Born in Hungary in 1942, Bedocs came to the country as a refugee, after becoming stranded when helping people flee to Austria. He found employment with Smart and Brown and Ferguson after a factory visit to help refugees seek work. He began an electrical apprenticeship, and his interest in light and lighting was ignited.

After completing his training, Bedocs joined Atlas Lighting – later Thorn Lighting – where he worked for 30 years at an increasingly senior level, becoming technical director in 1991.

As well as his distinguished career, Bedocs has been CIBSE vice-president and chair of the Lighting Division, now SLL. He has also been awarded two Leon Gaster Medals and the SLL Lighting Award, and was made honorary president of the Lighting Industry Federation in 2010.

‘It has been a privilege to have learned from him,’ said Carlisle. ‘There are few others who have contributed so much to our understanding – and the use – of light.’

In his citation for Brundrett, Alfred Leun said it was an honour to present the medal, noting Brundrett’s achievements during his 55-year career. He also outlined his contribution to the industry at regional, national and international levels.

Brundrett gained an international reputation for his contribution to the understanding of the control of Legionella, for which he received a CIBSE Bronze Medal in 1992. He was also heavily involved in several CIBSE guides and sat on the editorial committee for BSER&T.

Since retiring as head of the environment and buildings division at the Electricity Council research centre, he has been senior fellow at the University of Wales and visiting professor at the University of Liverpool. He was elected to represent engineers on the Council of the Royal Society for the Promotion of Health, of which he was subsequently chair.

Three silver medals were also presented on the night – in recognition of outstanding service to CIBSE – to Paul Ruffles, Stuart MacPherson and Colin Wilson.

The annual awards dinner recognises and rewards industry talent, with accolades that showcase newly qualified and experienced engineers.

Other awards presented include:

Hays Building Services President’s Prize

Patrick Tanner, of London South Bank University, won the CIBSE Undergraduate Award – and a prize of £500 – for his final-year project, ‘Investigation into potential CO₂ and energy savings due to specification of electrical cabling based on energy efficiency criteria’.

The award, sponsored by Hays Building Services, has been in existence for more than 20 years and is designed to encourage students to develop their potential and aim for excellence. It is targeted at those in their final year of a building services course, accredited by CIBSE, and recognises their academic achievements.

A trophy was also awarded to London South Bank University in acknowledgement of its achievements.

Happold Brilliant Award

This accolade recognises excellence in the teaching of building services engineering, and was this year presented to MidKent College.

Lee Hargreaves, associate at the Happold Foundation, presented the award to Kim Howes, who accepted the award on behalf of the college.
Water-filtration gadget lets Hayden sail off with SoPHE Young Engineers award

A simple adaptor to aid water filtration, which can be fitted to any home-made set-up, has won the 10th Society of Public Health Engineers (SoPHE) Young Engineers Awards.

Alastair Hayden, who designed the winning project, considered options for manufacture, material selection and costs. He won a sailing weekend in Devon or Cornwall, for two.

SoPHE worked with the charity Engineers Without Borders and its Mexican partner Cominos de Agua for this year’s awards. The challenge considered the rising levels of arsenic and fluoride in groundwater in areas of Mexico because of over-exploitation of aquifers. Entrants had to design a simple, small-water adaptor – made from cheap and widely available materials – that would fit into a bone char ceramic filter and attach to any home-made filtration set-up. Bone char is a naturally occurring, porous material that is effective in treating the water.

Hayden impressed the judges with his good understanding of the brief and his thorough research. They felt his final proposal was appropriate, scalable and sustainable. Joshua Dugdale received a high commendation for his proposal, which responded well to the brief and came up with an innovative solution. The judges particularly liked that it could be used in a variety of water containers.

The awards were presented at the SoPHE annual dinner in November, when Ian Fellingham was awarded an Honorary Fellowship of the society, in recognition of his contribution to the industry. SoPHE also donated £1,500 from the event to Engineers Without Borders UK.

Nominations for officers, board and council members

New CIBSE officers, board members and council members are elected each year to take office from the AGM in May. Officers and elected board members serve on the board, which is the Institution’s governing body. It comprises seven officers – president, president elect, three vice-presidents, honorary treasurer and immediate past president – and five elected members.

The council is a larger consultative body that advises the board on Institution policy. It includes representatives of regions, societies, groups and standing committees, and elected members, who serve a three-year term. Two corporate members and one non-corporate member can be elected each year.

The board is required to nominate candidates for all officer and board member vacancies arising at the AGM. It is advised by nominations panel, and all sections of the Institution are invited to suggest candidates for consideration.

The panel gives careful thought to its recommendations and seeks to reflect Charity Commission guidance by nominating a range of candidates with the skills and experience required to fulfil the board’s role as the governing body of a significant Registered Charity. It also seeks to ensure that the board includes a balance of representation from different sectors of the industry.

The board’s nominations this year are as follows:

- **President elect:** Lynne Jack CEng FCIBSE FSoPHE
- **Vice-presidents:** Ashley Bateson CEng FCIBSE, Kevin Kelly CEng FCIBSE FSoPHE, Stuart MacPherson CEng FCIBSE
- **Honorary treasurer:** Adrian Catchpole CEng FCIBSE
- **Members of the board:** P L Yuen FCIBSE
- **Members of council:** Colin Ashford LCIBSE, Maria Longo

Further details on the nominations process, qualifying criteria and biographical notes can be found in the members section at www.cibse.org

Nomination rules

Members of the Institution are entitled to nominate additional candidates for vacancies arising in May 2018, in accordance with the following rules, set out in Royal Charter, By-Laws and Regulations:

- **Fellows, Members, Associates and Licentiates** may submit nominations for the offices of president elect, vice-president and honorary treasurer, and for elected members of the board. The candidates must meet the qualifying criteria, and must be supported by 10 nominations from Fellows, Members, Associates and Licentiates.
- **Fellows, Members, Associates and Licentiates** may also nominate individuals from those grades for membership of council. Graduates, Companions and Affiliates (including students) may nominate individuals from those grades for membership of council. Candidates for council must meet the qualifying criteria and must be supported by five nominations from members in the appropriate grades.

Any such additional nominations must be made in writing to the chief executive, to be received at CIBSE headquarters by 31 January 2018, together with the written consent of the nominee to accept office if elected. The names of those making nominations will follow the name of the candidate on the ballot paper, should a ballot be required.
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New members, fellows and associates

FELLOWS

Bell, Graeme Andrew
Leeds, United Kingdom

Liu, Kam Wah
Kowloon, Hong Kong

Spencer, Ian
Wigan, United Kingdom

Redshaw, Stuart
Nottingham, United Kingdom

Tiang, Yiu Man
North Point, Hong Kong

McKenzie, Charles Neil
Denny, United Kingdom

MacFarlane, Daniel John
London, United Kingdom

Mansel-Thomas, Laura
Colchester, United Kingdom

Peerbocus, Zubair As-swaif
London, United Kingdom

ASSOCIATE

Hobson, James
Sittingbourne, United Kingdom

LICENTIATE

Smith, Dean
Tadley, United Kingdom

Yates, Michael
Portsmouth, United Kingdom

Reader, Christopher
Leicester, United Kingdom

Taylor, Stephen Michael
Manchester, United Kingdom

Tanner, Jacob
Bexleyheath, United Kingdom

Koonen, Rupinder
Birmingham, United Kingdom

Carr, Ryan
Bath, United Kingdom

Pullian, Adam
Bristol, United Kingdom

Jones, Bethan Jane Marie
Leeds, United Kingdom

Goodfellow, Benjamin James
London, United Kingdom

Clarke, Eleanor
London, United Kingdom

MEMBER

Man, Hung San Sunney
NT, Hong Kong

Ng, Siu Yuen Bryan
Taiung Kwan O, Hong Kong

Yiu, Kei Sing
Kowloon, Hong Kong

Ng, Ka Fai
Tai Kok Tou, Hong Kong

Leung, Hei Fai
Hong Kong, Hong Kong

Lou, So Fong
Tuen Mun, Hong Kong

Chang, Hsiu Ming Kevin
Vancouver, Canada

Chan, Siu Wai
Tsing Yi, Hong Kong

Lau, Ho Yin Wallace
Fanling NT, Hong Kong

Yu, Tsz Kiu
Tsing Yi, Hong Kong

Cook, Benjamin
Sydney, Australia

Chan, Ka Chun
Tuen Mun, Hong Kong

Tsang, Ka Wai
Tai Po, Hong Kong

Wong, Yao
West District, Hong Kong

Lai, Kit On
Sha Tin, Hong Kong

So, Wai Nang
Tai Koo Shing, Hong Kong

Wu, Suet Kuen
Chai Wan, Hong Kong

O’Neill, Denis Patrick
Maynooth, Ireland

Tighe, Paul
Dublin, Ireland

Goode, Kieran
Crossbarry, Ireland

Knights, Jason
Leatherhead, United Kingdom

McDonald, Matthew Thomas
Maggil, Australia

So, Man Kin
Wong Tai Sin, Hong Kong

Traboulsi, Rana
Bristol, United Kingdom

Wong, Lap Keung, Elken
Tsing Yi, N.T, Hong Kong

Leung, Wai Chung
Kowloon, Hong Kong

Ngai, Tin You
Wan Chai, Hong Kong

Pieraccini, Tommaso
London, United Kingdom

Chrysospathis, Christos
Athens, Greece

Dimopoulos, Konstantinos
Stratford, United Kingdom

Baldini, Alessandro
London, United Kingdom

Pyrintinos, Konstantinos
Bristol, United Kingdom

Mudoni, Marco
London, United Kingdom

Kwok, Wai Kin
Tuen Mun, Hong Kong

Simpson, Keith
Eastbourne, United Kingdom

Rimmer, Julian
London, United Kingdom

Kwan, Chun Hing
Kowloon, Hong Kong

McMillan, Richard
Grangemouth, United Kingdom

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www.cibsejournal.com December 2017
A reader recalls conditioning the House of Lords, and LinkedIn members discuss MEES

**Memory lane**

The article on the investigation of Parliament’s old ventilation system (CIBSE Journal, November 2017) brought back memories.

In the 1960s, I was a junior design draughtsman at the then Ministry of Works, which did the design and operation of all government buildings. I worked in the section that specialised in air conditioning systems. After complaints from the Lords about the temperatures being reached in their chamber, I was given the job of designing an air conditioning system for the House of Lords. I had to do a complete survey of the area surrounding it, which involved crawling through the existing brick air ducts so I knew where to install sheet metal ducts for the new system. I also had access to copies of the original Parliament design drawings, with all the statues shown in detail and coloured in.

Some horizontal brick ducts were hair-raising to survey because, in those days, torches were not that good. You could be going along and suddenly find no floor in front of you, only a huge vertical shaft with no apparent bottom.

The new system was installed in the cellars and, because there was very limited English equipment, Trane plant was used. I often wondered what the Lords would have said if they knew they were being kept cool by American air conditioning. The whole installation was probably replaced years ago – but, then, you never know. As the saying goes – been there, done that.

Clifton Walker

**CIBSE LinkedIn group discusses how MEES might be affected by grid decarbonisation**

**Chris Yates**

I predict a riot... or at least some consternation among commercial landlords. It goes like this: April 2018, MEES kick in. My property is heated by electricity and it gets an F-rated EPC. I can’t sell it or let it out.

Some time later, the Part L carbon factor for electricity catches up with reality. Electricity has miraculously become much cleaner; no longer emitting 529g of CO₂ per kWh, but probably about half that. My electric heating is now ‘clean’ and the EPC rating kicks up at least one band because it is compared with a building heated by gas. I’d be gutted if I’d spent a tonne of money installing a gas boiler.

**Stephen Borman**

I am renting out a flat that has electric heating with Economy 7. There is no gas in our building, so a gas boiler won’t be much use. We do, however, have storage heaters, which, surely, could use some of that ‘unreliable’ wind energy at night-time and be quite efficient?

**Chris Yates**

The grid is usually at its lowest carbon factor during your low Economy 7 tariff. What about real-time tariffs? Use cheap electricity while the wind blows.

**Gavin Gulliver-Goodall**

I will take this one step further – the dash for electric cars. Whatever the development of battery technology, the KWh per mile travelled is pretty fixed because of the mass, wind resistance and driving style of the vehicle, so all owners will want to recharge their vehicles overnight. That is a lot of KWh to deliver through the grid, especially in rural or suburban areas.

**Andrew Geens**

MEES is, in principle, a good thing, focusing the attention of landlords on the energy performance of their assets. There is evidence that tenants were getting savvy about energy costs before MEES came along, so this may not be a big change for some. Having selected EPCs as the metric for this legislation, BEIS [Department for Business, Energy and Industrial Strategy] will need to be smart with its exemptions to deal with situations that are genuinely a problem and not just landlords trying to avoid their responsibilities.

**Dzhordzhio Naldzhiev**

Considering the minimum standard is an E, it’s not too onerous. As long as the compliance/energy assessors advise how to improve buildings rather than churn out certificates and simply offer the cheapest option on SAP/SBEM/DSM, there should be progress.

**Chris Yates**

Most buildings could get an E even with electric heating. Once the carbon factor drops below 0.24, it’s even better than gas. There are other electricity-intense processes that lower electric carbon factors will affect: small form-factor pluggable (SFP) transceivers and lighting. It will also be a nail in the coffin of CHP.

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A sense of direction

Despite uncertainty around Brexit, there seems to be a greater sense of policy direction for energy, emissions and buildings, says Hywel Davies

The ‘Clean Energy for All Europeans’ package, published last November, sets out a pathway for the future of European policy on the promotion of renewables, energy performance of buildings, and the design of electricity markets. It includes, as one of several legislative initiatives, proposals for a review of the Energy Performance of Buildings Directive (EPBD).

In October, the UK government published its Clean Growth Strategy, setting out its plans to improve energy efficiency in the UK building stock, reduce energy use and costs in business, and help to meet the ambitious targets set by the fifth carbon budget.

Although UK carbon emissions have fallen by 40% from 1990 levels, the fifth carbon budget – due to run from 2028 to 2032 – requires a reduction of 57% relative to 1990. In 27 years, we have reduced emissions by 1.5% a year; we have around 14 years to reduce them by a further 17%.

