

CIBSE JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

May 2015



HIGH FLYER
Beca's award winning services at Christchurch Airport

HEIGHTENED AWARENESS
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X FACTORS

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Winning teams

Despite building services engineers being in the best position to advise on low carbon design, their voice often does not get heard by those who stand to gain the most from their skill and knowledge, such as architects, clients and building occupiers. That is not the case with property company Low Carbon Workplace (LCW). It recognises that the early involvement of the M&E consultant in the design is crucial to the success of its business strategy.

LCW is a partnership between the Carbon Trust, fund manager Threadneedle and Stanhope. It had the idea of increasing the value of worn-out office buildings by refurbishing them to high environmental standards. LCW acquires the buildings and is landlord to tenants attracted to the new-look buildings.

The business model has to work financially as well as environmentally, and LCW realises that for the building to guarantee low energy bills to tenants it needs a building services expert to give it a holistic view on the design and operation of the building. LCW's policy is to look at passive design first, which means it is especially important for the services engineer to work with the architect on the building envelope.

Skelly and Couch worked on Mansel Court in Wimbledon with architect Duggan Morris. It was able to argue that the direct cooling of exposed concrete ceilings would provide the thermal mass needed to reduce cooling loads. It also had a hand in devising simple-to-use controls to ensure tenants used the building as the design intended. Mansel Court illustrates perfectly why focusing on environmental design is good for a building owner's balance sheet as well as its corporate social responsibility (see page 40).

“Mansel Court illustrates why focusing on environmental design is good for the balance sheet

Last month's Technical Symposium was a full house and an inspiring two days. We will cover the event in more detail next month, but to whet your appetite we have a summary of Ashley Bateson's excellent talk on ventilating residential developments in London (page 27). The Hoare Lea partner explained why planners, Part L and property agents are driving designers away from passive to active ventilation. It's a sobering example of how real-life scenarios get in the way of the best of low carbon intentions.

In the autumn, the fifth Symposium on Lift and Escalator Technologies takes place. On page 22 Adam Scott discusses new EU rules that will affect building services engineers working in lifts and beyond.

Alex Smith, editor
 asmith@cibsejournal.com



In brief

LEADING LIGHTING DESIGNER DIES, AGED 78

Janet Turner, a former design director at Concord Lighting, has died after a short illness.

Turner trained and practised as an interior designer before specialising in lighting design. She spent more than 25 years with Concord, before consulting internationally on building and spatial lighting.

A fellow of the RSA and the Chartered Society of Designers, Turner was an honorary fellow of the Society of Light and Lighting and the Royal Incorporation of Architects in Scotland.

She is survived by partner Christophe Egret, her children Joanna and Jake, and grandchildren Amber and Dexter.

CHP KEY TO NHS CARBON SAVING TARGETS

The NHS could achieve major carbon and cost savings in building energy use by using more combined heat and power (CHP), according to the National Audit Office.

It estimates the NHS could save £180m a year through carbon-saving measures.

CHP provider Ener-G said the Heart of England NHS Foundation Trust would make energy and operational savings of nearly £1.6m a year by moving to low carbon heat and power, together with the wider refurbishment of its electricity, heating and cooling infrastructure.

TALENT SHORTAGES HAMPERING PROJECTS

Nine out of 10 construction project owners working in the public sector experienced underperforming projects in the last year, caused by a shortage of skilled labour, poor contractor performance or planning issues, a new global survey by KPMG has revealed.

Results from the annual global construction project owners' survey found nearly half of respondents were experiencing shortages in skilled labour, with 69% requiring external assistance to support the existing workforce to deliver projects.

BIOMASS TO POWER GIANT DATA CENTRE



A £100m cloud-hosting data centre in Fife is aiming to be one of the most efficient in the world with a power usage efficiency rating of just 1.15 and energy drawn from the UK's largest biomass power plant, which has been built next door.

Designed to achieve a BREEAM 'outstanding' rating, the facilities at Queensway Park, Glenrothes, will eventually form Scotland's largest co-location data centre campus – where storage is available for rental – when it opens its doors next year.

Fox wins symposium award

● CIBSE technical event sold out at UCL

There was a full house at the two-day CIBSE Technical Symposium hosted by UCL last month.

The event brought together 200 attendees for a programme, featuring more than 50 debates, presentations and poster sessions.

Sergio Fox, from Architecture without Engineers, who introduced the symposium theme of 'simple buildings, better buildings' with a study on Danish buildings, won the award for most effective delivery of material.

And the accolade for the most significant contribution went



Award winner Sergio Fox

jointly to Michael Lim, from Aecom, and Steve Harper, from Galliard Homes, for their paper on the Seager Distillery case study.

CIBSE vice-president Tadj Oreszczyk spoke of the challenges facing building

services engineers over the next 50 years and highlighted the importance of attempting to make buildings zero carbon to help tackle the challenges caused by rising global temperatures.

He described how new greenhouse gas emissions targets – including those expected to be agreed in UN climate change talks in December – made 2015 a critical year for setting the trajectory for the remainder of the century.

Next year's symposium will be held at Heriot-Watt University, in Edinburgh.

Selected papers can be downloaded at www.cibse.org/symposium

New code set to be a hot topic

A new code of practice on surface water source heat pumps was unveiled at the 2015 CIBSE Technical Symposium.

Surface water source heat pumps: A Code of Practice for the UK is a joint project between the CIBSE, the Heat Pump Association and Ground Source Heat Pump Association, supported by DECC. It follows the government's release of a map of 40 urban rivers, which show the greatest potential for the deployment of such pumps.

The code of practice – the draft of which is

due to be issued for industry-wide consultation in June – will aim to raise standards in the design, implementation and operation of surface water source heat pumps, covering a project's life-cycle.

It is structured by the typical sequence of a project by stage. For each stage, objectives are set, and for each objective, minimum requirements are defined to achieve it. All must be met if the project is to comply with the code.

Read more on page 7 of this month's Products Special.

Industry will suffer fallout from political uncertainty

● Slower construction growth predicted for 2016 and 2017

A 'hangover' from the General Election could damage construction-industry growth in two years' time, according to forecasters at the Construction Products Association (CPA).

Output is expected to continue growing this year, by 5.5%, before slowing during 2016 and 2017, to 4% and 3.4% respectively. The CPA has said the industry would have to work with the new government 'to address the need for greater investment in capacity and skills'.

While the construction sector is growing at double the rate of the rest of the UK economy – thanks to activity in private housing, infrastructure and commercial building – the 'most uncertain election in more than 40 years' will start to have a negative impact, according to the CPA's economics director Noble Francis.

'The lag between contracts and work on the ground means that construction activity in 2015 probably won't be impacted, since the majority of work for the year has already been planned,' he said.



1000 WORDS / SHUTTERSTOCK

'Instead, we expect a break in private and public investment this year for future projects, which – in turn – will lead to slower construction growth in 2016 and 2017.'

Francis added that uncertainty over future government policies, such as Help to Buy, would damage growth in the house-building sector, despite the national shortage of affordable homes.

The CPA is forecasting that private house-building will still be 19.2% lower than its pre-recession peak in 2007.

'Similarly, increases in commercial activity are likely to be constrained by a hiatus in business investment this year, due to the election, with growth in the sector expected to slow to 5.2% in 2016 and 4.4% in 2017,' added Francis.

One area that is expected to be largely unaffected by the General Election is infrastructure activity, which is predicted to continue growing well into 2018.

See CIBSE technical director Hywel Davies' overview of the main political parties' policies on page 16.

Experts put DECs under microscope

Building energy experts Robert Cohen and Bill Bordass have produced a study into the role of Display Energy Certificates (DECs), which face abolition after a controversial consultation process this year.

Mandating Transparency about Building Energy Performance in Use describes the difficulties of implementing policies based on being 'transparent about actual energy performance' with the intention of improving investment in practical energy management. The paper seeks to provide 'a number of lessons for improvements to future policy outcomes'.

The authors reviewed the history and precedents of Building Regulations in the UK and European building energy efficiency policies, to identify what helped and hindered progress towards buildings that use less energy in operation. Their paper also looks at operational rating schemes in the US and Australia.

It identifies: a tendency by regulators to focus on 'regulated loads'; an unhelpful split of the topic between various government ministries and agencies; neglect of follow-through, enforcement and feedback; and political rhetoric that favours an abdication of central government responsibilities to market forces.

Download the paper for free at <http://bit.ly/1yLVk5g>

Poor installation leads to water-damage claims

Poorly installed push-fit connections are being blamed for a number of expensive water-damage insurance claims.

Construction insurer ECIC has seen 'a marked increase' in claims linked to connections bursting under pressure. In one case, more than \$500,000 of water damage was caused to a care home.

ECIC claims manager Ian Hollingworth said: 'While these pipes are incredibly fast to fit and cost-effective, if the job is performed incorrectly, the fitting will burst, causing extensive water damage.'

...but surge in planning approvals bodes well for strong finish to 2015

Planning approvals in the first two months of this year jumped by more than a third compared with the same period last year.

According to figures from construction information specialist Glenigan, planning approvals in January and February were up by 36% compared with the same period in 2014. These include a 54% increase in non-residential approvals.

With more projects now expected to start on site later this year, observers are predicting a strong finish to 2015, although the overall value of projects has

dropped compared with last year.

'The overhang of last year's relatively muted rise in approvals, coupled with some private-sector clients pursuing a wait-and-see approach during the run-up to the General Election, may keep starts subdued into the second quarter,' said Allan Wilén, economics director at Glenigan.