As the UK government acknowledged in the Clean Growth Strategy, ‘to meet the fourth and fifth carbon budgets, we will need to drive a significant acceleration in the pace of decarbonisation and, in this strategy, we have set out stretching domestic policies that keep us on track to meet our carbon budgets.’

As buildings are the single largest energy consumer in Europe – using around 40% of aggregate energy demand – it is no surprise that they are at the centre of efforts to reduce demand and associated emissions.

Given the requirements of the UK’s Climate Change Act – which is home grown, not European – and our commitments to the Paris Agreement, the UK must redouble its efforts to improve the energy performance of its buildings, whether we are in the EU or out.

Revision of the EPBD is, therefore, far from an academic exercise in the corridors of Brussels. The European Council agreed its position on the revision in June, aiming to promote energy efficiency in buildings and support cost-effective renovation, to decarbonise the existing European building stock, which is highly inefficient. This will be a major contributor to meeting the EU’s 2020 and 2030 energy efficiency targets.

In October, the European Parliament’s Committee on Industry, Research and Energy (ITRE) adopted its formal report on the review of the Directive, which seeks to strengthen some of the measures. Negotiations between the Council, the European Parliament and the Commission are now progressing under the Estonian presidency, with the aim of reaching agreement by Christmas.

As one aspect of the proposal requires member states to establish long-term renovation strategies and to address energy poverty, the Clean Growth Strategy looks particularly timely, and would be needed whether or not the UK had chosen to leave the EU.

Another feature of the revised Directive is ‘the promotion of electro-mobility’ – requiring at least one charging point and pre-cabling for every third parking space for electric vehicles in non-residential buildings, and pre-cabling for every parking space in residential buildings – to apply to all buildings with more than 10 parking spaces.

This has implications for electrical designs, and it is anticipated that the wiring regulations will be updated accordingly. Again, there is a synergy with recent UK Budget announcements on electric-vehicle infrastructure.

The proposals will also introduce a ‘smartness readiness indicator’ (SRI) for buildings, which seeks to encourage making new buildings more ready for digital and smart technologies. Details of what the SRI will involve are sketchy, and there is the potential to create a new design gaming activity, to maximise the rating of a new design against the SRI.

Finally, it is proposed to simplify the system of inspection of heating and air conditioning systems. At this stage, it appears that the current approach of information campaigns will no longer be allowed. It is suggested that remote monitoring may be allowed in place of physical inspections, and that there should be a focus on larger buildings, with new thresholds proposed.

While this is an EU Directive, it will probably come into force before the UK leaves the European Union, so is likely to be included in the provisions of the Withdrawal Bill. It is also clear that, on the issue of energy, emissions and buildings, the UK and the EU are co-travellers on a journey to a decarbonised low-emissions future – and this is not dependent on the ongoing negotiations over Brexit.

In this area, we have a degree of clarity about what needs doing, and Journal readers have the knowledge and skills to deliver the proposed measures. If we are serious about the fifth carbon budget, we really have no choice.
Smarten up or risk dumbing down your BMS

Modern integrated controls must have a clear maintenance strategy so they do not become a burden for users, says InTandem Systems’ Jon Belfield.

Leaps in technology in the past two decades have created the belief that anything is possible with controls. But while products with ever-more sophisticated onboard controls offer the opportunity to increase efficiency and cut energy bills, they also require skilled integration of BMS and intelligent equipment in order that data can be exchanged between systems.

Although lighting, air conditioning, metering and ground source heat pumps (GSHP) can function in isolation, the BMS is the ‘hub’ for a building’s control and management. For example, the BMS needs to know what the air conditioning is doing to avoid simultaneous heating and cooling, and it needs to access the GSHP to maximise its use and only employ boilers/chillers when necessary.

Integration of controls is the responsibility of BMS specialists, who liaise with the suppliers of each system. This ensures that IT protocols and devices are compatible, so the correct data can be shared, without compromise, to any of the connected systems.

The challenge for the supply chain is to work together to deliver the overall system that the client requires. As part of this process, the equipment suppliers – who traditionally provided products that required full control from BMS systems – need to offer technical and field commissioning support for the new intelligent systems.

In the past, for example, air handling units (AHUs) might have been supplied without any controls and so require full BMS control. Now, some come with onboard control systems, and can be integrated simply, via volt-free contacts. A high-level interface is required, however, to get the data onto the BMS, so the client can access it from one point, and plant – such as boilers and pumps – can be enabled to meet any heating demands from the AHU.

Equipment suppliers need to help facilitate the BMS becoming the ‘hub’ for accessing and managing the systems during building operation.

With the focus then moving beyond ‘practical completion’ towards the operational life of a building, there are management challenges, because sustainable support mechanisms for smart buildings are still being worked through.

Once the building is handed over and occupied, facilities staff must ensure the integrated systems are maintained and supported. This presents anomalies, because maintenance contracts may be let separately, even though systems share data and devices. Routine software and firmware upgrades on one system may have an impact on another system to which it is integrated.

For example, a Bacnet connection was made between the BMS and a packaged GSHP. After routine maintenance on the GSHP – when all the look-up registers were changed during a firmware upgrade – ‘shared’ points held in those registers were no longer visible to the BMS. The GSHP worked correctly, as the points were still visible on that system, but the BMS showed a failure.

In our example, engineers that commissioned the individual systems – with the full understanding of the specific site-integration requirements – were no longer available, meaning the impact of changes across the networked platform were not fully understood.

If a system fails, it may not be an issue with the BMS, but with a shared device on another system, which requires input from a specific system supplier, rather than the BMS specialists. In the example given above, the BMS heating demands were affected because the GSHP data was no longer available. The GSHP supplier needed to supply the new register information so these look-up addresses could be changed within the BMS.

The supply chain needs to embrace open systems and integration, and have an ‘eyes wide open’ understanding of how the BMS will be managed and maintained. A strategy for supporting the integrated systems should be in place early, before building handover. A single document should define the levels of integration and protocols used, which will enable the occupier to budget for maintenance.

If a combination of companies is required to maintain and support the systems, site-specific relationships should be cultivated between these companies to ensure the right person is deployed to particular issues with the system.

Despite these challenges, such systems offer extensive opportunities for ‘smart’ control of building services – as long as the supply chain works together. In summary, smart integrated buildings need smart integrated support.

See page 52 for our feature on InTandem Systems.
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Build2Perform Live attracted more than 175 leading industry speakers at Olympia London. Alex Smith and Liza Young tapped into the vast array of expertise on offer and teasers for new CIBSE publications, including TM40 Health and Wellbeing, which aims to guide CIBSE engineers through the plethora of research and standards that have been published on the subject.

As well as presenting the shortlist for the 2018 Building Performance Awards (see page 24), the event introduced five inaugural members of the Society of Digital Engineers’ hall of fame (see panel ‘Digital hall of fame’), while the Green Infrastructure Design Challenge was launched with ARCC/UKCIP (see page 69).

The conference was opened by CIBSE President Peter Y Wong, who focused on the burgeoning wellbeing agenda and the opportunity the...
Clean Growth Strategy presented to the industry, despite Brexit.

On the digital front, the new Society of Digital Engineering hosted two half-day sessions, one on design and another entitled ‘Make’, which focused on building. In ‘Design’, Carl Collins covered the requirements that project clients have to do to enable BIM Level 2 processes.

Aleksander Wisniewski, a senior mechanical engineer at Buro Happold, and Dejan Mumovic, professor of Building Performance Analysis at University College London (UCL), covered automated concept design and how digital tools and processes can standardise early design methods without compromising the design itself. Mumovic described a benchmarking tool CIBSE is developing with UCL.

In a mathematical modelling session, SE Controls design manager Chris Iddon looked at the most effective way of calculating ventilation opening areas, (Air of Credibility, CIBSE Journal, May 2016).

Breathing Buildings chief executive Shaun Fitzgerald discussed how a water bath was used to model airflow in the Bloomberg building (see page 28). Henry Burridge, a lecturer in fluid mechanics at Imperial College London, attracted interest when he shared research on modelling airflow in a room, showing how heating affected air movement and, subsequently, the indoor air quality.

On day two, in the session on end users’ relationship with building controls and management, speakers said occupant education and post-handover aftercare were key to a good controls strategy.

Dr Michelle Agha-Hossein, soft landings operational lead at BSRIA, said a simple-to-understand guide for both the user and the facilities manager (FM) is essential, as well as helping users understand how they should interact with their building during the early stage of occupancy.

She said: ‘People are more productive if they have some level of control over their environment. However, when a building has both automatic and manual controls, they can create conflict.’

For example, in one building, users forgot to open the blinds in the afternoon, so the perimeter lights – with daylight sensors – were always on. Occupants were not aware of this, so there was conflict between the automatic and manual control systems.

This could lead to even worse consequences: in another building, Agha-Hossein said because occupants opened the windows instead of turning down the heating in the afternoon, the FM simply encased the controls in a locked box on the wall, rather than educating the users.

Kate van Someren, research engineer at the University of Reading, said controls should be intuitive, so anyone can use them without instructions. Controls with feedback – like an audible click – can help users understand and engage with them. ‘If we design for the most vulnerable users, everybody benefits,’ she added.

Dr Zack Gill, senior energy solutions engineer at Fortem Energy Solutions, said he witnessed good practice at an academy in Folkestone, Kent, where the FM reported energy use to the finance director on a weekly basis, and the building started saving £40,000 a year on energy bills. ‘Championing more performance-based targets will ensure all stakeholders pull up their socks and work together to deliver well-performing buildings, and then follow up on them,’ he said.

Richard Tetlow, sustainability consultant at Aecom, said the real challenge is trying to communicate the design intent of a control system to the building users.

During a post-occupancy evaluation at one school, Tetlow discovered that the project ran out of money, so a natural ventilation strategy – with night cooling – replaced a mechanical solution. ‘The users left the night vents open all the time, so the BMS engaged the heating earlier to warm up the building. Because the industry is so siloed, it’s hard to ensure all the systems are linked up’.

At the resilient cities session, Lee Chapman, professor of climate resilience in the school of geography, earth and environmental science...
The #Build2Perform hashtag attracted great running commentary from delegates. Here are five favourites:

Susan Hone-Brookes @brookes_hone
Budget News! Proceeds to fund a new £220m Clean Air Fund. Very timely given our discussions at #build2perform @cibse.

Kyle Gray @KyleAlexGray
Nottingham Trent new housing project Trent Basin went for tender for a battery that would guarantee an output of 1MWh after 10 years of use. They are installing a 2.1MWh Tesla battery. Food for thought.

Paula Morgenstern @pau_morg
In multi-tenanted buildings all sub-meters need to be specified so they can be used in billing + client & managing agents need to know how to use the system #Build2Perform #metering

Loic Jacob @fjmjacocb
Smart sensing with... Pigeons? Turns out you can learn a lot from them. Lee Chapman from @unibirmingham, @arbnco, @CIBSE #Build2Perform

Ben Virgo @virgoben
It’s not ‘leaves on the line’ it’s moisture from the leaves... oh, that makes a bit more sense @CIBSE #build2performw

at the University of Birmingham, said big data can help safeguard critical infrastructure. The Birmingham Urban Climate Laboratory’s HiTemp project is examining the city’s urban heat island (UHI) by deploying the densest air temperature-sensor network in the world to identify, model and promote adaptation to the impacts of urban heat and climate change on the people and infrastructure.

By deploying a high resolution sensor network, the project has helped unearth the impact of temperature on electricity transformers. ‘Once temperatures reach 6°C above their operating temperature of 98°C, their life expectancy halves. So we know they will need replacing by 2050.’ Its Wintersense project measures road surface temperatures for gritting applications, and its Summersense project uses infrared sensors to investigate ways to reduce heat-related railroad buckling.

Its next project – CityFlocks – will involve strapping lightweight sensors to pigeons’ backs to understand the 3D nature of UHI. ‘If we understand how heat behaves, we can get insights into things like pollution,’ he said.

Dr Debbie Clifford, environmental data consultant at the Institute for Environmental Analytics (IEA), said it uses satellite data to create tools that help people safeguard their infrastructure and improve their local environment.

In one of its projects, the IEA has used satellite data to produce solar maps of the Seychelles – studying incoming radiation levels and the impact of clouds – for the Public Utilities Corporation and the government to make better investment in renewable technologies. ‘The tool explores data and allows the users to run their own scenarios to see how a different mix of technologies at different sites would help them address the energy challenge of the future,’ Clifford said.

She added that a new European satellite was launched last month to monitor nitrogen oxide, ozone, formaldehyde, methane and carbon monoxide levels.

‘Cities face a lot of environmental challenges in the future, so they need to consider how adapted they are to mitigate them,’ she said.
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AT THE FOREFRONT

The high calibre of companies shortlisted for the 2018 Building Performance Awards shows it is possible to get to grips with the challenge of designing buildings that perform, says Alex Smith.

Judges for the 2018 CIBSE Building Performance Awards have shortlisted 60 of the best projects and initiatives in the industry. This year, there are 14 categories, which have attracted entries from all sectors – from small and medium-sized enterprises (SMEs) and councils, to higher education colleges and blue chip property giants.

Higher education buildings have made a particularly strong showing in the 2018 shortlist. They feature prominently in the award for Project of the Year – Public Use, as well as in the Facilities Management Team of the Year category.

The high number of contenders reflects the current strength of the sector and the level of competition there is among universities for students.

‘The quality of higher education buildings is now really high,’ said Tamsin Tweddell, senior partner at Max Fordham. ‘There were several projects here that could have been winners in the public use category in previous years.’

Not all the nominations for shortlisting were unanimous. There were marked differences of opinion in several categories, including the Commercial/Industrial Project of the Year. Chair of judges Hywel Davies said discussions were ‘the most lively and vigorous’ he had seen in the judging process, in its 11 years.

Another hotly contested category was the Energy Management Initiative Award, with some judges questioning whether it should recognise improvements in what were poorly set up buildings. After some debate, they agreed it was important to encourage the improvement of all buildings.

‘Some of these buildings have needed an energy management initiative to put right previous wrongs,’ said Davies. ‘We need to encourage that. We don’t want to knock people for admitting buildings aren’t working.’

Mitsubishi Electric’s Donald Daw agreed. ‘The transition of buildings from poor to good is what we have to encourage,’ he said.
“Judges were pleased that all the entries spoke of the importance of learning from the experience of operating the building”

In the Energy Efficient Product or Innovation of the Year category, there was a good mix of new products yet to come to market, and ones that had proven benefits. There was considerable excitement around some of the entries in this category, and the judges were encouraged to see products that were not necessarily highly engineered. “It’s good to see a diverse range of entrants in this category. We don’t often consider non-engineering solutions as being valid in our industry, and we should,” said David Stevens, vice-chair CIBSE Facilities Management Group.

The Collaborative Working Partnership Award attracted entrants from a diverse range of sectors, from commercial offices and galleries, to university buildings and social housing projects. Judges remarked on how difficult it can be to bring stakeholders together on projects when they have different priorities.

The Learning and Development Award attracted a high number of excellent initiatives, which were received enthusiastically by the judges.

“I found this the most interesting category,” said Daw. “There was something I loved in all of these, which made it difficult to judge.” The panel remarked that the strength in this category proved there was a thirst for learning in the services sector.

In the Consultancy of the Year (101-1,000 employees) category, judges were impressed by the entrants’ investment in young engineers. “There are a range of things that these companies are doing,” said Davies. “They either have strong graduate programmes or have provision for developing their engineers.”

The category for companies with more than 1,000 employees was another closely fought group, with judges’ marks being very similar. They were pleased that all the entries spoke of the importance of learning from the experience of operating the building.

“All of them had picked up on post-occupancy evaluations and the need to recognise when projects had gone wrong and required remedial work,” said Davies.

The shortlisted companies were announced at last month’s Build2Perform Live event, and will now vie to win the trophies at the Building Performance Awards presentation on Tuesday 6 February 2018.

They will look to emulate the University of Bradford’s department of estate and facilities, which – last year – not only scooped the Facilities Management Team award, but was also named the overall Building Performance Champion.

We will have to wait and see whether the next winner will also come from the education sector. CJ

CIBSE BPA 2018 JUDGING PANEL

1 Hywel Davies (chair) Technical director, CIBSE
2 Justin Bere Director, bere:architects
3 Mark Bryan Associate director, TÜV SÜD
4 Iain Carlile MSLL Associate, DPA Lighting Consultants London, and president elect, SLL
5 Donald Daw Divisional commercial director, Mitsubishi Electric
6 Julie Godfrey Head of sustainability development, CIBSE
7 Renford Gordon Development manager, CIT Group
8 Mark Hawker FCIBSE Senior engineering design manager, Sainsbury’s
9 Debbie Hobbs MCIBSE Head of sustainability, Legal & General Property
10 Susan Hone-Brookes FCIBSE Chief engineer, MTC and CIBSE board member
11 Sarah Ratcliffe Programme director, Better Buildings Partnership
12 David Stevens MCIBSE MSLL Vice-chair and secretary, CIBSE Facilities Management Group
13 Mark Sutton Vane MSLL Director and principal, Sutton Vane Associates
14 Tamsin Tweddell Senior partner, Max Fordham
15 David White FCIBSE Managing director, Building Services Design

The awards night – on 6 February 2018, at London’s Grosvenor House Hotel – will celebrate achievements across the built environment supply chain. Book a table now on www.cibse.org/bpa

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“THE ATMOSPHERE IS GREAT EVERY YEAR GETS BIGGER WHICH MEANS WHAT WE DO IS GOING OUT THERE AND GETTING MORE AND MORE RECOGNITION”

Sasha Krstanovic, Director at AECOM
Winner of CIBSE Building Performance Consultancy of the Year (over 1,000 employees) 2017

HOST
Mark Watson, comedian, producer and director

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Tuesday 6 February 2018

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SHORTLIST:

BUILDING PERFORMANCE CONSULTANCY (UP TO 100 EMPLOYEES)
» Crookes Walker Consulting
» Elementa Consulting
» Keysource

BUILDING PERFORMANCE CONSULTANCY (101 - 1000 EMPLOYEES)
» BDP
» Couch Perry Wilkes
» Hoare Lea
» Red Engineering Design
» TUV SUD Real Estate

BUILDING PERFORMANCE CONSULTANCY (OVER 1000 EMPLOYEES)
» AECOM
» Atkins
» BuroHappold Engineering

COLLABORATIVE WORKING PARTNERSHIP
» 5 Broadgate London Real Estate Programme – UBS
» David Attenborough Building – BuroHappold Engineering
» Energy Monitoring Platform with Intelligent Apportioning – Next Control Systems
» Royal Academy of Arts Heating Refurbishment – Remeha
» The NEDO Project – NFS Northwest

ENERGY MANAGEMENT INITIATIVE
» Aquatics Centre on the Queen Elizabeth Olympic Park – ENGIE
» Creation of a new London HQ at Broadgate that achieves the highest level of sustainability – UBS
» Knowledge-based Energy Management of Swire Properties Hong Kong Portfolio – Swire Properties
» Riverside Museum – IES / Glasgow Life
» Tower 3, Beyond The 6 Star NABERS Barrier, Melbourne, Australia – BDP

FACILITIES MANAGEMENT TEAM
» Midway House, Birmingham – CBRE Global Workplace Solutions
» Regent’s Place Office Buildings – Broadgate Estates
» University of Oxford Carbon Reduction Programme – University of Oxford

LEARNING AND DEVELOPMENT
» Atkins Human-Centred Design Initiative – Atkins
» Building Maintenance Apprenticeship Initiative – George Birchall Service
» GATES Training Scheme – Hurley Palmer Flatt
» Getting to Zero – Elementa Consulting
» Net Zero Buildings’ offsite construction tour/Redmoor Academy’s Schoolhaus® grand opening – Net Zero Buildings
» Sustainability Matters – Landsec / UK Green Building Council

ENERGY EFFICIENT PRODUCT OR INNOVATION
» Artus: Hybrid Low Energy Fan Coil Unit – Arup
» Danfoss FlatStation – 7 Series D5 (R-410) – SAV Systems
» i-FX-Q2 – Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A
» NewMass – BuroHappold Engineering
» RQM Multiview – Nicotra Gebhardt
» SmartAir – R & B Industrial

ENERGY SAVING PRODUCT OR INNOVATION
» Alreflex Full Fill – Thermal Economics
» C-Tech – Cavendish Engineers
» Q-Floor – Q-Bot
» Speed Technology for Lift – SODMAS

PROJECT OF THE YEAR – COMMERCIAL/INDUSTRIAL
» 350 Euston Road HVAC Refurbishment – Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A
» David Attenborough Building (Cambridge Conservation Initiative offices) – BuroHappold Engineering
» The Enterprise Centre – Architype / BDP
» Welcome Wolfson Institute for Experimental Medicine – WYG

PROJECT OF THE YEAR – LEISURE
» Oran – Max Fordham
» Shambrook Mill Theatre Phase 1 – Ash Building Services Consultants

PROJECT OF THE YEAR – PUBLIC USE
» Blavatnik School of Government – Hoare Lea
» Centre for Medicine, University of Leicester – Willmott Dixon
» Glass/SmithKline Carbon Neutral Laboratory for Sustainable Chemistry – AECOM
» The Fusion Building – Hoare Lea
» University of York Environment Building – BuroHappold Engineering
» Windmill Community Campus – Fife Council – Property Services

PROJECT OF THE YEAR – RESIDENTIAL
» Cobalt Place – TUV SUD Real Estate
» Hampshire Passivhaus – Cundall
» Killynure Green, Carryduff – Choice Housing Ireland
» The Paise – Newton Architects

PROJECT OF THE YEAR – INTERNATIONAL
» Capamor Headquarters, Almeria, Spain – Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A
» Pomona: Ultra-Low Energy Lab Eliminates Performance Gap, California, USA – Elementa Consulting
» The “New healthy office”, Warsaw, Poland – BuroHappold Engineering
» UCLA Engineering VI – Phase I (WIN-GEM), California, USA – BuroHappold Engineering

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BUSINESS IN BLOOM

Bloomberg’s new European HQ sets high standards for large-scale sustainable office design. The ambitious services strategy features a petal-shaped chilled ceiling and innovative vacuum drainage, which aims to reduce energy use by 33% and water by 73%. Andy Pearson reports

In the heart of the City of London, close to the Bank of England and St Paul’s Cathedral, is a giant, bronze-clad office building being hailed as an exemplar of sustainability. It is Bloomberg’s newly opened European headquarters, which reportedly cost £1bn and occupies an entire city block. The office actually comprises two buildings, linked by bridges that cross a Roman road that has been reinstated on the site as part of the scheme.

What sets this project apart from its neighbours is that the Bloomberg building has a Bream Outstanding environmental rating, with a score of 98.5% – the highest design-stage score ever for a major office development. This unparalleled rating has been achieved by the design team of architect Foster + Partners and building services engineer Sweco, in response to a challenge by company founder Michael Bloomberg ‘to push the boundaries of sustainable office design’.

The scheme features vacuum drainage, a combined heat and power (CHP) system, an absorption chiller and a bespoke chilled ceiling, and it incorporates a hybrid natural-ventilation option. As a result, the nine-storey development is expected to use 73% less water and 35% less energy than a typical office.

One of the more innovative aspects of the design is that the larger, northern building’s expansive, deep-plan floor plates can be ventilated and cooled using natural ventilation. Outside air will enter the floor plates through the purpose-designed, vertical bronze fins that line the building’s façade and frame the glazing. The fins incorporate acoustically treated vents that open and close to control airflow. From the floor plates, the air will rise up and out of the central atrium.

It is only the northern building that incorporates natural ventilation; the smaller, southern building does not have an atrium and, as a consequence, is mechanically ventilated.

The building's large floor plates meant it was particularly challenging to develop a natural ventilation solution for the office. Foster + Partners, with help from Wirth Engineering and Breathing Buildings, developed a system that enables this leviathan to naturally ventilate in mid-season, and is programmed for commissioning in time for milder weather next spring (see panel, ‘Helping the giant to breathe’).

In summer and winter, when the façades are sealed, the office will be mechanically ventilated with air supplied from rooftop air handling units (AHUs). The air is ducted down five perimeter cores
for distribution via diffusers in the back of
the office’s integrated ceiling. Air is extracted
from above the ceiling, close to the cores.
The systems are set up for 4,500 people
in the building, but at any one time a
reasonable proportion of these will be out,
and others will be in meeting rooms et
cetera – so if we had designed the system
on a constant-volume basis, we’d have had
to supply unnecessarily large quantities
of outdoor air,’ explains Trevor Farnfield,
operations director at Sweco, and design
director for the project.
Instead, each floor – typically containing
700 to 800 workstations – incorporates 60–
70 integrated CO₂ zonal sensors linked to the
building management system (BMS). ‘What
we’ve done is run the system on a variable

“The chilled ceiling enables the natural-
ventilation concept to work for extended
periods”
CASE STUDY | BLOOMBERG HQ

> air volume basis, by moving air around the building to follow where the people are, which gives significant energy and carbon savings,’ Farnfield adds.

The office floor plates feature a bespoke, integrated ceiling, which was proposed by and developed with the architect.

“The chilled ceiling enables the natural ventilation concept to work for extended periods,” says Farnfield. The solution — developed over ‘an extensive period of time and many iterations’ — was led by Foster + Partners’ partner Irene Gallou and is a filigree of polished aluminium petals, ‘inspired by the pressed metal ceilings of New York’.

Chris Trott, Foster + Partners’ head of sustainability, used rapid prototyping to test many configurations of fin inlet and, subsequently, they developed a full-scale, off-site, pre-commissioning mock-up of the office, to refine and optimise the operating characteristics and comfort.

The development process allowed for a highly integrated solution, in which the petals create a large surface area in contact with the chilled water pipework behind. This feature raises the water’s temperature from the more usual 13°C to 16.5°C. This has two main benefits: it reduces the amount of cooling energy needed and it lowers the condensation risk when the building is operating in hybrid mode and cooling is used to trim the lateral heat gains picked up by outside air moving across the floor plates.

Chilled water is supplied from either basement, water-cooled chillers — there are four units producing 1,850kW each — or from roof-mounted, critical back-up, air-cooled chillers — four units producing 550kW each.

LED lamps are incorporated into the ceiling, with the petals acting as light reflectors. Lighting levels are 300 lux, with a power load of 4.7W/m². ‘Because the lighting load is so low, it has the secondary benefit of reducing the cooling needed to offset heat from the lights,’ says Farnfield.

The integrated ceiling panel is pushed tight to the underside of the structural steelwork, to maximise the 2.9m floor-to-ceiling height on the large floor plates, so all services have to pass through the structural steelwork. ‘It was quite a challenge,’ says Farnfield. ‘We ended up with 25,000 holes in the steelwork.’

In winter, fan units — incorporated into the ceiling’s perimeter edge detail — offset heat losses using heat from the three, 520kWe basement CHP units. These are sized to meet a base electrical load

BRINGING MITHRAS'S ROMAN TEMPLE TO LIFE

Roman archaeology is embedded in Bloomberg’s new HQ. The building is bisected by a resurrected Roman road, while its basement contains the Roman temple of Mithras, built in the third century AD.

The temple was first discovered in 1954 - during excavations for the Bucklersbury office building, which previously occupied the Bloomberg site - and the remains were recorded, dismantled and removed. As part of Bloomberg’s redevelopment of the site, it was agreed that the 1,800-year-old temple would be returned to its original subterranean location.

The reconstructed temple now sits beneath the Bloomberg building – seven metres below modern street level – and forms part of a new cultural destination. Designed by US-based Local Projects, in consultation with the Museum of London Archaeology, the visitor experience includes a glazed viewing gallery running around the sides of the temple, and a platform suspended above its central aisle.

Light projected from above, onto baffles, creates the illusion of the long-gone temple walls and columns rising up from the haze-filled space. Courtesy of Bloomberg, London Mithraeum is free to visit, though booking is advised. Visit www.londonmithraeum.com

For more on lighting, see our special on page 37.

London Mithraeum uses light sculpture, haze and sound to bring the temple’s remains to life

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HELPING THE GIANT TO BREATHE

Foster + Partners worked with Wirth Engineering and Breathing Buildings to develop a natural ventilation solution for the Bloomberg building. Breathing Buildings CEO Shaun Fitzgerald explains.

The challenge of any natural ventilation system is that people need to be near an external wall, a roof or an atrium to benefit from fresh air. This building is multi-storey and deep plan, so you cannot say it will be naturally ventilated under all conditions, use profiles, types of space and weather conditions. One of the big challenges for a deep-plan building is how to get natural ventilation to work for large floor plates. With the Bloomberg building, we will bring fresh air in through the perimeter and across the floor plates to the atrium, where it will rise up to exit from the roof.