'However, this bank of prospective projects with detailed permissions bodes well for growth during the second half of this year, especially if a credible government emerges quickly from the aftermath of the election.'

There are still considerable differences in activity between regions in England, with the North East, Yorkshire, the East Midlands, the East and the South East all experiencing significant rises in the value of projects starting on site, compared to a year earlier. However, the value of projects in London, the South West, the West Midlands and the North West fell.

London still easily boasted the largest value of project starts of any UK region in the first quarter, at £2.2bn, but that figure was down by 13% on the first three months of 2014.



Canary Wharf backs thin-film solar glazing

Cambridge company Polysolar has won the sustainable buildings stream of Canary Wharf Group's Smart Cities accelerator competition – the Cognicity Challenge.

It received a £50,000 prize and the opportunity to pilot its transparent, thin-film solar PV glass panels at the high-profile business district.

The panels, which can be integrated into a new building's external structure to generate clean energy, can also be retrofitted into existing buildings. Polysolar has already completed projects for a number of supermarkets and at the Future Business Centre in Cambridge.

Cognicity's accelerator programme aims to fast-track promising smart city technology businesses by providing a series of intensive workshops, expert mentoring sessions by a team of Canary Wharf specialists and business mentors, along with networking opportunities.

BIM uptake 'on pause'

● Many practices blame lack of time, cost or expertise

Engineering and construction professionals believe the development of building information modelling (BIM) is largely moving in the right direction, according to this year's NBS National BIM Survey.

But there has been a 'pause in adoption' with a 'significant number of practices' still not seeing the advantages, the researchers said.

More than 80% of respondents to the fifth annual survey believe that BIM will be made compulsory on public sector projects, and

70% said the government would stick to the plan set out in its construction strategy to implement 3D collaborative Level 2 BIM.

Most respondents believe progress is 'on the right track', but only a quarter said the UK was a world leader. A further 45% remain ambivalent about the role of BIM, although most think it will help reduce project costs and time; and 41% see it as a tool that can help cut carbon emissions.

However, cost plus lack of expertise and training remain major barriers to BIM adoption, according to the survey, with many professionals saying they didn't have enough time to

get up to speed with the techniques required.

There has also been a small drop in the proportion of firms adopting the approach: 48% compared with 54% last year. On top of that finding, 63% said a lack of client demand was slowing their adoption of BIM.

Despite this, David Philp, head of the UK BIM Task Group, said he was heartened to know that 'a majority of the industry feels the government is on the right track'.

Among BIM adopters: 59% had experienced cost efficiencies; 56% an improvement in client outcomes; 51% an increase in the speed of delivery; and 48% an increase in profitability.

Lift security concerns after jewel heist

Lift security has been thrust into the spotlight after a multi-million-pound gems heist gang used the elevator shaft to access the Hatton Garden Safe Deposit vault over the Easter weekend.

After disabling the communal lift on the second floor of the building, the men abseiled down the lift shaft into the basement, looting 71 security boxes.

Adam Scott, operations director at Grontmij, said maintenance and inspection personnel often enter lift shafts, following established safety procedures, to isolate a lift car from inadvertent movement.

The doors to the shaft itself are typically unlocked using a



NANDO MACHADO / SHUTTERSTOCK

commonly-available 'key', similar to those used for gas meter cupboards. Scott said: 'There are enhancements available to upgrade lift installations for use in vandal-resistant environments. Likewise, enhancements – including iris scanning – are available to restrict lift use to

authorised personnel only.'

Scott said these lifts are typically designed to BS EN81-71, which defines different categories of vandal-resistance. Category 2 includes the requirement for a security system to prevent opening of the landing door with the standard key, unless the security system has been deactivated.

Scott said it was not mandatory to design lifts for high-security buildings to a higher category of vandal-resistance. However, this was likely to be considered during the design stage and adopted if it was felt appropriate.

More on lifts on page 22.

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ESOS set to give boost to in-house energy reporting



● Mandatory energy assessment scheme encourages metering

Most UK businesses are now aware of the forthcoming Energy Savings Opportunity Scheme (ESOS), and more than half are planning to increase in-house measurement and reporting.

These were two of the findings of the latest report by edie.net, *Energy Management: Procurement, Planning and Purchasing Priorities 2015/16*, which surveyed 381 energy managers.

It found that 82% of respondents had heard of the

government's mandatory energy assessment scheme and, of these, 53% said they would be increasing in-house measurement and reporting, and 18% were planning to apply for approval under the ISO 50001 standard this year.

However, the survey also revealed a 'lukewarm response' to questions about how the scheme was likely to influence future energy efficiency activity. Just 30% of ESOS-affected businesses believe it will help them identify savings or format plans; 12% said it would complement existing plans; 9% said it would not inform plans at all; and, despite the energy assessment needing director approval, 'just 6% of respondents believe ESOS will engage senior management in energy efficiency'.

ESOS requires all 'large enterprises' with more than 250 employees or a turnover of more than €50m to produce detailed reports on their energy use and efficiency every four years. There is no obligation to implement any of the efficiency measures identified.

Qualifying organisations must carry out their ESOS assessment and notify the Environment Agency by 5 December 2015.

Industry facing specification time bomb

Specification writing is falling far short of the standard required to support digital methods of construction and industry efforts to modernise, experts claim.

At the launch of a new Model Format for building services specifications (BG56/2015), senior representatives of CIBSE, BSRIA, B&ES and building engineering firms agreed that the status of the specification writer had been relegated in importance, leading to falling standards, which undermine

the contractual process.

CIBSE technical director Hywel Davies said a specification was not just about the 'techy details', but should provide 'good asset information that makes a building workable'. He explained that the updated RIBA Plan of Work included an 'in use' period, which should be reflected in design specifications.

Davies also warned that 'screwing up the specification' was like writing a 'blank cheque for lawyers'.

He was backed by B&ES

president Andy Sneyd who said the use of non-standard design specifications led to confusion, pricing errors and contractual disputes, as well as undermining the government's stated aim of reducing the cost of construction by 30%.

And Jo Harris, head of BSRIA's sustainable construction group, added that the new model format more closely reflected the construction process, creating a link between what the industry currently does and where it is going in the future.

Final nail in coffin for housing code

The Code for Sustainable Homes was officially abolished at the end of March with the rubber stamping of the outgoing coalition government's Housing Standards Review, which aims to slash housing 'red tape' by 90%.

Energy requirements for new homes will now be contained within the Building Regulations and set at values equivalent to Code Level 4.

Some projects already in the pipeline are being allowed to continue using the code and the Building

Research Establishment (BRE) said it would continue to certify schemes.

'The code has been a catalyst for significant positive change in housebuilding. It created a step change in standards, knowledge, products and skills within the sector,' said Gwyn Roberts, BRE head of housing standards. 'However, the code as a government standard has not resonated with consumers and that is key to really driving the market further forward. BRE is now working with the industry to do this.'

Movers and makers

Send your job moves to
editor@cibsejournal.com

Norman Disney & Young

Australian-based Norman Disney & Young (NDY) has a new CEO, following the appointment of Stuart Fowler in March. He replaces Ian Hopkins who is remaining a director of the building services consultant until December 2015. Fowler was formerly the company's chief operating officer

NDY's London office has been run for the last year by director-in-charge Allen Williamson (above).

The mechanical engineer has been with the consultancy firm for more than 14 years, 10 as director.



NDY's Williamson

Angus Roberts

will lead the new Edinburgh office of environmental engineering consultancy Atelier Ten.

The practice, at 39 Hanover Street, offers

environmental design, building services, lighting design and fire engineering services for clients and architects in Scotland and beyond.

Roberts brings with him 15 years of experience, with four years spent working on projects including Chelsea Barracks, The National Theatre, the Royal Academy of Music and the BREEAM Outstanding World Wildlife Foundation HQ.

The firm said this development was in response to growing demand for their services in the east of Scotland, where the firm has already secured projects at The University of Edinburgh and Edinburgh Bioquarter with Scottish Enterprise.



Carla Bartholomew

has been appointed senior mechanical engineer at Arup's Bristol office, after leaving a similar post at Aecom.

She is chair of the CIBSE South West Young

Engineers Network (YEN), and a YEN representative on the CIBSE Council. She represents YEN at CIBSE Regional Liaison Committee and Council meetings in a bid to forge a closer working relationship between YEN centres worldwide and CIBSE HQ.

Bartholomew is a STEMNet ambassador, aiming to inspire young people to study STEM subjects and promote opportunities in building services engineering.



CIBSE makes connections down under



● Sunny reception in ANZ Region for CIBSE representatives

CIBSE chief executive Stephen Matthews, and technical director Hywel Davies, travelled to Australia, New Zealand and Hong Kong in March, to mark the end of Peter Kinsella's presidency of the institution.

The trip – which was also a valuable opportunity to renew and strengthen relationships in the region – coincided with the President's Dinner and the ANZ Region's Soft Landings seminars. These took place across Australia and New Zealand, in Perth, Melbourne, Auckland and Sydney.



The keynote speaker for the seminar series was Rod Bunn, from BSRIA, while Davies covered the CIBSE tools available to support whole-life management and link to soft landings – particularly the relevant CIBSE guidance. He also gave a short overview of the UK BIM programme, while Matthews provided an introduction to CIBSE and its aims.

During their trip, Matthews and Davies attended an ANZ regional committee meeting, which left them with a sense of the strength of leadership and enthusiasm in the group. They returned with various actions and the resolution that more frequent visits to the region would be beneficial.

The ANZ Region – which has nine chapters – is growing, with committee meetings held two or three times a year.

The CIBSE duo met representatives from other organisations, including the Air Conditioning & Mechanical Contractors Association and the Association of Hydraulic Services Consultants Australia, who were very welcoming and supportive.

Kinsella was the first international President of CIBSE, and the President's Dinner, held on 20 March in Sydney, was one of the highlights of the trip (see panel below).

On the final leg of their tour, in Hong Kong, Matthews and Davies met members of the HK branch committee, led by PL Yuen, and visited the International Commercial Centre, which won the facilities management accolade at the 2015 Building Performance Awards.

Overall, the pair felt the trip was a success, with significant benefits. CIBSE staff are now more focused on continuing to support the ANZ and Hong Kong regions, with a better understanding of how this can be achieved.

Matthews and Davies would like to thank everyone involved in delivering and hosting their visit, including the many sponsors who made the seminar series possible.

Paul Angus, CIBSE NSW chair, on prizes and partying at the President's Dinner

In Australia, we know a thing or two about throwing a party, and that's exactly what we did to celebrate Peter Kinsella's year as CIBSE President.

The Australia and New Zealand (ANZ) Inaugural Dinner, held in March, was attended by 150 building services engineers, architects, facilities managers and friends of the industry.

Stephen Matthews highlighted the importance of the institution worldwide and how Kinsella had been influential in raising CIBSE's profile on a global platform.

A number of awards were

presented on the night. Sihui Wang, from the University of Sydney, was presented with the CIBSE NSW Student of the Year award. Her passion and flair for building services was evident in her innovative approach to retrofitting the Wilkinson Building at the university. Wang received \$500, a trophy and a certificate.

Oscar Aitchison, of Norman Disney & Young, received the Highly Commended CIBSE NSW Young Engineer of the Year award. The electrical project engineer has excelled in challenging projects, including



Sydney's Barangaroo commercial towers, and he has demonstrated his passion for using BIM, as well as broad market knowledge.

The CIBSE NSW Young Engineer of the Year award went to Arup's Rory Brennan. He designed building services of the future for data

centres, one of which won the Data Centre Dynamics Award for Innovation in the Mega Data Centre category in the Asia-Pacific region. Brennan received \$500, a trophy and a certificate.

Kinsella also presented Stephen Hennessy (pictured, right) with the CIBSE ANZ certificate of appreciation in recognition of his outstanding service to the regional committee and building services engineering in Australia.

The evening raised \$1,260 for the CIBSE Benevolent Fund and Mates In Construction, a mental health awareness charity.

Regular events in pipeline for new SoPHE region

● Group to promote public health engineering in east

The Society of Public Health Engineers (SoPHE) has launched an East Anglia Region, based in Cambridge, to provide engineers working or living in the area with more access to technical events and meetings.

Coordinator Dean Burroughs, public health engineer at Hoare Lea, Cambridge, plans to organise regular technical evenings – provided by SoPHE Industrial Associate members – on the second Wednesday of every other month. The first is planned for 13 May.



Dean Burroughs

Burroughs said: 'The aim in launching the SoPHE East Anglia Region is to promote public health engineering design in this area. The industry is great at the moment – especially in Cambridge, where refurbishment works are happening around the city centre's train station, with many new office blocks and hotels being built on Station Road.

'Hopefully our events will be well attended, and I look forward to meeting new public health engineers in this area.'

For more information about the new East Anglia SoPHE region visit www.cibse.org/sophe

In brief

NEW IENG ROUTE TO HELP NAVIGATE YOUR CIBSE CAREER

CIBSE has introduced a new route to membership for people with an accredited undergraduate degree in engineering, who are working at a high level in the industry.

The Member Incorporated option is open to applicants who are able to satisfy the competencies for the member grade and who hold an accredited qualification for Incorporated Engineer (see www.cibse.org/accreditedcourses – non-accredited qualifications will be assessed on an individual basis). This enables applicants to gain IEng registration with the application for full Member. Visit www.cibse.org/member, email membership@cibse.org or call +44 (0)208 772 3650.

PAPERS COMPETITION OPENS

The CIBSE Lifts Group and The Lift Academy have announced that the annual papers competition is open for entries.

Papers on the subject of 'Safe working' are invited from lift industry members who operate at craft and technician level, including apprentices, trainees, fitters and testers.

The submitted paper must relate to the lift or escalator industry, and will be peer-reviewed by a board of judges. Entries are limited to 2,000 words, and must be received by 30 June. For more details visit www.cibseliftsgroup.org

LIFT ME HIGHER

Registration is open for the fifth Symposium on Lift and Escalator Technologies, which brings together experts in vertical transportation, offering speakers an opportunity to present their peer-reviewed research papers.

The symposium will be held at Highgate House, Northampton, on 23–24 September. There is an 'early bird' discount of £30 if you register and pay before 30 June. Further discounts are available to members of supporting organisations, including CIBSE, the University of Northampton, LEIA and the IET.

For details and to register, visit www.liftsymposium.org

Making your institution stronger



CIBSE's board is to commission a review of aspects of the way the institution is governed to ensure it is fit for the challenges of the future.

The board would like to hear from members with ideas about how the current arrangements – including in areas of communication and reporting to members – might be improved.

In particular, it wants to ensure the public benefit provided by

the institution continues to fulfil the obligations of its charitable status, and that members with valuable experience are not inhibited by the nomination process from serving the Institution in particular roles.

Members are invited to submit their thoughts by email to governance@cibse.org, or in writing to Stuart Brown at CIBSE HQ, by the end of May, providing contact information for possible follow-up.

Engineers one step closer to BIM with launch of first eight PDTs

The first eight Product Data Templates (PDTs) are now available.

PDTs were developed by CIBSE's BIM Steering Group – in partnership with other industry bodies and professional engineering institutions – to fast-track the flow of general product information into BIM models.

They are written in Excel format and are usable with all BIM platforms, so manufacturers do not need to grapple with multiple versions of Level 2 BIM to join the game. The first eight PDTs cover:

- Air grille diffuser
- Heat detector

- Isolation valve
- Luminaire
- Manhole
- Pump
- Radiator
- Smoke detector

For full details of all PDTs available for use – and for consultation – visit <http://bit.ly/1CwQSIR>

Further information about why the PDTs are needed – and how they work – can be found at www.cibse.org/bim

Videos explaining the process can be found at www.BIMtalk.co.uk



@ Feedback

Readers discuss the proposed Swansea Bay lagoon, domestic water systems, district heating costs and the timescale for smart offices



An impression of the proposed Swansea Bay lagoon

Lagoon fears

Harnessing power by using low-carbon means should be done in an economically, environmentally and ecologically acceptable manner. The proposed Swansea Bay lagoon ('Budget backing for Swansea tidal lagoon', *CIBSE Journal* April 2015) – involving a 9.5km-long, 26m high breakwater, enclosing 11.5km² of mud flats and sea – fails to satisfy these criteria because:

- It should be outside Swansea Bay and enclose deeper seawater – for example, at the upper reaches of the Bristol Channel coastline
- The proposed turbine design is

inappropriate for Swansea Bay, because of rapid silt movements, and would lead to a deteriorating, power-harnessing electrical output

- The 16 turbines would function simultaneously for only 16 hours per day, thereby not harnessing any power for one third of each day.

The proposed lagoon would make the beautiful sweep of Swansea Bay less attractive and lead to increased sea pollution – because of contaminated seabed disturbance – and increased flooding of the seashore.

For any UK government to agree to a strike price of £168/MWh – as sought

Its failure would set back the technological cause of harnessing tidal energy in Britain for many years

by the developer – locked in for 35 years, would be financially profligate. To subsidise this £850m project would be a high-risk, ultra-expensive strategy, economically. Its failure would set back the technological cause of harnessing tidal energy in Britain for many years.
Doug Probert, Emeritus professor of applied energy and the environment, Cranfield Postgraduate University

Rewriting the standards

The article on oversizing domestic water systems (*CIBSE Journal* April 2015) highlights a real problem with standard mechanical services design, and reflects the issue of diversity that I discussed in my article on lean design (*CIBSE Journal* June 2014).

The findings on actual hot-water use in apartment blocks indicate that using BS6700 overestimates predicted use by a factor of 10. Oversizing wastes clients' money, leads to inefficient system operation and gets building services engineers a bad reputation. Time to rewrite the standards!

*Matthew Hill MCIBSE
Consulting engineer and director at LEDA*

The cost of district heat

The recent *Which?* update on district heating (<http://bit.ly/1IXdRlX>) raises strong consumer concerns about the cost of heat supplied in district heating.

To provide more appropriate charging – and, importantly, to ensure end-users'

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systems are designed to extract the maximum potential heat – a simple solution is to pay for heat just as we do for gas, so that payment is based on its potential energy. ‘Heat metering’ results in consumers paying only for the energy they extract. This potentially allows end-users to return water into the district heating distribution system at high temperatures; having feasted on the supplied high temperature, it can return the water just a few degrees cooler than when it was taken.

A proper application of the potentially useful energy – and exergy – in the heat supply (for ‘counterflow’ domestic water heating, for example) could result in a 15°C return temperature. Such a system will give savings of more than 10% to producers and consumers because it will increase the efficiency of heat supply from CHP, electric heat pumps, biomass boilers and solar thermal. It will also minimise the volume of water that consumers take from the system, reducing distribution costs and losses, as well as ensuring that those remote from the source get heat at times of peak demand.

William Orchard MCIBSE

Note from editor

The standfirst in last month’s opinion article by Paddy Conaghan (‘Time to change our BIM practices’, *CIBSE Journal* April 2015) incorrectly stated that contractors and designers must work

on the same model. Conaghan makes clear that – while in an ideal world this would be true – the current generation of Level 2 BIM platforms used by designers does not give contractors all the features they require.