Chris Trott, of Foster + Partners, developed the approach in house – including the CFD modelling for the rapid prototyping. When the fin characteristics were known, Wirth Engineering was commissioned to carry out what is believed to be the largest CFD study ever undertaken. This looked at the air movement from outside to inside the building, and the CFD used full coupling of the outside and inside airflows. In collaboration with Foster + Partners’ model makers, we constructed the world’s largest water-bath model, to show that getting the airflow to move across the floor plates was going to work. The model was also used to confirm the CFD and analysis, which showed that natural ventilation might not be effective for some floors if they were all linked.

The biggest risk was that the upper floors would become part of the exhaust air pathway for the lower floors. We managed this by divorcing the top floor from the atrium, as far as the air is concerned, because it has roof access. The floor below has its own challenges and has had special treatment; the lower floors work fine.

The openings on floor seven need to be open wider than on floor two, because the buoyancy-stack effect you have available on the higher floor is less than on floor two. We did a lot of work with Foster + Partners to develop the control algorithm for the vent openings, to balance airflows within a given floor and to manage temperature differences between the floors. Effectively, you have to sacrifice some of the ventilation rate you could have achieved on floor two for the benefit of people on floor seven.

Another big problem when you have a 30-metre floor plate is the heat gain the air will experience as it moves across the floor. Natural ventilation might remove much of the heat from the space, but – nearer the atrium – you will need to ensure that cooling is available from the chilled ceiling to limit the heat gain.

Natural ventilation for this building is most definitely a hybrid. We exploit the benefits of natural ventilation when possible, but have the option of sealing the building and running it under a fully mechanical solution. The system has been tested extensively by Foster using mock-ups. There is also a proper soft landing for this building, which will include seasonal commissioning – because you cannot pretend you know how the building will function on day one.

“There is a proper soft landing for this building, which will include seasonal commissioning, because you cannot pretend you know how the building will function on day one” – Shaun Fitzgerald

of 1.5MW, are controlled on electrical demand, and run in parallel with mains electricity.

Heat generated by the CHP units is used by an absorption chiller to cool three large comms rooms, hidden in the basement, as well as other technical facilities, says Conor O’Donoghue, operations director in the buildings team at Sweco.

The CHP units are one layer in a fully resilient N+N electrical system. The building has two incoming 33kV supplies, from different UK Power Networks primary substations, which are transformed down in the building so there is no single point of failure. All critical facilities have standby generation, while an uninterruptible power supply (UPS) ensures continuity of supply.

Perhaps the most unusual building services innovation is the vacuum drainage. This came about because – when Bloomberg issued the sustainability challenge – he made it clear that the organisation was looking to reduce its water consumption. ‘We put forward a proposal for a vacuum drainage system as part of an integrated water conservation strategy,’ says Farnfield. It was an inspired decision: there are more than 450 toilets in the building and a typical flush on a vacuum drainage toilet is 0.8l/s of water – 20% of what a traditional
WC installation would use. ‘It gives us a massive water saving,’ says Farnfield.

In total, five vacuum systems have been installed, each serving one or two vertical blocks of toilets. ‘It gives you a resilient solution, in case there is a problem with one of the vacuum systems,’ adds Farnfield.

With water consumption significantly reduced by the vacuum system, it is possible to flush the toilets using only harvested rainwater and water recycled from wash-hand basins and showers. The harvested and recycled water is passed through filters in the basement before being used for flushing.

‘Effectively, the building uses no mains water for flushing toilets,’ says Farnfield, who anticipates that 25 million litres of water a year will be saved as a result of this solution, equivalent to filling 10 Olympic-sized swimming pools a year. In addition, there are savings in drainage infrastructure costs linked to water consumption.

‘I believe a lot more of these systems will be used in the future, because they use a lot less water, which takes pressure off the mains and an equivalent pressure off drainage from the site,’ Farnfield says. A good idea going down the drain – or not, in this case. CJ

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There is endemic UK government non-compliance with Display Energy Certificates and Advisory Reports, say Leeds Beckett University researchers, who explain why

The first independent synthesis of UK central government compliance with Display Energy Certificates (DECs) and Advisory Reports (ARs) has found that no UK central government buildings achieved a DEC A rating, with 23% being E rated, 11% F rated, and 24% G rated.

This underlines challenges that may be faced should minimum energy performance standards be introduced at a future date.

The study also found that only 42% of the 104 UK central government buildings will likely meet the government property unit (GPU) target to score A to D DEC ratings by 2018.

Non-compliance with DECs was endemic, with 80% of DECs and ARs not lodged for UK central government buildings, implying they are not well-enforced energy efficiency tools.

DECs were introduced by the government in response to the EU Energy Performance of Buildings Directive (EPBD), with legislation requiring them to be displayed prominently by public authority buildings, accompanied by ARs that offer recommendations on potential energy saving measures.

The authors, from the Leeds Sustainability Institute at Leeds Beckett University, investigated UK central government compliance with DECs and ARs. Summary statistics are produced on their lodgement, energy efficiency ratings, and energy saving priority recommendations for 2008 to 2017.

The data
Of the 510 UK central government public authority buildings that may be expected to have DECs and ARs, only 104 could be retrieved via the open access portal.

This implies that 80% of the data originally intended to be collected was unavailable. This is a significant discovery, which is in line with previously published concerns, but indicative of a higher level of non-lodgement and non-compliance.

It is unknown if this was a data management issue associated with the data set, or if building owners had not undertaken the DEC process.

There appears to be no clear correlation between government organisation type and performance.

Overall, most buildings were heated by gas, and have air conditioning, but this likely had no major impact on the rating they were awarded. However, of the six B-rated buildings, two have a biomass boiler, and 67% of the B-rated buildings have natural ventilation in place rather than air conditioning.

This research has not collected data to suggest DECs have not encouraged buildings to improve, it offered an insight into the ARs that were produced relating to the government estate. These pertain to 36
priority AR recommendations on potential energy saving measures for G-rated UK central government buildings.

Perhaps surprisingly, these 36 priority AR recommendations do not appear to prioritise fabric improvements to the buildings. Insulating buildings – often referred to as the ‘fabric first’ approach – is endorsed by experts, such as in the Building Research Establishment (BRE) guide by Stenlund. But fabric insulation is not mentioned in any of the top 10 priority AR recommendations, and is only mentioned three times in the entire list.

This suggests either a misalignment of AR recommendations with best practice principles for energy retrofits, or that there may be planning, listed building consent, or cost issues.

This means that fabric improvements are not being recommended for these buildings, which is a significant issue for improving the performance of the UK central government building stock.

It will be the focus of future investigations, including similar issues that might exist in the local government building stock in England and Wales.

Interestingly, there appears to be a substantial diversity in the type of AR recommendations being provided.

This may mean either there are no easy wins that can be applied universally to improve the energy efficiency of the UK central government buildings, or such buildings require relatively bespoke investments.

Having said this, several clusters or themes do seem to appear among the AR recommendations. For example, there appears to be a focus specifically on: expert assessment of air conditioning (AC) systems in accordance with CIBSE TM 44 (10 recommendations); reduction of hot water use (10 recommendations); electrical equipment automated controls and monitoring systems (nine recommendations); introduction of energy management techniques (nine recommendations); and expert review of strategies and implementation plans for lighting upgrades (nine recommendations). Less frequent recommendations include installation of renewables and more energy efficient equipment.

References:
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Lighting industry must learn to embrace role as improver of human health and wellbeing
A brise soleil, linked to two NASA satellites, monitors the surface of the sun and projects its solar-flare activity onto its fibre optic lighting system. Jill Entwistle finds out how daylight control is also art

Solar flair

Corona is on the cusp of art and science. It is both work of art and daylight-control device. Created by artist Wolfgang Buttress – who created The Hive at Kew Gardens – it is a complex answer to a simple brief: a ‘living sculpture’ that improves the energy efficiency of the building by day and by night.

Like The Hive – which explores the life of the bee colony – it is the result of Buttress’s collaboration with physicist Dr Martin Bencsik, of Nottingham Trent University, and BDP Lighting. The 50m by 20m brise soleil sculpture sits on the façade of Nottingham’s new Discovery Building, Designed by CPMG Architects, the 4,645m², five-storey building will support more than 700 new bioscience roles in the city over the next 30 years, and houses high-tech biology and chemistry laboratories, as well as offices and space for commercial leasing.

Corona’s structure comprises 1,160 aluminium extrusions, which form a curtain. The configuration is inspired by Nottingham’s historic lace industry. ‘What’s interesting about lace is not just its form, but the space – the voids – between the lace itself,’ says Buttress. ‘These are all extrusions of the voids.’

As well as providing solar shading by day, the curtain houses a fibre optic lighting system. This creates a perpetually fluctuating, shimmering lit effect that animates the building’s façade at night.

There is meaning in the colours and duration of different phases, as Corona not only offers protection from the sun by day, but reflects its activity at night.

Linked to two NASA satellites monitoring the surface of the sun
for solar-flare activity, the Corona sculpture translates this energy through the lighting system, reflecting the sun's rotation in real time on the building's façade. It morphs from cooler colours – whites, blues, turquoise and lilacs – to warmer hues, reflecting the 26.5 days it takes the sun to rotate on its axis.

‘If you see a blast of bright white light, that might be a solar flare,’ explains Buttress. ‘It’s reflecting the energy of the sun. It’s not just a pretty pattern – it comes from something.’

Dr Glenn Crocker, CEO at BioCity, says: ‘There are some who see the arts and sciences as distinct – almost polar – opposites, but that is not the case, and this installation reflects that perfectly.’

“Linked to two NASA satellites monitoring solar-flare activity on the surface of the sun, the sculpture translates this energy through lighting”

www.cibsejournal.com December 2017 39
Industry-Leading DC Smart Lighting

Loxone is a leading European smart home brand that has developed a bold range of products for truly intelligent smart home automation. As part of this, the company has focussed on bringing a robust smart lighting solution to the market that bucks the trend of AC light fittings.

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The Austrian smart home company recognises the lighting industry’s prevalent AC lighting control standards and has developed driver interfaces for these - such as DMX, DALI, 0-10V, KNX, etc. Having a firm understanding of the strengths of these standards led to the development of an innovative technology that encompasses the strengths of these - resulting in Loxone Tree.

Loxone Tree is a free-form wiring topology on which each light fitting is individually addressable, thanks to their integrated drivers all communicating through Tree. The benefits of this award-winning technology allows for a flexible connection of accessories on a room-by-room basis - significantly reducing the amount of cable that needs to be run by up to 80%. Other benefits include high speed data transmission which simplifies installation with individually searchable fittings giving full diagnostic feedback.

The in-house R&D team and future lab continue to develop game-changing smart lighting products that further entrench them as leaders in lighting and home automation, pushing boundaries in the pursuit of excellence.

For product information visit shop.loxone.com or call 01183 130 140 to arrange a consultation.
BIM has become a buzzword over the past few years, and most designers, contractors and manufacturers are talking about digital engineering in one form or another – but what does it really mean and how does it affect the lighting sector?

I would like to try to unpack the reasons why we all should be looking seriously at digital engineering as a method to improve efficiency and product, no matter which part of the industry your company operates in.

For my own sanity, I like to differentiate between BIM Level 2 – the government-mandated process – and BIM, which I tend to refer to as digital engineering. It is more about using technology to do the boring stuff better, freeing us up to do the interesting and artistic things.

There have been endless articles about BIM Level 2, most of which extol its virtues as a new technology and a fresh way of collaborating. Well, it’s not that new, actually; one of the first construction projects to use Level 2 concepts was Heathrow Terminal 5, the design of which began in 1989 and which was completed in 2008.

These concepts have now been codified and standardised through British and international standards, of which I won’t go into detail. They are all free to download from the BSI website, and the CIBSE Digital Engineering series of publications explain in greater depth. The nub of what these processes are trying to achieve is the simple, seamless and painless exchange of data.

It turns out that the construction industry is really rather poor at exchanging information – and this is the root cause of many errors, overruns and budget-busting costs. So, let’s all play nice and share our data in structured forms! The world will be a better and happier place, with construction projects that come in on time and budget, and facilities managers who inherit a complete data set that populates their CAFM systems.

Digital engineering is the stuff that gets me out of bed in the morning. This is the application of technologies we already have available to do the meat and potatoes work that seems to take up most of our working lives. I’m more a quinoa and kale kind of guy, so I want that stuff to just take care of itself. Can it? Well no, not quite, but we can take a lot of the drudge out of it.

Let’s take luminaire schedules for a start. Not that much fun to create, and less fun to...
keep up to date as the design progresses. It’s easy to miss something and – if you are trying to keep count of the number of each type of luminaire – you can spend your entire day counting and recounting.

This is something we can easily automate. If you are using a modelling package to generate your designs, the luminaire schedule is just another view of the same data, so it will update automatically. Data can be fed into the schedule by using information supplied in a structured format such as a CIBSE Product Data Template (PDT). This contains industry-agreed parameters and uses CIBSE BIMHawk technology – free to use for everyone – to feed it through into design platforms.

So, what other tedious tasks can the machine do for us? How about circuiting up some luminaires? Drawing little curly lines from one luminaire to the next, room after room – then adding the circuit references – takes time, is prone to error, and has a fun quotient of 0.001.

In our modelling platform, we can select the fittings that are to share a circuit and, if the objects are configured correctly, we can create a power circuit for them, going back to a distribution board. Or we can collect them up for a lighting control module. The software will assign them to a way on the board and generate the lines to create the circuits on the drawings automatically.

I like to use a filter on the view to show the phase to which each circuit is assigned, assuming our distribution board is three-phase with single-phase circuits. I’m a bit of a traditionalist with phases, so I use red, yellow and blue to highlight which phase is assigned to which circuit.

The diagram (on page 43) shows that each circuit in the space is assigned to a different phase, and that I’ve called my distribution board DB1/Lgts. Maybe I don’t want that – maybe I want to have a single phase in the space (safety first) and to call my distribution board DB1/LTG. I can do that in a different view of the same data; I have a distribution board schedule as a view of my project so – if I make changes there – it will also change on my drawings.