CIBSE LinkedIn group considers the timescale for smart office buildings

Ken Dooley

How many years are we from having fully smart office buildings, with ventilation, lighting and equipment controlled by occupancy sensors?

Michael Brankin

Lots of buildings with good BMS control over the heating vent and cooling energy, and good lighting control, can be considered smart. However, the best ones were designed years ago, when the services consultant worked for the client.

Nick Hudleston

All the fancy front-end, internet-enabled, mobile tech in the world is useless without robust scientific research into control algorithms, and maintaining that scientific approach post-occupancy.

Tony Thurgood

Until owners and their backers change their funding mindset, in this current

dark-age, set-in-stone economic environment, it will never happen.

Simon Owen

There is a lot to be said for passive solutions that have been properly thought out, and where occupants are familiar with how it works.

Roy Gee

Until clients, accountants and engineers remove the word payback from progressive solutions, take-up will be much slower than it should be. If it doesn’t have a payback of three years or less, it will struggle to be implemented.

David M. Cowtrick

Until we have maintenance personnel with an understanding of the installed systems, ‘smart’ buildings may not stay that way for long.

Gersil Kay

Net-zero energy, complete automation, and Internet of Things may never be achieved because people are so unpredictable. One careless user could sabotage the best plan.

CIBSE Journal welcomes readers’ letters, opinions, news stories, events listings, and proposals for articles.
Please send all material for possible publication to: editor@cibsejournal.com, or write to Alex Smith, editor, CIBSE Journal, CPL, 275 Newmarket Road, Cambridge, CB5 8JE, UK. We reserve the right to edit all letters.

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FROM 'COULD DO' TO 'MUST DO' STANDARDS



A new heat networks code of practice – to be published this summer – will ensure district heating schemes achieve best-practice standards, says CIBSE CHP Group chair **Phil Jones**

If heat networks are to form a significant part of the UK's low carbon energy infrastructure in the future, they need to be designed, built and operated to a high standard.

To help achieve this, a new voluntary code of practice on heat networks has been produced by CIBSE and the Association for Decentralised Energy (ADE), previously the Combined Heat and Power Association.

Heat networks: A Code of Practice for the UK will be published this summer and is structured around a new cradle-to-grave heat networks plan of work. As well as helping to specify minimum standards in the tendering/contracting processes, its adoption by developers could give assurance to property purchasers that the district heating scheme has been designed, installed and commissioned to a specific set of standards. In the longer term, a condition of receiving private investment or public funding could be following the code.

Work is under way to introduce training, accreditation and registration of heat-network professionals, to ensure that the skills to implement the code are available across the sector.

From 'could do' to 'must do'

The code represents a new approach for CIBSE in terms of style, structure, presentation and approach. It moves away from 'could do' guidance towards 'must do' minimum standards.

Structuring the code around a heat networks plan of work is also a significant departure, with a new colour-coded layout that could be used for other technologies or techniques in the future.

Where certain standards were thought too onerous as a minimum, they are presented as best practice, with the intention that these might become the minimum in future.

Feasibility

The industry lacks standards around the feasibility of heat networks. Feasibility is essential to achieving sufficient accuracy of peak heat demands and annual heat consumptions. It also requires identification of the most suitable, low carbon heat energy sources and location of an energy centre with top-up and standby boilers where necessary.

The feasibility study should select suitable operating temperatures, and define heat network distribution routes, pipe sizes and costs. It should conduct a consistent economic analysis, and options appraisals with full risk and sensitivity analyses across all environmental impacts and benefits. The study should also develop preferred business structures, contract strategy and procurement strategy.

Commissioning

Well-designed schemes often perform badly because of poor commissioning. The code requires schemes to achieve consistently low return temperatures

The code represents an entirely new approach for CIBSE in terms of style, structure, presentation and approach

through commissioning building heating systems/controls.

One of the most critical aspects of the design and operation of a heat network is the return temperature, although – in existing systems – this is something over which the operator has relatively little control. So the commissioning is vital because it is harder to change settings once the system is in operation.

This is, in part, a cultural change. Operatives commissioning heating systems using gas-fired boilers in a building are more concerned with high flow rates and ensuring radiators deliver their output. As a result, there is a tendency to set flows and return temperatures higher than the design value. With heat networks, the main commissioning objectives should be to achieve the correct return temperatures and make sure flow rates are balanced to no more than the design value.

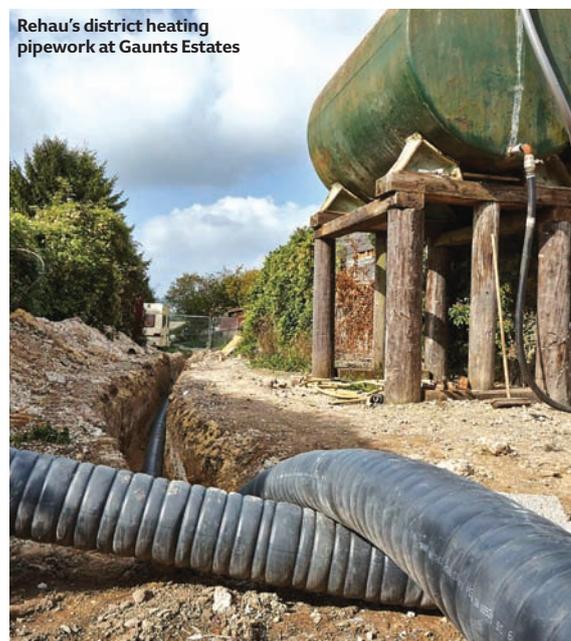
To the future

Demand for standards means the code of practice is already being used by some local authorities in tendering for heat network schemes. Questions have been raised about how implementation of the code might be policed, and it could be that district heating schemes will be accredited, perhaps with an attached rating or compliance level. It is hoped the code will be regularly reviewed to upgrade standards with current best practice, eventually becoming minimum standards.

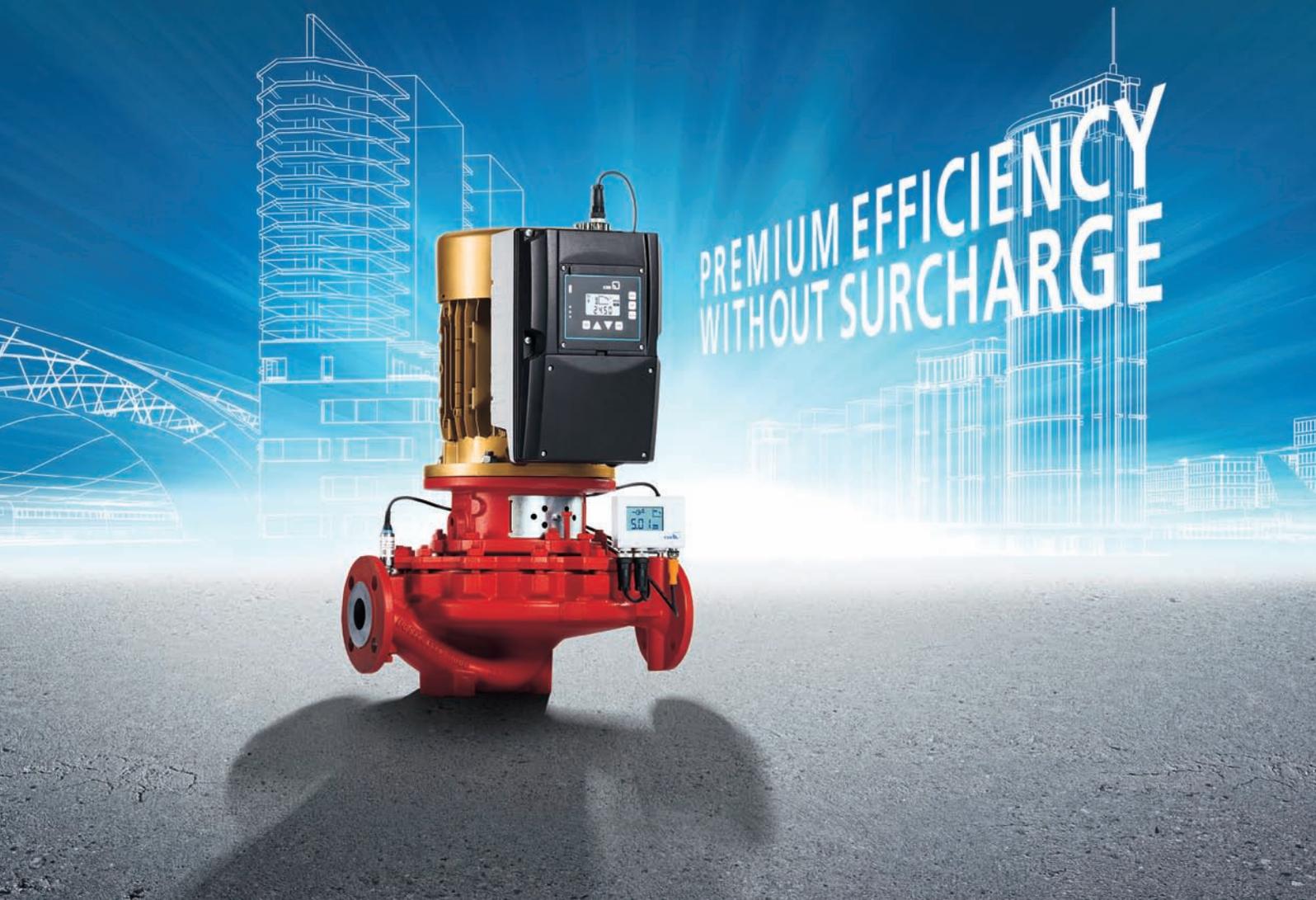
This article is based on a CIBSE Technical Symposium 2015 paper by Paul Woods, Tim Rotheray and Phil Jones www.cibse.org/symposium

- DECC has funded a new CIBSE *Surface water source heat pumps: A Code of Practice for the UK* – produced in partnership with the Heat Pump Association and the Ground Source Heat Pump Association – to be published in late 2015. See page 7 in the Products Special.

- **PHIL JONES** FCIBSE is an energy consultant and chair of CIBSE Energy Performance Group



Rehau's district heating pipework at Gaunts Estates



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PARTY LINES

The 2015 UK General Election result is one of the most unpredictable in living memory, so what does this mean for building services engineers and their clients? Hywel Davies explores the possibilities

This election outcome is the least predictable for a very long time. It seems unlikely that any one party will gain a majority in the House of Commons, so thoughts are turning to coalition or minority rule.

A number of possible permutations are keeping the daily news media occupied, but what might this mean for building services engineers as they consider future design commissions, advise clients on energy savings in their existing stock, build or refurbish projects, or manage buildings? What policies might the new administration have in mind for us?

There are a number of areas where energy in buildings is addressed by existing policy and legislation, as summarised in table 1. In these areas we already have legislation: sometimes it has been developed within the UK – such as Enhanced Capital Allowances – and sometimes it implements an EU

Directive across the UK – as with the Energy Savings Opportunity Scheme. In some cases – such as Energy Certification – legislation is implemented by an EU Directive with devolved powers in Scotland and Northern Ireland, and in others – as with the Building Regulations (Standards in Scotland) – there is now a devolved regime in each of the four parts of the UK.

In addition, current planning legislation allows local authorities to impose conditions on developers when consenting to new developments. The Housing Standards Review (see panel 'Pickles' last stand'), which was finalised in March, removes powers to impose additional technical requirements, such as those from the Code for Sustainable Homes, Lifetime Homes or Secured by Design schemes, as a condition of planning consent for new residential developments.

Planning authorities may still make BREEAM ratings a planning condition. But it



6 The major parties have something to say on the energy trilemma but none articulate an overall approach to address the whole problem

But there has been little discussion of this major challenge by many of those seeking to represent us in Westminster after 7 May. Each of the major parties has something to say about the various elements of the trilemma, but nobody articulates an overall approach to address the whole problem.

The Conservative party has confirmed its commitment to see every home fitted with a smart meter by 2020, and to support low-cost measures on energy efficiency, with the goal of insulating a further million homes by that time. Labour, meanwhile, has committed to improve 200,000 low income homes each year, as well as delivering a further million interest free loans for home energy efficiency improvements. In addition, it will introduce a decency standard for private rented properties, which will presumably incorporate the energy requirements included in the Minimum Energy Efficiency Standards legislation introduced shortly before the end of the previous parliament.

The Liberal Democrats have a range of commitments to improve the energy efficiency of the existing building stock, including: a new Green Buildings Act setting new efficiency targets; Council Tax reductions to incentivise energy efficiency measures in homes; targets for all rented homes and those in fuel poverty to be EPC Band C by 2027, and *all* homes Band C by 2035. It would also reform the Green Deal and introduce incentives to install solid wall insulation, a so called 'feed out' tariff.

Meanwhile, the SNP seeks further support for offshore wind, and for changes to the funding for renewables to be fairer to Scotland, ensuring it is not penalised for its distance from the south of England, where peak demand for energy is greatest. It would also seek to fund the Energy Company

is widely anticipated that a new Conservative-led administration will review the non-domestic Building Regulations, with the specific objective of removing planning powers to impose additional de facto regulatory requirements, such as BREEAM, that are not directly approved by parliament or by the Secretary of State under powers delegated by the Building Act.

Manifestos for change

In his Presidential Address last year, Peter Kinsella highlighted the increasing significance of resource constraints on the built environment, and the impact of the energy constraints on building services engineers in particular. Many readers will be familiar with the 'energy trilemma' – the need to improve security of supply, reduce costs to consumers and businesses, and reduce carbon emissions to minimise increases in global temperatures.

Policy checker

Headline policies from the seven parties set to hold sway in this month's General Election



Conservative Party

- Smart meter in every home by 2020
- Insulate 1 million homes
- New garden cities



Liberal Democrat Party

- Council tax reductions to incentivise energy efficiency
- 'Feed out' tariff for solid wall insulation
- No zero carbon exemption for small sites



Labour Party

- Improve 200,000 low-income homes
- 1 million interest free loans for domestic energy efficiency
- Decency standard for private rented properties



Green Party

- Repeal of National Planning Policy Framework
- Protection of green belts



UK Independence Party

- No stamp duty on brownfield sites
- Merge planning and building control



Scottish National Party

- Create a climate justice fund
- Fund Energy Company Obligation from general taxation



Plaid Cymru

- Introduce a Climate Change Act for Wales
- Greater use of tidal and hydro power

► Obligation from general taxation, not as a levy on utility bills. Plaid Cymru supports greater use of renewables, especially from tidal and hydro sources, linked with a commitment to reducing aggregate energy demand, in the only manifesto linking energy generation and consumption. It is committed to requiring the NHS to address energy efficiency, so more money is available for care. It seeks devolved responsibility for energy policy and supports energy efficiency in the business sector.

For new buildings there is a varied approach. Labour will start to build a new generation of garden cities, and the Conservatives will support locally led garden cities. The Liberal Democrats, meanwhile, propose 10 new such developments in England, five along the proposed railway line between Oxford and Cambridge. The Liberal Democrats also want to remove the exemption from the zero carbon standard for smaller development sites, to increase the standard for all homes

Department of Energy and Climate Change	
1.	CRC Energy Efficiency Scheme (CRC) (UK)
2.	ESOS Audits & Energy Savings Opportunity Scheme (from 5 Dec 2015) (UK)
3.	Minimum Energy Efficiency Standards (from 2016) (England & Wales)
4.	Green Deal (England, Wales, Scotland)
5.	Smart Meters (England, Wales, Scotland)
6.	EU minimum product efficiency standards and energy performance labelling (UK)
7.	Climate Change Levy and Sector Climate Change Agreements (UK)
8.	Enhanced Capital Allowances (ECAs) (UK)
Department of Communities and Local Government	
9.	Energy Performance Certificates (EPCs), Display Energy Certificates (DECs) & Air conditioning inspections (England & Wales, Scotland and Northern Ireland)
10.	Building Regulations, including Zero Carbon Homes and Nearly Zero Energy Buildings (four devolved regimes)
11.	Planning Legislation (including BREEAM) (four devolved regimes)
Department of Environment, Food and Rural Affairs	
12.	F-Gas Regulation & related requirements (EU)
13.	Mandatory Greenhouse Gas Emissions and Environmental reporting (UK)
European Union	
14.	Resource Efficiency (EU) (No current legislation, but a communication setting out clear intentions to regulate in this area)

► Table 1: Regulations relating to energy use or energy-using systems in buildings.

Pickles' last stand

The last few weeks before the dissolution of parliament saw a flurry of legislative activity relevant to the built environment.

Zero Carbon Homes

The coalition restated its commitment to a Zero Carbon Homes standard in 2016 and to the future strengthening of minimum on-site energy performance requirements. The Infrastructure Act 2015 creates the powers needed to enable off-site carbon abatement measures (Allowable Solutions) to support the zero carbon standard, although the details will need to be worked out by the next government.

There is an exemption from off-site abatement for small housing sites of 10 units or fewer, but all new homes on small sites will have to meet the higher on-site energy performance standard. The coalition promised legislation to ensure that this exemption is not abused, which was a key element of the CIBSE response to the consultation on this matter in 2014.

Housing Standards Review

This creates a new 'streamlined' approach to setting technical standards for housing. It introduces optional Building Regulations on water, access, and space standards, in addition to the mandatory requirements.

Neighbourhood or Local Plans may no longer include additional local technical standards or requirements relating to the construction, internal layout or performance of new dwellings. In particular, they do not require

developers to build to the Code for Sustainable Homes, and the Code is now withdrawn. Existing Plans and guidance need to be reviewed.

Optional technical standards should only be required if they address a clearly evidenced need, and their impact on viability has been considered, in accordance with the National Planning Policy Framework and Planning Guidance. Neighbourhood plans should not be used to apply new national technical standards.

Local planners may still set and apply policies in Local Plans that require compliance with energy performance standards beyond those of Building Regulations – until commencement of amendments to the Planning and Energy Act 2008 made through the Deregulation Act 2015.

This is expected to happen alongside the introduction of Zero Carbon Homes policy in late 2016, when the coalition intended that the energy performance requirements in Building Regulations should be set at a level equivalent to the old Code Level 4. Interim levels above that are not what the coalition had in mind.

This does not modify the National Planning Policy Framework stipulation allowing connection of new housing developments to district heating or other low carbon infrastructure. Flood resilience and resistance and external noise remain matters to be dealt with through planning.

There is detailed guidance on transitional arrangements from existing plans to the new arrangements. From 1 October 2015 plans and policies must be interpreted 'by reference to

the nearest equivalent new national technical standard'. Compliance with the new optional standards should only be required where a relevant current Local Plan policy applies.

A new Building Regulations Approved Document Q covers security. Policies on the external design and layout of new development, to reduce crime and disorder are unaffected.