This is pretty straightforward to do, and means I’ve got my distribution board schedule as well – which is another of my deliverables done by dropping some luminaires into the room, with a couple of clicks to connect them up.

That’s why digital engineering gets me up in the morning – solving all those issues that have governed my working day for the past few decades: drawing the circuit lines, typing out the luminaire and distribution-board schedules, and adding circuit references manually.

What other tasks can we automate? The honest answer is, I don’t know. It depends how smart we want to be with this. There is no point creating all these clever processes if they are not going to make us more efficient, so it depends on what you – as a lighting designer – want to automate, and how easy that will be to execute.

Some things I have tried and succeeded at in the past include quick daylight analysis, though this is not as thorough as calculating properly. All the daylighting fixtures schedule

<table>
<thead>
<tr>
<th>Type mark</th>
<th>Type</th>
<th>Count</th>
<th>Description</th>
<th>Lamp</th>
<th>Lamp lumen depreciation</th>
<th>Luminous flux</th>
<th>Luminous intensity</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL1</td>
<td>60W – 230V</td>
<td>44</td>
<td>Ceiling light – flat round</td>
<td>A19</td>
<td>1</td>
<td>855lm</td>
<td>68cd</td>
<td>Lights R Us</td>
</tr>
<tr>
<td>PL1</td>
<td>100W – 230V</td>
<td>10</td>
<td>Pendant light – hemisphere</td>
<td>A19</td>
<td>1</td>
<td>1,690lm</td>
<td>134cd</td>
<td>Luminaire U like</td>
</tr>
<tr>
<td>SL1</td>
<td>300x1200 – 220</td>
<td>59</td>
<td>Plain surface lighting fixture</td>
<td>1</td>
<td>1</td>
<td>5,800lm</td>
<td>462cd</td>
<td>Light Bites</td>
</tr>
</tbody>
</table>

Grand total: 113

If you are using a modelling package to generate your designs, then the luminaire schedule is just another view of the same data, so it will update automatically.
“Digital engineering is the application of technologies to do the meat and potatoes work that takes up most of our lives.”

visuals (on page 42) are different views of the same data. The luminaires used in this example are generic, but are using real .IES files to generate the rendering and the illumination calculations. The rendered layout visual is a deliberately uncomplicated design, to demonstrate the principles that can be applied to any project, no matter how complex.

The purpose of this is to show that digital engineering is all about making your day job easier; taking away – or reducing to a minimum – all the tasks that take time and can be done by machines. This then allows the designer to focus on the things that really matter, such as the experience of the space, the quality of light, and getting a good system designed to a tight budget.

Whatever the parameters, let’s allow the designers to design – and the software should be able to take care of the rest. CJ

CARL COLLINS is digital engineering consultant at CIBSE. He is the guest speaker on digital engineering and lighting for SLL’s latest Lighting Knowledge Series: Light Bytes. See bit.ly/2yjCb0i

Distribution board DB1/Lgts, with each circuit in the space assigned to a different phase.
Mere mention of the phrase ‘human-centric lighting’ unleashes a torrent of opinions and frustration. Given that lighting employs the only non-fundamental derived SI unit, the lumen – based on human visual performance – the idea that it may not be human centric is illogical. For the argumentative, it raises the interesting question: what in recent practice was not human centric?

Controversy does, at least, encourage discourse. The definition of the lumen is based on humans’ photopic response to visible light within a narrow field of vision. This had the virtue of being measurable in the early 20th century, and has led to the quest for optimising task performance.

The latter has been enshrined in successive editions of recommendations by professional bodies that were largely subsisting on the sale of lighting equipment, and which needed to reassure their clients of how much was needed.

Critics, such as author and educator Kit Cuttle, have urged us to set aside this dogma, but it is difficult to substitute – as he suggests – a perception-derived system, treating the environment as the luminaire/light source, for comfortable and simply determined methods of direct-beam illumination, which can be calculated easily and verified in the field.

It remains to be seen whether anyone will be bold enough to speculate on whether the lighting energy numerical indicator (Leni) will serve to buttress this photopic status quo, particularly if adopted in legislation.

‘Wellbeing’ and ‘human centric’ have entered the lighting lexicon, as well as academic study. Stephen Cannon-Brookes suggests the medical mantra ‘do no harm’ might be more appropriate.
The debate is still being conducted in a single dimension – that is, photopic vision – while new dimensions present themselves. These include the growing interest in the cultural/experiential dimensions of vision – look out for biophilia – and the relatively recent discovery of previously unknown photoreceptors, retinal ganglion cells, with pathways outside the visual cortex to the hormonal system and only indirectly to the visual system. Such dimensions are being swiftly adopted within new criteria to meet the latest objective – namely wellbeing – and have a cheerleader in the form of the International Well Building Institute.

With Pandora’s box well (excuse the pun) and truly opened, we have discovered its contents are not finite. The key question now is should the photopic basis for lighting be reconsidered? This has such enormous consequences that most shy away from even speculating as to what could succeed the system on which we have constructed our current understanding of light. In truth, it is probably too early to do so; we need to reach a fresh plateau in our understanding of vision to be able to share universally a new system for its quantification.

This said, we need to reconcile ourselves with an increasing divergence between day-to-day practice and our orthodox description of vision – a gap that will not be sustainable in the long term. The cracks are already there and, through these, we are seeing the arrival of metrics that will compete with existing ones, leading to confusion for lighting professionals and the wider audience.

A good example is the promulgation of equivalent melanopic lux (EML), now quoted in the Well Building Standard for offices. The EML metric encompasses a substantially wider range of the visual light spectrum, including the blues associated with wavelengths that excite retinal ganglion cells and generate melanopsin – hence the title for this recently minted light definition. Blue-rich light has long been known to be more stimulating – now we know why, and use of EML encourages its employment.

Should offices be lit with cool-colour light sources – of a high colour quality – to ensure staff operate with maximum alertness? Maybe at 8.30am, but perhaps not at 5.30pm. But this depends on the people, as well as the function of the workplace, and begs rather more complex questions about how lighting systems are optimised for building occupants.

At present, the Well Building Standard does not engage with this issue, but infers the benefits of blue-rich light sources by comparing current warmer sources and computing their relative efficiency using EML. Unsurprisingly, red-rich sources – and most of all incandescents – fair worst on the comparison, and one can easily see the consequences of this in the hands of those for whom efficiency is the only measure.

Perhaps it is fortuitous that the most ubiquitous light source now available is blue. Today’s lighting manufacturers are asking themselves what sort of spectrum is best to sell to their clients, and whether this should be variable. Increasingly, the answer is yes – a timely innovation given that selling light sources with life expectancies in many multiples of previous types is going to reduce demand. But to which criteria should we design and build? Is this a matter of belief or legislation?

Now that the pursuit of wellbeing is becoming central to the way we consider our use and design of buildings, we need to engage lighting from a range of different perspectives. These are clearly ‘human centric’, and we already have a few, such as task performance and comfort – the latter relating largely to the avoidance of glare.

Beyond these, we are wrestling with a wide range of factors, most of which are being drawn from current research and the significance of which is not yet fully established. Few have tried to encompass these, and perhaps it is time to draw upon ethical analogies.

Given the responsibilities of the lighting industry within the building field –

“The idea that any lighting may not be human centric is illogical. For the argumentative, it raises the question: what in recent practice was not human centric?”

www.cibsejournal.com   December 2017   45
which includes architecture – might we now acknowledge our impact on people’s lives by adopting the medical mantra ‘do no harm’, and even aspire to improve health through good building design? This is a route to becoming truly human centric. It requires us to consider ourselves first, however, and to determine our needs in achieving wellbeing – now a catch-all for health without mentioning the word.

Recent research into vision has served as a reminder of how daylight plays an integral role in our evolutionary state and so will remain the benchmark for vision – as well as other pathways – for a considerable time. Our skin tone, vision and other characteristics are clearly evolved for an outside lifestyle. Looking from this perspective, daytime occupation of buildings – and perhaps vehicles too – can be measured in terms of isolation from our evolutionary state. For example, in reduced levels of illumination and its inherent variability; partial exposure to the UV spectrum; reduced views; light exposure outside the ‘natural’ hours; and exposure to light sources with unnatural spectra and flicker. This list is steadily getting longer. We simply don’t know what the effect is of such isolation. When we see this in the context of environmental pollution and other factors, it is apparent that we are conducting a massive multifactorial experiment on ourselves, in which it will be extremely difficult to separate the effect of light use.

Despite this, the ‘do no harm’ principal could be more widely applied. If the lighting industry is going to show some form of example in the lighting of buildings, it needs to become truly human centric. It is time to relearn what was understood in the pre-lumen era about the relationship between health and building design. We need to support cultural and societal pressure to ensure this is enshrined in protective legislation that works from a long-term, sustainable perspective.

DR STEPHEN CANNON-BROOKES is a lighting consultant, and lecturer at The Bartlett Institute of Environmental Design and Engineering. He is working on a new module on light, lighting and healthy buildings as part of the MSc in health, wellbeing and sustainable buildings.

“Most shy away from even speculating as to what could succeed the system on which we have constructed our current understanding of light"
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The Lighting Handbook is one of two SLL publications currently being updated. Paul Ruffles examines some of the changes.

If, as Harold Wilson once said, a week is a long time in politics, then a decade is a very long time in lighting – not just because of the advances and disruptions in technology, but because of the way it is specified and used. New forms of light production through various forms of LEDs – and the changes in size, form and flexibility of the luminaires – have given the lighting designer a great deal more freedom, but much more to think about.

Developments in control and data-signalling protocols have also changed how we dynamically control lighting, and have opened up many new ways to use light creatively – and, of course, many ways to do it badly. With all this upheaval, the Society of Light and Lighting (SLL) decided it was time to update The Lighting Handbook, as the last edition was written in the SLL’s centenary year, 2009.

The existing handbook and the Code for Lighting are being updated in parallel, to ensure there is good cross-referencing and a better division of subjects between them. The code will concentrate on the fundamentals, calculation methods and standards, while the handbook will focus on the design and application of the process.

Two of the existing handbook’s 23 chapters – on light and vision – will be transferred to the Code for Lighting. The publication has three broad sections; the first is on design, with five chapters; the second on technical issues, with five chapters; and finally, applications, with 22 chapters.

One of the more unusual, but important, new chapters is on design ethos. This refers to the CIBSE Code of Professional Conduct and similar documents from related professions, to set out what should be expected from those involved in lighting. It also gives information on the Bribery Act, to ensure suppliers and specifiers do not receive gifts or ‘visits to events’ that could be construed as a bribe.

To assist the increasing number of SLL members from non-engineering backgrounds – such as interior design, theatre design and architecture – there are new chapters on integration of lighting with other services, and the need for lighting space in ceiling voids.

A new chapter on electrical supplies explains methods of getting power to the lighting, from the conventional 230V mains distribution methods through to DC supplies and power over ethernet. Changes to the way it can be controlled and used dynamically are covered in the new chapter on controls.

There are two key new chapters on commissioning and post-occupancy verification – offering important information and guidance to newcomers and more experienced designers, suppliers and specifiers.

New sections include summaries of SLL Lighting Guides – such as Places of Worship, and Controls and Transport – while others look at areas not yet covered by guides, such as event lighting, exterior architectural lighting and extreme environments.

There is a chapter on lighting common building areas, such as corridors, storerooms, toilets and coffee areas. So, perhaps we can look forward to a future with no more spilt coffee while fumbling in the gloom for a mug, no more grotty lift lighting; and no more stumbling over meal trays left on the floor of badly lit hotel corridors.

International regulations and standards have been incorporated where sensible. The section on extreme environments covers the issues of cold, hot and humid settings, as well as marine environments, vibration, explosion risk areas and the common issue of dustproof and waterproof luminaires. It aims to be a comprehensive guide to the production, selection and use of luminaires for all likely places the extremophiles among you can find.

Paul Ruffles is editor-in-chief of the 2018 Lighting Handbook

The Lighting Handbook will be published in 2018 and will be available as a free PDF download for members. The Code for Lighting is scheduled for January 2019.
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IoT attracts smart hires

Smart building technology and controls will be key factors in attracting and retaining top talent, said experts at last month’s Smart Buildings Show.

Darlene Pope, senior vice-president at JLL, said a smart workplace responds based on real-time conditions and the needs of its occupants.

The cost of the workforce is 100 times more than a firm’s energy cost, so worker productivity, happiness and wellness are now the priority, she added. ‘A 10% rise in your workforce’s productivity is worth more than 10% in energy savings.’

As well as cost benefits, the Internet of Things (IoT) uses minute-by-minute data to optimise space. ‘The ‘double-humped’ occupancy curve of a building is completely different from its operational curve’, said Pope. ‘The data between the two is an opportunity – you should run the lighting and HVAC differently, based on that information.’

Charbel Aoun, Future Cities Catapult board member, said smart offices that – for example – automatically adjust room settings to workers’ individual preferences, are becoming part of a firm’s talent-attraction strategy. ‘For employees, it’s no longer a job – it’s a way of life,’ he said.

Pope added: ‘If you’re a high-tech company with low-tech space, you will hurt your brand. You have to take the technology people use in the palm of their hand and apply it to your workplace, because it’s no longer about the service, it’s about the experience.’

Trend is all for open protocol

Trend Control Systems, which manufactures and supplies building energy management systems (BEMS), is often perceived as a proprietary technology developer. But it is dedicated to offering open-protocol solutions, and its range of IQ4 controllers now comes with full BACnet Building Controller (B-BC) compliance.

Open protocol BEMS offer enhanced usability, with one point of operation for multiple building systems, such as intelligent lighting controls, fire detection and security, and packaged plant. The primary advantage is its flexibility – individual systems can be tailored to the exact needs of the client. Also if one system needs to be replaced, it can be without disrupting the entire BEMS network.

Steve Browning, partner and end customer marketing communications manager, said: ‘The complexity of modern buildings means disparate elements of building services infrastructure need to be integrated into one holistic, open-protocol BEMS.’

Beckhoff plugs into expertise

Understanding the automation requirements for modern intelligent buildings requires many skills – and knowledge of the relevant regulations and standards. Beckhoff has chosen 13 integration partner companies, with the expertise to design, manufacture, install, program, commission and maintain a range of control solutions, using Beckhoff hardware and complementary technologies.

Such solutions could range from a standalone lighting system to a complete building management system with cloud-based management.