Planning

A newly consolidated Development Management Procedure Order, which consolidates the 15 amendments previously made to the 2010 Order, is intended to simplify and improve the planning process for all users of the system, and came into force on 15 April. It introduces new measures to improve the process of statutory consultation and a new provision for 'deemed discharge' of planning conditions to speed up development.

New guidance has been issued on the pre-application and examination stages of planning, and new planning practice guidance covers controls for storage of hazardous substances in England to reflect changes to new regulations being introduced on 1 June 2015. Further new guidance explains changes to the environmental impact assessment screening thresholds that took effect on 6 April 2015, to 'remove gold plating' of the EU Directive.

The Town and Country Planning (General Permitted Development) (England) Order 2015 introduced new permitted development rights from 15 April 2015.

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► and to extend it to non-domestic buildings by 2019. There is also a commitment to address the issue of higher summer temperatures in new buildings. The SNP emphasises its commitment to a continued programme of school building and improvement.

The issue of brownfield sites has generated some debate. Conservatives and Liberal Democrats are committed to prioritising development on brownfield sites, while UKIP has set out a range of incentives including exemptions from Stamp Duty, grants for remediation and indemnity insurance for the development of contaminated land. UKIP also aims to build a million new homes on brownfield sites by 2025.

Both UKIP and the Green Party are committed to repeal of the National Planning Policy Framework and greater local control over development and protection of the green belt. UKIP also want to see planning and building control merged.

CIBSE members have the knowledge and expertise to make significant energy efficiency improvements without compromising building performance. The urgency of that task is growing, and the December Conference on the UN Framework Climate Change Treaty

in Paris faces critical challenges to set the world on a path to mitigating the impact of human activity on global climate, or committing us to further damage that will be irreversible in our lifetimes.

The current three major parties are all committed to securing an agreement at the Paris conference, although there is limited detail on what they would be seeking; the Labour Party want an 'ambitious' agreement while conservatives seek a 'strong' one. This lack of clarity will concern those who consider that this is one of the most pressing long-term issues for the new government.

The SNP has committed to press for the rest of the UK to align with Scottish policies on climate change and carbon reduction and to create a dedicated climate justice fund. The SNP will also seek to ensure that the UK plays a positive role in the Paris conference. Plaid Cymru is committed to introducing a Climate Change Act for Wales.

Meanwhile, the Liberal Democrats explicitly commit to the development of a national resilience plan to help the UK economy, national infrastructure and natural resources adapt to the likely impacts of a 3-4 degree global average temperature rise. **CJ**



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RAISING STANDARDS

New lifts installed after August 2017 will have to comply with revised safety standards. Building services engineers need to be aware of the changes, says Grontmij's Adam Scott

Twin lifts in the St Botolph Building, London

The mid-19th century brought with it the invention of a rather mundane device that, arguably, changed the face of the developed world – the lift safety gear. Up until this point, space on the lower floors of buildings was favoured over that on the upper floors because people wished to avoid the travail of ‘walking the stairs’. The height of buildings was, therefore, limited by human convenience.

However, the lift safety gear – invented in 1854 by the now household name of Elisha Graves Otis, an American industrialist – gave people the confidence to travel in lifts to greater and greater heights.

His invention spawned the growth of the skyscraper, the height limits of which we have yet to find, and for which developers’ aspirations continue to push the technological boundaries of lift design.

Lifts are now being designed to travel up to a kilometre from the ground, at speeds of up to 45mph – yet most of us step into this ‘box in the sky’ without a second thought, assuming that we’re safe. And, typically, we are – but this has not come about by chance.

Over the years, the design of lifts has been controlled and guided by an established set of safety standards, and – in Europe at least – by legislation in the form of the Lifts Directive.

In 2014, the most significant revisions of the foundation lift-safety standard in the past quarter of a century were published in Europe: EN81-20 and BS EN81-50.¹

These new standards provide one way of complying with the essential safety requirements of the Lifts Directive. Typically, most lifts installed in Europe will be designed to meet them.

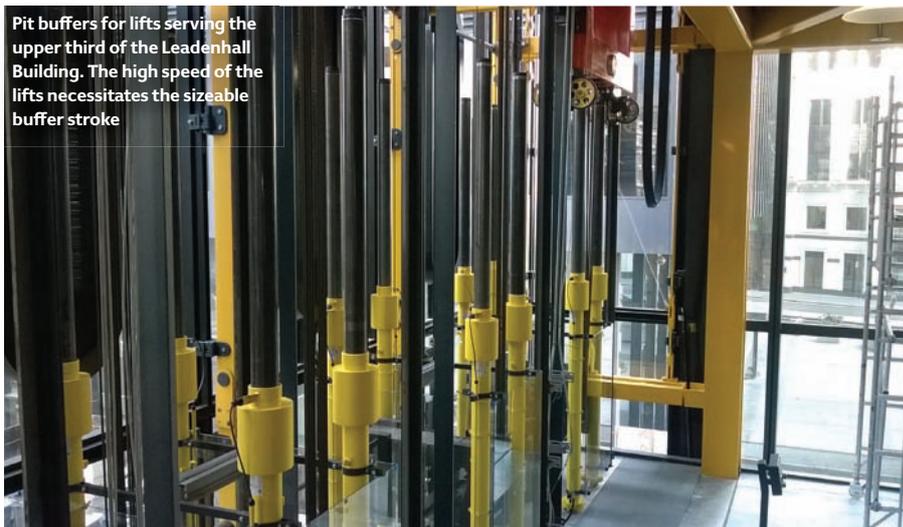
Date for your diary

In the UK, these standards have been published as BS EN81-20 and BS EN81-50. They are applicable to all passenger and goods-passenger lifts, but do not apply to lifting platforms, goods-only hoists, dumbwaiter service hoists or stair lifts – all of which have their own standards to govern safe design and use.

As with many new standards, the requirements are not retrospective and are subject to an adoption period from publication, before the withdrawal of the standards that they supersede.

In the case of BS EN81-20 and BS EN81-50, all lifts placed into public service after 31 August 2017 – including those for temporary builders’ use – will have to comply. Any deviation from the standards

Pit buffers for lifts serving the upper third of the Leadenhall Building. The high speed of the lifts necessitates the sizeable buffer stroke



after this date will require an appropriate Design Examination Certificate (DEC) from a notified body.

August 2017 may seem a long way away, but – when it is considered against the delivery programme for many buildings – lifts being designed now will be installed to these new standards.

While the design of vertical transportation systems is, quite rightly, undertaken by specialist engineers, all building services engineers should familiarise themselves with the principle requirements of the new standards (see panel, ‘Main changes’, below).

These have created a domino effect in the world of lift standards. Consequently, a revised fire-fighting lift standard – BS EN81-72² – will be published this year, and this will be followed in 2016 by the revised

The new EN81-20 and EN81-50 lift standards were peer reviewed and commented on around the world, with notable engagement in China – the world’s largest market for lifts



Main changes

The most visible and far-reaching changes to the lift standards include:

- Significantly revised requirements for refuge spaces in the lift-well headroom and pit. These may increase the lift headroom and pit depth, particularly for smaller, slower-speed lifts
- Where there are accessible spaces under the lift pit, a safety gear must be provided on the lift counterweight. It is no longer permissible to use a solid pier or other structural reinforcement. The use of counterweight safety gear may, in turn, increase lift-well plan dimensions and pit depths
- Where a lift pit is more than 2.5m deep (typically required when lift-rated speeds start to exceed around 2.5m/s to 3.0m/s),

- access must be via stairs and a permanent door. This requirement becomes particularly significant when considering higher-speed lifts in tall residential buildings, which typically serve basement car-parking levels, thereby creating a need for a stair-accessed sub-basement for safe pit access
- Lifts are now permitted to serve private premises directly, though this must be subject to negotiation with the owner, to guarantee unrestricted access for rescue and maintenance
- Lift-car lighting must now provide an illuminance of at least 100 lux. Previously a recommendation in the associated accessibility of lifts standard, this has now become a requirement.



Scenic lifts in the Jumeirah Emirates Towers hotel, Dubai

- standard for accessible lifts, BS EN81-70³. Many others will be published over the next five years.

World-class standard

Building services engineers frequently work on projects all over the world, which is challenging in terms of the varying local codes and standards.

The new EN81-20 and EN81-50 lift

standards were peer reviewed and commented on around the world, with notable engagement in China – the world's largest market for lifts. Off the back of this global engagement with the new standards, an initiative has now been launched to investigate the possibility of turning the standards into an international ISO document, allowing engineers to work to the same standard anywhere in the world. This is an attractive proposition, but one that has many political and technical hurdles to overcome before being realised.

While safety is a fundamental requirement of a lift system, it also needs to move people efficiently and effectively. Lift-system performance is key to the success of most commercial buildings and many residential developments.

Last year, the 2014 British Council for Offices (BCO) *Guide to Specification* was launched. This document contains significant guidance on lift-system performance and specification that builds on previously established benchmarks, to reflect our growing knowledge of how people use buildings and lifts (see panel, 'Key BCO guidance').

The global population is urbanising and becoming more mobile, which is driving a plethora of residential and hotel developments. In the UK, lift-performance guidance for buildings of this type has been less developed than that for commercial premises.

However, the revised CIBSE *Guide D Transportation Systems in Buildings* will be published this year, and will contain developed guidance on the appropriate performance standards for hotel and residential buildings. Watch this space. **CJ**

References:

- 1 *BS EN81-20* Safety rules for the construction and installation of lifts. Lifts for the transport of persons and goods. Passenger and goods passenger lifts; *BS EN81-50* Safety rules for the construction and installation of lifts. Examinations and tests. Design rules, calculations, examinations and tests of lift components.
- 2 *BS EN81-72* Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Firefighters lifts.
- 3 *BS EN81-70* Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Accessibility to lifts for persons, including persons with disability.