The partner companies will be supported by Beckhoff’s field-based applications engineers to help supply future-proofed solutions that integrate seamlessly with existing controls and network infrastructures, and offer endless possibilities for expansion.

‘Beckhoff’s automation products differ from the industry norm,’ said marketing development manager Karl Walker, ‘in that they can encompass all required building functions in a single, open platform, and connect real-time data to the Cloud for advanced performance analytics, predictive maintenance, remote monitoring and diagnostics, and integration with computer-aided facility management packages.’

Warmafloor smartens up

Underfloor heating and cooling systems supplier Warmafloor has upgraded its smart control system and rebranded it as Inteliq.

The enhanced system has Warmafloor’s integrated control technology and allows the temperature in up to 32 zones to be managed from a single intelligent, password-protected device.

The upgrades include a new layout, two touchscreen sizes (4.3 and 7 inches), and a range of newly designed thermostats and heat pumps.

Inteliq can interface with multiple energy sources – such as boilers, heat pumps, and solar panels – to optimise the energy circulating within the building.

CP shines light on major rail project

CP Electronics’ Vitesse Plus lighting control system has been installed at the new National College for High Speed Rail, in Doncaster. The college will play a key role in training the thousands of engineers needed to deliver the HS2 project, and CP was tasked with meeting the lighting-control requirements for its learning spaces.

Its Vitesse Plus system allows all lights to be controlled via a single switch, while individual luminaires at the front of the class can be turned on and off, to make the interactive whiteboard more visible.

The system’s graduated-dimming function helps minimise energy consumption and cost by making the most of natural light sources. In addition, An10 wireless presence detectors – in the corridors and stairways – ensure that lighting is activated to full brightness only when the space is in use. As the sensors are linked wirelessly, they also saved time on installation.

A key requirement of the project was that the lighting had to be compatible with the intruder alarm system, and the Vitesse Plus system made this possible.
MISSION CONTROL

Industry relies on specialist controls firms to make complex buildings perform as intended. The exemplary work done by InTandem Systems to nurture engineers in the sector led to it being named CIBSE Employer of the Year. Alex Smith reports

Jon Belfield has never forgotten those who gave him career opportunities when he was an apprentice engineer. Without the encouragement of staff and tutors, he would not have had the confidence to apply for a degree in engineering with business studies at Portsmouth Polytechnic, which gave him the knowledge to pursue a career in controls.

‘You don’t realise at the time how valuable your mentors were, giving you wisdom and helping you on your way,’ says Belfield. ‘You can never pay back what you owe, but you can pass on your knowledge to the next generation of young engineers – you can pay forward.’

Supporting and encouraging young engineers is one of the core principles of Belfield’s specialist controls company, InTandem Systems, which he formed 20 years ago. Their work in developing and training internal staff, and promoting best practice to the wider industry, resulted in InTandem being named CIBSE Employer of the Year in October. This was no mean feat for a company with just 16 employees, operating out of a former chicken shed in rural Hampshire, but the firm’s training initiatives – and commitment to performance-based engineering – have given it a leading edge in the building-controls industry.

InTandem is committed to giving its young engineers the best start to their careers – even if an apprentice or graduate doesn’t see their long-term future as being with the company. ‘If they want to leave, we’ll help them on their way. We will look at their skill set and see how they could fit into the industry elsewhere,’ says Jon. Recent examples include an engineer who went to work for the Fleet Air Arm, and one who moved to facilities management (FM) company Mitie. For those apprentices and graduates who stay, however, InTandem offers training in every element of building energy management systems (BEMS) – from design and engineering, panel build, installation and problem solving, to commissioning, strategy and interface graphics. Jon and Wendy are keen to identify the aptitudes, interests and motivations of the apprentices, to help them formulate career strategies. ‘I want them to see how they can progress their own career at the company,’ says Jon. (See panel, ‘Nurturing talent’.)

InTandem works with local colleges and universities to give opportunities to young engineers – the great untapped resource in building services, according to commercial director Wendy Belfield. As well as taking on apprentices and graduates, it also offers work placements to students, as well as external training to controls.

MISSION CONTROL

InTandem punches above its weight with its commitment to industry training

16 employees

InTandem

CIBSE Dec17 pp52-54 InTandem Controls.indd 52
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manufacturers, contractors and other integrators similar to InTandem. This may raise eyebrows, but the company believes that only by sharing knowledge in the supply chain will there be greater understanding of controls in the building services industry and, ultimately, better performing buildings. ‘If another company sees something that works at InTandem, and they take it back to their company, then that’s great. I’ll be flattered,’ says Jon. ‘If that raises everyone’s game, then good.’

When the Journal photographer visited InTandem, there were two apprentices there from a controls manufacturer, learning about panel building. InTandem is involved in every process of controls design and installation, so people from other companies come to complete modules for their qualifications.

InTandem is currently teaching a contractor’s engineers about BEMS, which should result in fewer call-outs for InTandem to deal with relatively simple controls issues – such as set points and temperature. ‘It’s an investment for us, and it means they are in control of their systems,’ says Jon.

The company has built a test rig that it takes to the contractors’ premises. ‘We make sure any engineer we’re working for is familiar with that system, so they can change the set point.’

**Knowledge sharing**

Buildings controls are becoming increasingly complicated. Smart buildings mean more interfacing with third-party suppliers and an increasing reliance on IT networking. As a result, says Jon, it is essential that companies such as InTandem – which design, build, and integrate controls – share their knowledge.

‘We’re designing ever more complicated systems, and we’re managed by mechanical engineers and builders who fear controls,’ adds Jon. ‘Anybody in the supply chain should be confident of using BEMS.’

One area in which InTandem is trying to help contractors is in the installation, wiring and testing of controls during construction projects. It has developed a template for each project that shows every point in the building management system (BMS) – whether it’s a sensor, boiler, pump or passive infrared (PIR) detector. Each point has a tick box, showing the stages towards completion: installation; wired; wired to power; and pre-tested. This means contractors can monitor the progress of the controls installation during construction, so they have a better chance of being commissioned properly.

The commissioning period takes place as a project nears completion – when the ‘pressure’s really on’, according to Belfield –
which means building controls are often not commissioned correctly. ‘The process meets contractual requirements, but that doesn’t necessarily mean it will suit the person paying the energy bills for the next 25 years,’ says Jon.

InTandem is keen to foster an ethical business culture; Jon believes ethical behaviour is doing the right thing when no-one else is watching – even when doing the wrong thing is legal. ‘If you see something crazy – that’s going to run 24 hours a day and waste energy – you should say something,’ says Jon.

‘We must make sure ethics are embedded in the building,’ adds Wendy. ‘Our culture means the engineers are looking out for things that could help the customers, such as sensors not working or rooms being used for other things.’

This is how InTandem builds trust with supply-chain partners and it helps create long-term relationships, in the industry, says Wendy. ‘We have worked hard to achieve this status,’ she adds. ‘We have to build trust and convince companies that we’re not trying to maximise profit and minimise effort. People who have previously been hostile, now treat us completely differently. It proves the world can change.’

‘We must make sure ethics are embedded in the building. Our culture means the engineers are looking out for things that could help the customer’

Jon says he teaches young engineers to be calm with clients and not judge people who may sound unreasonable. ‘I tell them that it’s the pressure talking, and not to hate this guy,’ he adds. ‘Sometimes, it takes someone at the bottom of the food chain to remind those at the top about professional values.’

To give controls engineering a higher profile, Jon and Wendy are keen to help professionalise the industry. Jon is the incoming president of the Building Controls Industry Association, and Wendy is closely involved in defining a controls apprenticeship for the government’s Trailblazing scheme.

‘The increasing sophistication of controls over the past 30 years means we need recognition,’ says Jon. ‘There are some incredible people and companies doing incredible work. We just need to formalise everything that’s been done.’

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8-10°C
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- Increased capacity
- Reduced maintenance
- Flexible system
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Tenants of multi-let properties must be billed accurately for their heating and cooling energy use, under the Heat Network (Metering & Billing) Regulations 2014. These rules require landlords of properties where heating, cooling or hot water is supplied through a district or communal heating network to measure and bill tenants based on the actual energy they use.

Legal & General’s (L&G) Gresham Street building, in London, was one of the first projects to implement an automated tenant billing system, rather than apportioning costs based on a percentage of floor area.

Synapsys Solutions’ SIP Billing system was installed at the six-storey property, and measures each tenant’s heating and cooling energy consumption. Previously, this was only possible by manually reading lots of meters, processing data on spreadsheets, and producing calculations that were used to produce invoices – a process that was time-consuming and costly.

Billing at Gresham Street
Working alongside Hoare Lea – the building services engineer on the refurbishment of the top floors – Synapsys Solutions installed data loggers in the building, to collect information from meters on the tenants’ heating and cooling supply networks.

To produce accurate heating bills, the data loggers record half-hourly readings from all the tenant-area thermal meters, before feeding this information into the SIP Billing platform. Each tenant’s consumption – calculated on a monthly basis – is then applied, as a percentage, to the total heating and cooling consumption, acquired from the main gas or bulk meter.

The same principle is applied to the cooling demand, where cost is calculated based on a percentage of the overall chiller use.

Matt Gardner, business development team manager at Synapsys Solutions, says: ‘The ability to acquire accurate, half-hourly meter readings from each tenant at Gresham Street – and then apportion this figure as a percentage of the total energy consumed by the building – ensures each tenant only pays for their actual use, rather than their expected use based on the area that they let.’

Roger Macklin, associate director at Hoare Lea, says a position must also be taken on whether to allocate additional costs incurred during the production of heat – for example, the gas consumed by the boilers and the electricity used by the circulation pumps, ‘You calculate how much heat is consumed by each tenant, divide that by the total energy used, and apply that ratio to gas consumption,’ he says.

‘The system is fair, Macklin adds, because if – for example – only one tenant is working out of hours, the other five are not obliged to contribute to the cost of running the heating system at that time.

Debbie Hobbs, head of sustainability at LGIM Real Assets, adds: ‘If a call centre is working 24-7, and another office works 9-5, is it fair to bill them based on square footage? Billing technology is making this fairer.’

To comply with regulations and offer tenants more transparency about their energy consumption, Legal & General has adopted an automated billing system at its multi-let building. Liza Young finds out more.
Cost of commissioning
Commissioning and validation of meters is essential for rooting out issues with reverse polarity, loose connections or wrong meter locations, and ensuring that accurate bills can be produced.

At Gresham Street, Hoare Lea and Synapsys Systems did simple checks on the metering by making sure the secondary meter readings equalled the primary-meter output from the boilers.

Point-to-point verification was also carried out, to ensure the values at the meter were the same as those on the data logger.

A meter – which must be MID compliant – is made up of three components: a flow sensor, to measure the water flow rate; a pair of temperature probes, measuring the difference between the flow and return pipes; and a calculator, which uses the quantities of the other two components to work out the amount of heat generated or used.

‘If any of those elements are not working properly, it will throw out the billing,’ says Macklin. ‘Given that the tenants are being charged for the energy they use, it is important to ensure metering is accurate.’

Seasonal commissioning is also a priority, adds Hobbs. ‘In summer, everything was working perfectly but, in winter, we found the meters on the chillers were actually heat meters, with the wrong system in them.’

Incentives
Behavioural change is the most difficult factor to influence when it comes to reducing consumption, says Gardner. The energy cost to the tenant in an office such as Gresham Street is about 2-3% of the total expense. ‘Broadly speaking, energy-saving measures are likely to be extremely low on a tenant’s list of priorities,’ says Macklin.

However, measuring and billing data gives both the landlord and tenants the opportunity to understand how much energy they are using. ‘Knowing what you’re consuming is a good first step – if you choose to do something about it, that’s a bonus,’ Macklin adds.

Synapsys Solutions’ billing platform creates invoices for the managing agent, who passes them onto the tenants. They are then able to view their individual tenancy data and compare consumption with previous years. Landlords can also look at operational data and – if they’re keen to reduce use – offer energy saving guidance to tenants.

Macklin believes the industry will move to variable tariffs in future, so electricity cost will vary throughout the day. ‘That’s why it’s important to be able to allocate cost on an hourly basis.’

Gardner adds: Another benefit of the solution is that the data loggers can be configured to share data with the BMS [building management system] and export information to data analytics partners. This offers a means to introduce energy-monitoring dashboards, to give the building operator and the tenants total visibility of energy consumption, anomalies and trends.

Hobbs says that by metering and analysing data, L&G has made carbon savings of 23% and energy savings of 22% over the last five years. ‘Building managers are incentivised to hit performance targets in their appraisals, because if they don’t, they won’t get a percentage of their bonus. They are starting to take notice and ask questions,’ she says.

Since implementing its billing platform at Gresham Street, Synapsys Solutions has installed it in a number of other buildings – including 245 Hammersmith Road, London, all McCarthy & Stone residential developments, and the Barbican – while L&G plans to roll it out to other buildings in its portfolio.

“Given that the tenants are being charged for the energy they use, it is important to ensure metering is accurate” – Roger Macklin
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Assessing co-heating tests – a tool to reduce the building performance gap

This module looks at a project designed to assess the practical reliability of the current application of co-heating tests to evaluate a building’s heat-transfer coefficient.

The so-called ‘performance gap’ between the designer’s expectation and reality of the building operation has highlighted the need to assess properly the post-construction thermal characteristics of buildings. The co-heating test is widely used throughout Europe to measure the total heat transfer from buildings and to calculate the building ‘heat-transfer coefficient’ (HTC) (W·K⁻¹). This article reports on a project aimed at assessing the practical reliability of the current application of co-heating tests to evaluate a building’s HTC.

Whole-house performance measurements have shown that the ‘performance gap’ exists and, in the vast majority of cases, the energy consumption and the total heat loss through the building fabric are higher than predicted. This includes existing, newly built and recently retrofitted dwellings, as well as flagship high-performance projects. This is likely to be caused by a combination of factors, including underperformance of individual building elements and a lack of airtightness, but also thermal bridging and missing insulation. So a reliable test of the whole house is needed to provide an accurate reflection of real performance.

The co-heating test

The co-heating test is a pseudo-steady-state test, where the amount of energy required to maintain a constant, raised, indoor temperature is measured, as well as the total heat-transfer rate. The resulting HTC is a measure of average steady-state heat flow from the building for each 1K of temperature difference between the internal space and the outside (ambient). This test has existed since the early 1980s, and has been more widely used in the past 10 years in the UK and the rest of Europe. An industry-standard protocol for carrying out the measurements and for analysing the data is yet to be established, even though the co-heating test is already offered commercially.

The thermal performance of a building fabric can be described by two main heat-flow mechanisms: heat transfer through the fabric of the building, including the net energy flow through glazing and heat bridges; and heat lost as a result of air infiltration.

For the co-heating test, the total heat input rate to the building – provided by electrical heaters (installed for the test) and solar heating – is assumed to be equivalent to the total rate of heat loss from the building, so can be used to evaluate the building HTC.

Electrical heating (W) + solar heating (W) = fabric heat loss (W) + infiltration heat loss (W)

So

\[ \text{HTC} = \frac{Q_f + Q_i}{\Delta \theta} = \frac{\sum U \cdot A + 0.33N \cdot V}{\Delta \theta} \]

Where

- \( U \) is the U-value for each building element (W·m⁻²·K⁻¹)
- \( A \) = total area of each building element (m²)
- \( \Delta \theta \) is the air temperature difference between the inside and outside of the building (K)
- \( N \) is the air leakage rate in air changes per hour (h⁻¹)
- \( V \) is the internal heated volume of the building (m³)

www.cibsejournal.com December 2017
The project

The Building Research Establishment (BRE), at Garston, Hertfordshire, UK, gave access for the project to test a pair of identical, adjacent, well-insulated and well-constructed detached test houses (Figure 1). These, effectively, have thermal performance similar to – but slightly worse than – that required by 2013 English Building Regulations. Using the UK government’s Standard Assessment Procedure (SAP), the houses had a previously evaluated HTC of 68.4 W K⁻¹ (fabric 65.9 W K⁻¹ and infiltration 2.5 W K⁻¹).

Seven teams from different organisations successively undertook co-heating tests on the same house, and BRE did coincident tests in the other house. To enable the full range of possible co-heating methods to be used, no guidance was given to any team on the design and planning of their data-collection or analysis procedures.

The test teams had different levels of experience, with one performing its first-ever test. The seven test teams used an experimental method broadly similar to that published by Johnston et al., but all had some variations. One team didn’t complete the exercise because of equipment failure.

During the test, the air temperature inside the building was maintained – using electrical heating equipment – at a constant raised level (mainly 24°C) for approximately two weeks, with fans used to mix the house air with all internal doors open. Co-heating tests are traditionally undertaken over periods of between one and three weeks. Maintaining a constant internal air temperature throughout the building is vital in a co-heating test to ensure accurate measurements of the whole building’s performance. This was achieved by the test teams employing proportional-integral-derivative (PID) temperature-controlled heaters and mixing fans, at least one in each large room.

The electrical energy consumption required to maintain the temperature was recorded, together with the weather conditions – in particular, the ambient air temperature and solar irradiance.

Six methods of estimating solar gain were used in the project; most required some measurement of the total solar irradiance – and subsequent analysis and data manipulation – and one avoided the need for any solar-irradiance measurement. The solar gain was included in the energy balance; even during winter months, it is likely that significant solar gains will occur. Solar gains were mainly estimated from multiple linear regression techniques, though some used calculations based on glazed area and G-values. Most of these methods account for shading implicitly. The solar gains through opaque elements were ignored, and the project took no account of heat stored in thermal mass during the day.

The HTC was determined by plotting the rate of heat input – both electrical and solar – taken over a 24-hour period against the 24-hourly average air temperature difference between the inside and outside of the building (Figure 2), with the gradient providing the HTC. Using daily averages assumes that any solar gains only affect the internal thermal conditions on that day, whereas the impact can actually be carried over to subsequent days, by storage in a building’s thermal mass.

In this project, most test teams carried out only one whole-building, air-infiltration-rate measurement. Generally in co-heating tests, the air-leakage rate can be measured before a test, after a test, or both, and the results averaged, as the co-heating test may cause drying of materials – potentially altering the infiltration rate (all ventilation-specific openings are closed off during the tests).

The method used to account for solar gains remains an area of uncertainty and produced most variation between the test teams. However, the analysis indicates that the co-heating test is robust to small changes in the solar-gain analysis method, so any of the methods studied would be suitable for general use. It is likely that the uncertainty in the HTC will be higher in periods of higher solar irradiance, when solar gains are likely to represent a larger contribution to the total heat input and so could impact on the accuracy of the derived HTC. In the development of a future standard test method, it may be necessary to define a set of limiting external
conditions under which the test can be applied. That could include maximum solar irradiance figures, but also extend to include other parameters, such as wind speed. To achieve the highest possible repeatability, a common orientation for solar-irradiance measurements – together with a single analysis method for defining solar input – will need to be defined. The method used for the estimation of solar gains should be clearly reported.

Variations in wind speed affect the infiltration rate and have a small effect on heat transfer at external surfaces. However, it can be difficult to find a suitable location for wind measurements that is free of local disruptions to the airflow, so local weather-station data can be used as available. Analysis can be undertaken to account for the influence of variations in wind speed, together with solar irradiance and indoor-outdoor temperature difference, and a value of HTC can be so determined at a zero wind speed. However, it is reported that this approach is prone to inaccuracy because of complex interrelations between variables specific to each building, such as sheltering, orientation, airtightness, location, and leakage paths.

The HTC is determined for the weather conditions at the time of the test, but U-values are typically calculated for an assumed wind speed of 4 m·s⁻¹, so it may be considered more suitable to normalise the HTC to a wind speed of 4 m·s⁻¹. However, a significant relationship between wind speed and power consumption is rare, because wind effects are generally small and cannot be isolated from other influencing factors. As an acceptable method to account for varying wind speeds and sheltering has not been developed, it is recommended that the HTC be reported with no adjustment for wind speed – although daily mean wind speeds should be recorded.

The limiting conditions may be linked to the specific building under test, as uncertainty, for example, will be higher for buildings with a lower HTC, so the limits on environmental conditions may be more stringent. However, no significant relationship was found between the evaluated HTC and external temperature, solar irradiance or wind speed that indicates repeatable HTC measurements were possible during different weather conditions. It is, of course, the lack of steady-state that necessitates co-heating tests being carried out over an extended period.

The research team examined the uncertainty in the values of HTC determined by the six test teams (Figure 3) resulting from the aggregate measurement uncertainties in the three key measurements:

- Internal-external air temperature difference ±5%
- Electrical power consumption ±5%
- Measurement of solar irradiance ±2%

(This project had insufficient data to conclude on the most appropriate solar-gain analysis method of the seven employed.)

The estimated general uncertainty in the overall HTC measurement was ±8% and is similar to the actual variability of ±10% in the measured HTC values. Differences in the data-collection methods observed in this project were minor in comparison with those observed in the data analysis, with a best-practice approach clearly emerging. A slightly lower uncertainty could be expected if all the data were collected using the same method and with the same equipment.

The results indicate that the co-heating test is reasonably robust to different measurement methods, weather conditions and data-analysis methods. This project was performed using a single detached house, and further testing in a wider sample of houses, designs and situations is recommended as the next step towards the development of a standardised co-heating test. For the construction industry to adopt a co-heating protocol, further development will be needed – not least because housebuilders are likely to be reluctant to have properties vacant for a two-week test. Research is already under way to develop methods that can be completed in a much shorter timeframe, or that can be applied in occupied dwellings.

Despite differences in the weather and in the experimental and analytical approaches, the test teams’ reported HTC measurements were within ±10% of the mean, and uncertainty analysis – based upon a 95% confidence interval – resulted in an estimated uncertainty in HTC measurements of ±8%. By comparison, observed differences between the as-built HTC and the predicted HTC have been reported as 100% or more. It is likely that the repeatability of the test could be improved, given the application of a standardised best-practice protocol being employed by trained and experienced test teams. Increased confidence in the reliability of the co-heating test could lead to its adoption and use by the industry and regulators as a quality-control and compliance tool.

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Module 120
December 2017

1. When was the co-heating test thought to originate?
   - A. 1960s
   - B. 1970s
   - C. 1980s
   - D. 1990s
   - E. 2000s

2. What value of HTC had been evaluated for the house by the SAP method?
   - A. 61.2 W K⁻¹
   - B. 64.4 W K⁻¹
   - C. 65.2 W K⁻¹
   - D. 68.4 W K⁻¹
   - E. 69.6 W K⁻¹

3. What wind speed is normally applied when evaluating U-values?
   - A. 0 m s⁻¹
   - B. 1 m s⁻¹
   - C. 2 m s⁻¹
   - D. 3 m s⁻¹
   - E. 4 m s⁻¹

4. What was the approximate mean value of the HTC as reported by the six teams?
   - A. 62 W K⁻¹
   - B. 64 W K⁻¹
   - C. 66 W K⁻¹
   - D. 68 W K⁻¹
   - E. 70 W K⁻¹

5. In the tests, what was the actual variability in overall measurement?
   - A. ±2%
   - B. ±5%
   - C. ±6%
   - D. ±8%
   - E. ±10%

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**Gary Clark covers Scottish region for Hargreaves**

Gary Clark has joined cast iron drainage specialist manufacturer Hargreaves Foundry Drainage as technical sales manager.

He is covering Scotland and the north, with responsibility for all cast iron drainage products, including the traditional Premier rainwater and soil system, and the fully-compliant Halifax Soil and Drain product range.

With 25 years of industry experience to his credit, he is working alongside the full sales team providing cover across Great Britain.

Gary said: ‘It’s my aim to offer quality, value and service to specifiers, and to further Hargreaves’ role in the supply chain, building long-standing, robust working relationships.’

[Call 01422 330607, email info@hargreavesfoundry.co.uk or visit http://www.hargreavesfoundry.co.uk/](http://www.hargreavesfoundry.co.uk/)

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**Efficient water heating from Elco**

Elco Heating Solutions has launched the Trigon XL WH – a condensing direct gas-fired water heater capable of instantaneously supplying large volumes of hot water in commercial applications.

The range comprises seven models with outputs from 150kW to 570kW, each offering class-leading efficiencies up to 110%, robust performance and NOx emissions as low as 34mg/kWh.

Trigon XL WH can provide a supply of hot water at a recovery rate of up to 9,257 litres per hour.

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The Sky's the limit with Future Designs

Skyline by Future Designs is an integrating lighting and cabling system. It is designed to not just illuminate, but house all modern cable systems and incorporate downlighter modules, PIR and voice evacuation systems.

It includes specially crafted junction sections, which ensure LV and ELV cables do not conflict. System modules allow for seamless joins and total flexibility in the design.

Skyline can be designed to follow staircase structures and architectural details, as well as providing excellent lighting to the working environment.

It incorporates light as well as being a fully integrating trunking system, and features a range of lumen outputs; homogeneous light; tuneable white LED option; integrated emergency; links with lighting control systems and power over Ethernet; part L and enhanced capital allowance; low and easy maintenance; replaceable LED modules and long life of 50,000 hours.

www.futuredesigns.co.uk

Green light for underfloor air conditioning in Romania

AET Flexible Space, provider of underfloor air conditioning, is commissioning the system and equipment supplied to German IT company iQuest for its new-build headquarters in Cluj Napoca, Romania. AET UK has worked with Romanian distributor Convergo Energy on the first underfloor air conditioning installation in the country, and the high profile project will create first-class grade-A office space for the owner-occupier. The project covers 18,200 m².

BSRIA test confirms SWEP plate heat exchanger performs at 1K

There has long been an issue about the claimed performance of heat exchangers compared with what they deliver. They are often oversized or deliver heat loads lower than specified, leading to customer frustration and disappointment.

One of the most complicated specifications to deliver is the market requirement of 1K, meaning 1 degree between the primary source - the plant - and secondary side, for example the space heating or cooling.

Chirster Frennfelt, manager for SWEP’s consultant and utility business, explains that BSRIA has recently tested a SWEP 1K heat exchanger to verify its performance. ‘The resulting comprehensive and authoritative report assures consultants and our clients that the SWEP heat exchanger’s actual product performance closely matches predicted performance, even at very low approach temperatures.’

Visit https://www.swep.net/

District heating at Southbank Place Canary Wharf

Evinox Energy is working with Canary Wharf Group on the Southbank Place development. This scheme features a district heating system that incorporates a highly efficient energy centre, which will reduce the carbon footprint of the site. The district network will supply residents with thermal energy for heating, cooling and the production of domestic hot water.

Southbank Place is being developed by Breaum Estates, a joint venture between Canary Wharf Group and Qatari Diar Real Estate Investment Company.

When complete, it will feature seven new buildings, including residential space, offices and a diverse mix of retail. This 5.25-acre development also features the iconic Shell building and offers some of the best river views in London.

Evinox Energy has supplied ModuSat heating and cooling interface units, including twin plate units for instantaneous heating and hot water.

Email info@evinoxenergy.co.uk or visit www.evinoxenergy.co.uk

Time is running out on cooling equipment containing HFCs

New Year’s Day is fast approaching and it is an important date because – following the EU’s new F-Gas regulations – that’s when the first significant cut in the supply of HFCs happens, a huge 37%.

As a direct result, with many refrigerant manufacturers already reducing production of older HFCs, costs for HFC refrigerants have soared. The proposed phase-down will lead to a massive 79% cut in the quantity of HFCs available on the market by 2030. With the typical life expectancy of a chiller around 15 years, this becomes an issue when specifying a new chiller.

Andy Legg, Swegon’s cooling product director, said: ‘Swegon have been prepared for these regulations for some time, with compliant units already introduced into Switzerland back in 2014, because of government legislation there. Swegon’s BlueBox Kappa Rev LGW range of air-cooled screw chillers was, in fact, the first to be Eurovent certified, using a HFO refrigerant known as R1234ze. It has a GWP of 0.9 and is available in chillers ranging from 250kW to 1,000kW.’

Swegon’s BlueBox range of chillers are available with integrated free cooling, which offers the most environmentally friendly cooling solution for applications with year-round demand. Testing of these chillers has also shown an 8% improvement in energy efficiency.

Call 0800 093 7929, email sales@swegon.co.uk or visit www.swegon.co.uk
**Mikrofill supplies plantroom upgrade at Leasowes High School**

Leasowes High School, Halesowen, is a hard-working and successful school, where traditional values of fairness, discipline and respect underpin a culture of aspiration for all.