● **ADAM SCOTT** FCIBSE is operations director and technical lead of the specialist vertical transportation team at Grontmij

Key BCO guidance

- Revised demand templates for both morning and lunchtime lift traffic. Peak five-minute morning demand is now 12% of served population rather than 15%, but the traffic is no longer modelled as a simplistic 100% up, but a more realistic 85% up/10% down/5% interfloor. Lunchtime demand continues to be seen as the most taxing for lifts, with a five-minute peak of 13% of the served population
- Car loadings have been revised to be more realistic. We all know you never travel in a 21-person-rated lift car with 20 other people – there simply isn't sufficient space; lifts fail to fill to their rated capacity. Typically, people consider a 21-person lift to be full at around 80% of its actual capacity, not its rated capacity. Actual capacity is determined in a logical manner by assessing the area of the lift car and dividing it by the space required by a typical person; for a 21-person car this equates to 13 people. There is no longer any

further reduction in car loading for scenic lift cars because car loadings have been observed as lower, regardless of the type of lift

- Performance metrics – in terms of target average waiting times and average times to destination – remain unchanged from the 2009 guide, though they are now measured across all served floors. However, it should be noted that all lift-system performance criteria are averages, not maximums – an often misunderstood principle
- Where not all lifts serve all floors, the performance to and from those floors with restricted lift service should be assessed. The prevalence of destination control provides designers with the ability to drop lifts off at low floors to enhance the floor efficiencies at the valuable upper levels. This is good to consider in principle, but does potentially compromise lift performance at those valuable floors.

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Beca's award-winning airport design, a low carbon office refurbishment, and research on indoor environmental quality

Residences in London are increasingly being built in noisy locations and on irregular-shaped land. This often results in designs for single-aspect homes with façades exposed to traffic.

At the same time, there has been a drive for large areas of glazing in new apartments, as it is perceived to be popular with buyers.

These trends pose overheating risks for occupants, caused by solar gains from large expanses of glass and the restricted use of openable windows because of street noise. Single aspect designs also offer less opportunity for cross-ventilation.

The London planning guidance¹ states that developers should minimise the need for active cooling systems and consider natural means of maintaining comfort (London Plan policy 5.9). This means designers need to consider passive measures such as shading.

In reality this is hard to achieve. In many apartment buildings the proportion of glazing on the façade is more than 50% – generally less than 35% in older domestic buildings. Population increase means there is a higher density of residential development in London, so less space for dual-aspect flats.

Meanwhile temperatures are on the rise. Most of the hottest years since 1850 have been in the last 10 years and average temperatures have increased by 0.5°C since the 1950s². Cities in particular are getting hotter and are susceptible to the urban heat island effect.

CIBSE's overheating criteria for residential design states that operative temperature in living rooms should not exceed 28°C for more than 1% annual occupied hours, while the Passivhaus Overheating Criteria says that air temperature should not exceed 25°C for more than 10% of total annual hours.

While it is difficult to achieve these targets in single-aspect flats in London without openable windows, the acoustic standards presented in *BS8233: 2014 Guidance on sound insulation and noise reduction*, make it impossible in many circumstances.

This means designers have to turn to mechanical ventilation and heat recovery (MVHR) to prevent overheating and high noise levels. But there are issues around this technology, particularly around installation and maintenance. For example, filters – critical to the performance of MVHR – often become

Shading on the ArtHouse apartment scheme at King's Cross

CREDIT: JOHN STURROCK



URBAN REALITY

Passive design for new London homes is being thwarted by external noise and the desire for glazing. **Ashley Bateson** says MVHR and shading are the most viable solutions

clogged and are not changed often enough by occupants.^{4,5,6}

Other challenges in urban schemes are smaller dwelling sizes and internal heat gains from communal heating systems, which together raise solar and internal heat loads.

Case study

Hoare Lea modelled a typical London residential development to test a number of scenarios. The project is a multi-storey apartment block with two elevations facing busy roads. (For full case study and references visit www.cibsejournal.com or via the app at www.cibsejournal.com/app).

Modelling revealed that natural ventilation is not suitable, given the high levels of traffic noise, although modelling shows it would be effective in minimising overheating risk.

It showed that standard MVHR ventilation rates are insufficient to avoid overheating risk, but higher MVHR ventilation rates reduce overheating risk when used with shading. The best solution comprises large MVHR with high ventilation rates, external shading and openable windows for purge ventilation.

Key lessons

- Early review of external noise and ventilation strategies will become increasingly important
- Natural ventilation strategies may be unacceptable from an acoustic perspective. MVHR is increasingly likely to be the future solution
- The use of external shading, light coloured facades, thermal mass and smaller areas of glazing should be evaluated as passive strategies to complement the MVHR system
- Dynamic thermal modelling is a useful tool to test the impact of passive measures at pre-planning stage
- MVHR performance issues need fixing
- Impact of the future climate conditions, adaptation and microclimate will be increasingly important (including the urban heat island effect). **CJ**
- Ashley Bateson MCIBSE is a partner at Hoare Lea. He presented on this topic at this year's Technical Symposium www.cibse.org/technical-symposium-2015

A FLYING START

Christchurch International Airport's new terminal features a water source heat pump system with a payback period of only two years. **Andy Pearson** looks at an innovative system that triumphed in the International Project of the Year category at the CIBSE Building Performance Awards 2015

The new three-storey terminal at New Zealand's Christchurch International Airport was the first major infrastructure project to be completed on the South Island after the devastating earthquakes of 2010 and 2011. It is fitting, then, that the 30,000m² building relies on artesian water, abstracted from beneath the Earth's surface, to provide an innovative, energy-efficient, cost-effective and environmentally benign heating and cooling solution.

The artesian system was designed by the New Zealand office of multinational consultancy Beca. Since the completion and opening of the NZ\$237m (£121m) terminal in 2013, it has dramatically reduced the operational costs of the building and its dependency on fossil fuels. The airport operating company has been so impressed with the cost savings that it is implementing a similar artesian water-based set-up at the airport's existing international terminal.

The system's success is not confined to the airport; artesian arrangements for sustainable heating and cooling are under design or in construction at a number of other developments in the city.

This potential legacy was recognised by the judges of the CIBSE Building Performance Awards 2015, who gave top honours to the scheme in the International Project category. They described the artesian



solution as: 'An innovative application, with very good collaboration and strong ongoing involvement, and lots of potential for wider involvement.'

Work started on the scheme in 2005. Along with architect Warren and Mahoney, in association with Hassell (Australia), the firm designed a new terminal – incorporating an integrated domestic and international check-in – to sit on the site of the original 1960s domestic terminal. It was to be constructed in phases as the original terminal was progressively demolished, to make sure the airport could continue to operate.

As a consequence of this phased construction, the services had to be designed to ensure the new terminal's plantrooms and services were up and running before the existing ones were dismantled.

The first stage of the new

construction had to contain the central plant to enable the new terminal to operate as a stand-alone building,' explains Justin Hill, Beca's technical director, building services. As subsequent construction phases were completed, the new systems were extended to service these too.

'The new terminal had to be designed so that its building services could be extended as new areas were built; this included, for example, the use of differential pressure control valves on the heating and chilled water systems, so the operational areas did not need to be recommissioned as new areas were constructed,' Hill adds.

The client's brief for the integrated terminal was

“The use of artesian water was always on the cards as the existing international terminal uses it directly in a pre-cooling application – Justin Hill



Christchurch International Airport terminal

► for it to be as energy efficient and sustainable as possible within the constraints of the budget. ‘The use of artesian water was always on the cards as the existing international terminal uses it directly in a pre-cooling application,’ Hill says. ‘The challenge for Beca was to make better use of artesian water and to eliminate the need for fossil fuels.’

The elegance of the system is that it uses standard equipment – including three chillers – which have been configured to enable them to provide simultaneous heating and cooling, with the ability to recover and redistribute energy around the building.

‘The idea arose when Keith Paterson (business director for Canterbury Rebuild) realised the temperature of the artesian water – at 10-12°C – was perfect for a heat pump-type application and configured the system in a similar manner to that used in the thermal storage industry, which Keith had experience of from his work in Singapore,’ Hill recalls.

The system comprises two principal circuits: a closed-loop secondary system and an open artesian water circuit. In the open circuit, artesian water is abstracted from five wells, which draw water from a major aquifer flowing 35m beneath the terminal. There is provision to add a sixth well, should the capacity of the system need to be increased in the future.

These boreholes are located 50-75m apart, and relatively close to the terminal, to keep pipe runs to a minimum. Abstracted artesian water passes through any one – or all three – of the heat exchangers before being discharged back into the ground via a 5m-deep soak pit beneath the car park. No water is consumed by the system; the only effect is that the temperature of the returned water will vary from 7-20°C, depending on the plant’s mode of operation.

With the closed-loop system, water circulates through the secondary side of the heat exchangers, the air handling unit heating and cooling coils and, if required, the chillers when they operate as water-to-water heat pumps.

When cooling loads are low, water from the aquifer can meet the terminal’s cooling requirements. This avoids the need for any mechanical refrigeration. Areas requiring year-round cooling have coils sized to enable them to use artesian temperature cooling year-round, to minimise the use of the chillers.

With higher heating or cooling loads, the artesian water is used as part of a mechanical refrigeration system, with the



The terminal’s integrated check-in hall



Artesian-based systems for sustainable heating and cooling are under design or in construction at a number of other developments in the city

chillers working as geothermal heat pumps, thereby enabling the system to provide heating and cooling simultaneously, and in any proportion, from every chiller.