Following a dilapidation survey by Dudley Metropolitan Borough Council, the decision was made to upgrade the inefficient LPHW and HWS equipment.

The existing atmospheric heating boilers were replaced with six Ethos 130kW wall-mounted condensing boilers. The new installation has a total modulation of 60 > 1 (780 > 13kW) ensuring the building’s heat load is accurately achieved at all times.

The HWS requirement for the kitchen and main block area was catered for by the installation of an Extreme 500-litre loading cylinder. Fed via an indirect primary circuit of 80/50°C, the loading cylinder optimises the boiler’s condensing mode and produces in excess of 2,500 l/hr at 60°C. In addition, a Mikrofill 1,200/2 pressurisation package unvented the existing LPHW circuit.

The new system design was carried out by in-house DMBC engineers within the Corporate Landlord Services department and the installation was carried out by long-standing West Midlands based contractor TDR Mechanical Services.

‘I would like to thank both Mikrofill Systems and Dudley Metropolitan Council for all their help during the design and installation phase. Collectively this has made a huge difference to the school,’ said Leasowes site manager Rob Upton.

**Luceco Stadium floodlights at Bristol fruit market**

Luceco has supplied specialist LED floodlighting to Bristol fruit market, based at St Philip’s Marsh. The installation was carried out by commercial and industrial electrical contractors, Quipex, based in Bristol.

Tristan Brady said: ‘The client required enhanced lighting levels but looked to reduce running costs. We replaced old 2kW floods with environmentally friendly and energy efficient 1kW LED fittings.’

Stadium from Luceco is a high output floodlight designed for large outside areas, sports grounds and logistic yards. Stadium 500W offers an energy efficient alternative to a 1,000W metal halide floodlight.

Stadium 1,000W is the equivalent to a 2,000W metal halide flood, both giving 100% instant light output with no warm-up time. Both variants are available in 15, 30 and 60-degree beam angles to meet application requirements, and boast outstanding performance, as well as 50,000 hours of maintenance-free working life.

**Geniox – The next generation of air handling units**

Ventilation company Systemair has launched its next generation of air handling units, Geniox.

Geniox offers an energy efficient ventilation solution for commercial, hygiene, marine and industrial applications.

The Geniox family can handle airflows from 750-70,000m³/h (0.2-19m³/s).

This level of flexibility means an optimised solution can be offered regardless of project and industry.

Geniox is configured in the SystemairCAD design programme. The SystemairCAD allows the air handling unit to be optimised to your needs and to the lowest possible energy consumption. It can be downloaded from www.systemair.co.uk

The Geniox range is certified by Eurovent and has 60mm double skinned panels as standard.

**New MD range of high-efficiency condensing gas boilers**

Adveco has announced the launch of the new MD range of high-efficiency condensing gas boilers. This expands its product range with higher capacity, floor-standing central heating appliances for the UK, Netherlands, and Belgium markets. Supplied with a 10-year heat exchanger warranty, it is manufactured to the highest standards by a well-respected European manufacturer with more than 50 years’ experience in boiler production. The MD offers efficient, reliable, and low-emission heating solution for large applications.

**Systemair Geniox – The next generation of air handling units**

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The Geniox range is certified by Eurovent and has 60mm double skinned panels as standard.

**Visit www.systemair.co.uk**
Nittan sales team expands for increased regional focus

Nittan Europe, UK manufacturer of conventional and addressable fire detection products, has expanded its sales team. Wayne Gibson has been appointed dedicated regional sales manager covering East Anglia, the Midlands and Wales.

He said: ‘I have worked my way through the ranks in this industry and welcome the new challenges that this role will bring, I hope to help Nittan make its mark in this territory.’

Call 01463 769 555, email at sales@nittan.co.uk

or visit www.nittan.co.uk

Makita introduces new 10.8v and 18v rotary hammer drills to extensive range

Makita has added two new SDS+ rotary hammer drills to its ever-expanding inventory of cordless tools. The new 10.8v model will generate 4,900 impacts per minute (ipm), while the beefy 18v model will punch a 17mm hole into concrete. The Makita HR140D rotary hammer drill further extends the increasingly popular 10.8v cordless range of tools. This new 14mm CXT machine generates 1 joule of impact energy and up to 4,900ipm.

Visit www.makitauk.com, follow @MakitaUK, Facebook.com/makitauk or google.com/+makitauk

Vent-Axia wins award for tackling air quality

British ventilation manufacturer Vent-Axia is celebrating winning Commercial/Industrial Ventilation Product of the Year category at the HVR Awards 2017. Scooping the award for the Vent-Axia Pure Air, an innovative air filtration system, the Sussex-based company received the accolade at the awards ceremony on 26 October at London’s Chelsea Harbour Hotel.

‘We are very proud to have been acknowledged for our Vent-Axia Pure Air filtration system,’ said David Cook, product marketing manager – non residential, at Vent-Axia.

Call 0844 856 0590 or visit www.vent-axia.com

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- Building Drainage Explained
- Designing Water Efficient Hot & Cold Supplies
- Gas Safety Regulations

If you have suitable experience, we’d like to hear from you. Please contact the Training Team at training@cibse.org to find out more.
Green futures

CIBSE Resilient Cities Special Interest Group secretary Kirstin Johansen explains why climate change adaptation and the urban environment are key issues

CIBSE and climate change adaptation specialist, UKCIP, launched the 2018 Green Infrastructure Design Challenge at last month’s Build2Perform.

The seminar was chaired by Tanya Wilkins, from ARCC/UKCIP.

The challenge aims to highlight the role of building-level green infrastructure, such as green roofs, living walls, indoor farms and gardens, in creating sustainable indoor and outdoor environments.

The objectives of the design challenge are to showcase opportunities to improve the livability of our cities through green infrastructure; demonstrate how green infrastructure can make an area attractive to work in; and demonstrate how it can contribute to improved health and wellbeing, as well as improve energy efficiency and climatic resilience.

For details, visit www.arcc-network.org.uk/gi-challenge

Kirstin Johansen is secretary of the CIBSE Resilient Cities Special Interest Group, which organised the seminar. She tells the Journal why climate-change adaptation and the urban environment are such key issues.

**Q** What is the aim of the Green Infrastructure Design Challenge?

**A** The challenge is supported by Ecobuild and offers designers an opportunity to showcase what constitutes a healthy, productive and sustainable growing urban density within a dangerously warming environment.

It highlights the role of green infrastructure (GI), internal or external living walls, inner city farms and social green spaces – as well as planting more trees – in combating building-performance issues, and improving urban public spaces.

The aim of the challenge is to show how we could improve the livelihood and sustainability of our cities through GI – and how this can contribute positively to people’s health and wellbeing, and improve energy efficiency, climatic resilience and air quality.

**Q** How important is ‘greening’ in urban environments?

**A** The most livable cities are green cities. Trees help to combat poor air quality, reduce greenhouse gases and cool cities. Parks contribute to more people-centred and energy-efficient cities, and can help reduce the urban heat island effect.

The human benefits associated with green space – which creates more sociable, pleasant areas to live and work – include reduced levels of stress and depression, and improved health because of better air quality.

**Q** How did you get involved in the Resilient Cities Group?

**A** I wanted to contribute to a more joined-up way of thinking within the industry, and develop the impetus for change. I discovered that CIBSE was forming a special interest group for resilient cities, and I eventually became group secretary.

The urban environment and climate change adaptation are important topics. It is critical that, as an industry, we take corrective measures against the effects of climate change, and reduce emissions drastically. We can drive this by disseminating research on improving urban design and operations; building resilience; encouraging behavioural change; and pressing government to focus on smart-city development.

**Q** What initiatives are being planned by the Resilient Cities Group?

**A** The group’s aim is to share knowledge, identify gaps in understanding, and develop communication among the wider industry.

Last year, its attention was on air quality and, this year, big data will be an important focus. We are planning a series of events to share research, including on the importance of city landscapes.

The group is formulating a response to the recently published government paper, Building a market for energy efficiency, and has issued a response to the Greater London Authority’s London Environment Strategy. A collaborative working approach is key to achieving our objectives and we are continuously making connections with various other parties – such as Space for Climate, through which we will influence the data required for collection from space-satellite sensors.

The Resilient Cities Group, supported by a network of experts, practitioners and academics, has a very strong knowledge base, and it is important to ensure this is exchanged effectively.

**KIRSTIN JOHANSEN** is a mechanical engineer at Imtech and secretary of the CIBSE Resilient Cities Special Interest Group

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CIBSE Building Performance Awards
6 February, London

The shortlist for the 14 categories of the 2018 CIBSE Building Performance Awards has been revealed. The awards celebrate the best in building performance, and will be presented to the people, products, projects and initiatives that have demonstrated engineering excellence in the built environment.

Join host Mark Watson on the night to celebrate excellence and achievements in building performance, and network with more than 700 guests from across the built-environment sector.

Don’t miss your chance to see who will take home this year’s awards. Book your place now at www.cibse.org/bpa

EVENTS

NATIONAL EVENTS AND CONFERENCES

Society of Light and Lighting: Light Bites
25 January, Birmingham

The 2017-18 SLL Lighting Knowledge Series, Light Bites, continues at Birmingham Botanical Gardens. The day includes peer-reviewed, bite-size presentations on four areas: designing, building, specifying and future trends. Speakers will include Lee Thomas and Nick Van Tromp, from Eagerhill; Steve Shackleton, from Zumtobel Group; Helen Loomes, from Trilux; and Roger Sexton, from Xicato. The series will continue until June 2018. www.cibse.org/sll

CIBSE TRAINING

For details, visit www.cibse.org/training or call 020 8772 3640

Energy savings opportunity scheme (ESOS)
5 December, London

LCC building design and EPC
5-6 December, Manchester

Building services explained (three-day)
5-7 December, London

Fundamentals of digital engineering (including BIM)
6 December, London

Energy monitoring and targeting
7 December, London

Lighting design: Principles and application
8 December, London

Overview of current fire legislation and guidance
8 December, London

Mechanical services explained (three-day)
12-14 December, London

Heat networks code of practice
12-13 December, Manchester

Air conditioning inspection for buildings
14 December, London

Practical controls for HVAC systems
12 January 2018, London

Low carbon consultant building design and EPC
16-18 January 2018, London

Practical project management
18 January 2018, London

IET wiring regulations (17th edition)
19 January 2018, London

Mechanical services explained
23-25 January 2018, Birmingham

Fundamentals of digital engineering (including BIM)
24 January 2018, Birmingham

Electrical services explained

Power system harmonics
25 January 2018, London

Fire risk assessment to PAS 79
26 January 2018, London

Low carbon consultant building operations and DEC
30 January - 1 February 2018

CIBSE GROUPS, SOCIETIES AND REGIONS

For more information about these events, visit: www.cibse.org/events

HCNW: The HCNW papers
4 December, London

Inviting papers and presentations from regional members.

SLL: Will AI redesign the lighting profession?
4 December, London

The SLL, with Arup, hosts an ‘Artificial intelligence – enabling machines to learn’ exhibition. Chaired by Florence Lam, director and head of global lighting design at Arup.

Yorkshire: Social – end-of-year wrap-up
5 December, Leeds

Informal social event, with five short presentations.

Scotland: Low-temperature heating systems
5 December, Edinburgh

Afternoon seminar with: Franz Huelle, Rehau; Chris Davidson, Genius Energy Lab; and Dave Pearson, Star Renewable Energy.

South West: Why do we expect buildings to perform like the models?
6 and 7 December, Bristol

Guest lecture by Ant Wilson on the performance gap.

Merseyside and North Wales: Blockchain and its role in BIM
7 December, Liverpool

An introduction to blockchain and its potential application, by John McDermott.

North East: Power quality monitoring
12 December, Newcastle upon Tyne

David Bradley, of Soomere, explores a series of case studies and a rationale for energy efficiency, explaining power-quality monitoring.

ANZ: South Australia annual Christmas lunch
14 December, Adelaide

With speaker Tom Whithworth, from Adelaide Zoo.

North East: Heat pumps and decarbonising heat
9 January, Newcastle upon Tyne

With speaker Dr Chris Underwood, of Northumbria University.

CIBSE closing-date surgery
11 January, London

Applicants for the 1 February closing date can book a 20-minute slot with a CIBSE interviewer to discuss the draft Engineering Practice report and interview process.

Society of Light and Lighting: Light Bites
6 December, London

A talk by Jason Fretwell, of A O Smith.

SoPHE: Using CHP with prioritised DHW systems
17 January, Manchester

A talk by Jason Fretwell, of A O Smith.

Southern: Non-visual responses to light, and health and wellbeing
23 January, Eastleigh

Presentation by Professor Debra Skene, section head of chronobiology at the University of Surrey and president of the European Biological Rhythms Society. Skene will discuss studies into light’s influence on human chronobiology, circadian rhythms and pineal melatonin.

Scotland: Soft landings in practice
23 January, Edinburgh

An overview of the soft landings process, and a detailed look at the performance gap from the perspective of balancing architectural and M&E strategies.

South West: Water treatment in commercial heating systems
23 January, Bristol

Russ Walliss will focus on best practice for water-treatment systems – clean, protect, maintain – with real examples of problems and their associated cost.

North West: Annual celebration dinner
26 January, Manchester

Annual dinner at the Midlands Hotel in Manchester, with guest speaker Eddie ‘The Eagle’ Edwards.

CIBSE Building Performance Awards
6 February, London

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HIGHLIGHT

Eddie ‘The Eagle’ Edwards will speak at the North West dinner
GREEN INFRASTRUCTURE DESIGN CHALLENGE

CALL FOR ENTRIES

Closing date: 19 February 2018
Announcement & exhibition: 06 March 2018

CIBSE & UKCIP warmly invite you to take part in the third annual GI design challenge!

Supported by ecobuild, this challenge provides an opportunity to showcase what constitutes a healthy, productive and sustainable urban environment both now and as the climate changes. From a building performance perspective as well as the improvement of surrounding public spaces, the challenge will highlight the role of building-level green infrastructure such as green roofs, internal or external living walls, indoor farms and gardens, and collections of plants.

The objectives of this challenge are to:

• showcase opportunities to improve the liveability of our cities through GI
• demonstrate how GI can make an area an attractive place to work
• demonstrate how GI can contribute to improved health and wellbeing
• improve energy efficiency and climatic resilience

Find out more from:
www.arcc-network.org.uk/gi-challenge
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