In this mode, the heat energy removed by the chiller in the evaporator to generate chilled water is used to provide heat. Rather than reject the heat energy – generated as a by-product of providing cooling through cooling towers to the atmosphere, the chiller’s condenser water is used as a heat source for the terminal’s heating circuit. This enables the system simultaneously to generate heating and cooling. When heat is not needed by the terminal, it is rejected to the artesian water via the plate heat exchangers.

‘When we want to generate heat, if there is no requirement to chill the terminal’s cooling water system we, effectively, chill the artesian water,’ explains Hill. ‘To my knowledge, there are no artesian-based systems elsewhere, of this size and nature, configured to provide simultaneous heating, cooling and artesian temperature cooling with the ability to recover and redistribute energy around the building.’

Comprehensive engineering analysis was



The new terminal, lit blue

undertaken to assess the most appropriate solutions and to provide confidence that the system would achieve the design objectives. This resulted in the central plant having four modes of operation: artesian cooling; mechanical cooling; heating; and simultaneous heating and cooling (see panel 'Four modes of operation' on page 32).

Water temperatures in heating mode were analysed to optimise the flow and return temperatures. Operational efficiencies and capital cost – along with reliability and plant longevity – were all considered at various LTHW temperatures. The analysis showed the optimal temperature for heating to be 40°C flow and 25°C return.

In addition to heat from the chillers, heat is recovered from two 1MW electrical generators, when they operate, and is added to the LTHW system. The generators were installed to ensure the terminal can continue to operate in a power cut and – at the request of the terminal's electricity supply company – to operate during periods of peak electrical demand. The chillers are more than capable of supplying sufficient heat for the building, but the heat is recovered because it is cost-effective to do so.

Predicted thermal loads per month

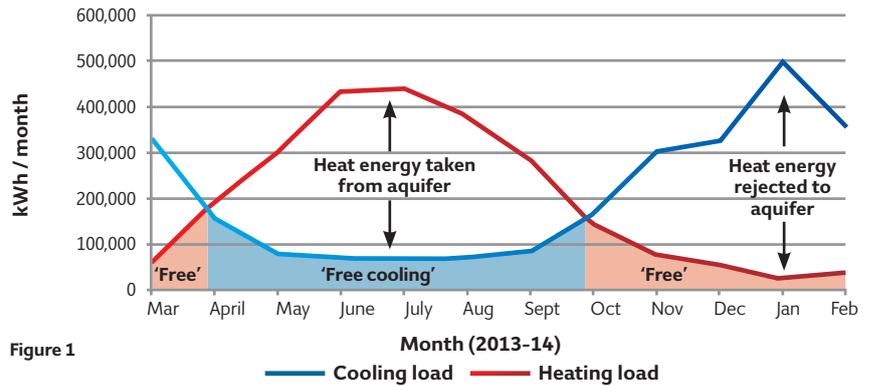


Figure 1

Actual thermal loads per month (March 2013 – February 2014)

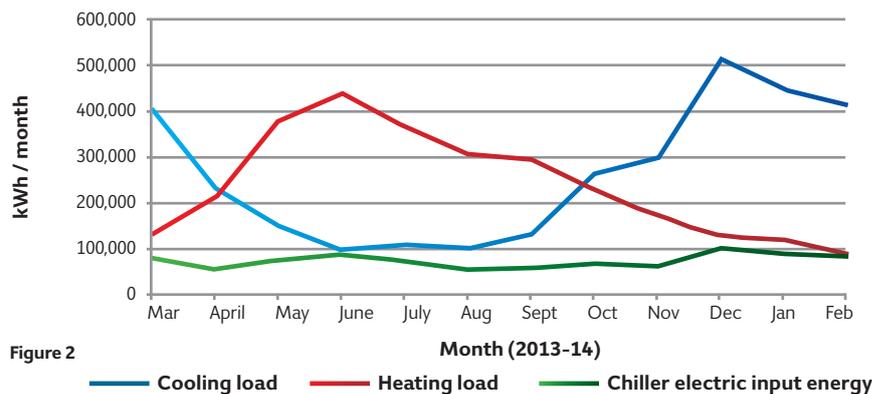


Figure 2

Figures 1 and 2 show the predicted and actual thermal energy consumption for the new terminal for the year March 2013 to February 2014, its first year of operation. The red shaded area shows the heating load derived as a by-product of providing the required cooling; the blue-shaded area shows the cooling load met as a by-product of providing the required heating

The heating and chilled water systems have been designed with floating water temperature set-points to maximise efficiencies of the central plant. The heating water circuit flow temperature has been designed to float between 30°C and 40°C, depending on the heating requirement of the building. If, for example, there is a reduction in the building's heating demand, the heating water flow temperature set-point is reduced gradually until the temperature of the heating water meets the demands of the building. This improves the efficiency of the chiller as a heat source for the building.

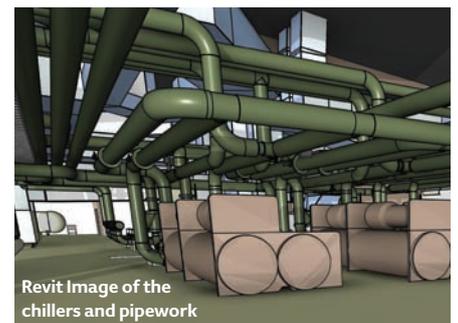
The company spent a long time developing and bench-testing a robust control strategy for the artesian system. 'We did not set out to provide the optimum and most efficient control strategy, but rather one that was reasonably efficient, and – most importantly – stable and robust, and capable of handling all possible scenarios,' says Hill.

'Using this as a base, the control strategy can be optimised and the system efficiency improved, based on actual building performance and usage.'

In July 2013, four months after completion of the terminal, the new and



The main central plantroom, showing chillers



Revit Image of the chillers and pipework



Artesian water filters in the basement plantroom



The chiller installation

existing international buildings' energy consumption – which includes all energy sources, equipment and tenancy loads – was measured at 27.97kWh/(m²·month). As part of a soft landings approach (apt for an airport) over the following year, the engineers – after fine-tuning – reduced this figure to 27.01kWh/(m²·month), which equates to an annual figure of 324kWh/m².

Once the system was complete and its performance established, Beca undertook a study of the performance of the central plant system. During the period analysed, the total annual heating consumption was 2,860MWh for the new terminal, while annual cooling was 3,170MWh. The electrical input to the chillers was 901MWh, which equates to 34.7kWh/m² for the 26,000m² of conditioned floor area, giving an overall coefficient of performance (CoP) of 6.7 for the central chiller system, excluding

pumping energy. This corresponds to CO₂ emissions of 5.9kgCO₂/m², based on the New Zealand Green Building Council Green Star calculator.

The study showed that, with some modifications to the chiller control strategy, annual central plant energy could be reduced by 100MWh – approximately 10% of the chiller input power – which, excluding pumping energy, would increase the overall central chiller system CoP to 7.5.

The cost of the artesian-based system over and above a conventional boiler, chiller, cooling tower system was approximately NZ\$750,000 (£375,000). Based on in-use data of 6,030MWh of thermal and 901MWh of electrical input energy, payback on the solution is approximately two years. Hill says that the payback period alone has 'justified retaining the system, rather than opting for a cheaper conventional solution during the project's various rounds of value engineering'.

The final word on the scheme should be left to Mike Parker, the terminal's facilities manager: 'We are ecstatic with the artesian heating and cooling system.

'During the many rounds of value management, the system came under heavy scrutiny and pressure to be dropped for a more conventional and cheaper solution. Thankfully, Beca and Christchurch Airport were well aligned and retained the system, which is performing better than we could have hoped.' CJ



Four modes of operation

- **Mode 1: Artesian cooling.** Artesian water at 10-12°C is used to cool the secondary circuit directly to reduce, or even avoid, the need to run the chillers
- **Mode 2: Mechanical cooling.** The chillers provide chilled water, with the artesian water used to remove heat from the condensers
- **Mode 3: Heating.** Artesian-temperature water is used as the heat energy source for the chiller evaporators to generate hot

condenser water for use in the heating circuits

- **Mode 4: Simultaneous heating and cooling.** Recovering and redistributing energy around the building, using condenser-heated water in the secondary heating circuit and evaporator-chilled water in the secondary cooling circuit, with artesian water used as the heat source or heat sink, depending on the imbalance between cooling and heating loads.

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Striking A BALANCE

Increasing energy efficiency without compromising indoor environmental quality is one of the biggest challenges facing building services engineers. **Anastasia Mylona** highlights research from a special issue of the *Building Services Engineering Research and Technology Journal* that aims to help engineers design low carbon *and* healthy buildings

Journal (BSERT) focuses on the latest research around overheating and IAQ. This demonstrates the importance of looking at the overall performance of a building to avoid the unintended consequences of pursuing energy efficiency goals. The special issue considers the future performance of buildings that have been designed or retrofitted to current requirements, and offers recommendations for addressing the issues around overheating and IAQ.

PIOTR SNIKORSKI / SHUTTERSTOCK

Expanding cities and the threat of a changing climate are driving the building services industry to design and manage buildings with lower impacts on the environment. In the UK, much attention has been paid to the winter performance of buildings in order to reduce heat loss, and to save energy. However, there must also be consideration of the effect that highly insulated and airtight spaces have on indoor air quality (IAQ) and overheating.

In addition, rising temperatures caused by climate change and urbanisation might render conventional cooling measures – such as shading and opening windows – insufficient, especially given the potential for pollution ingress, noise and security breaches.

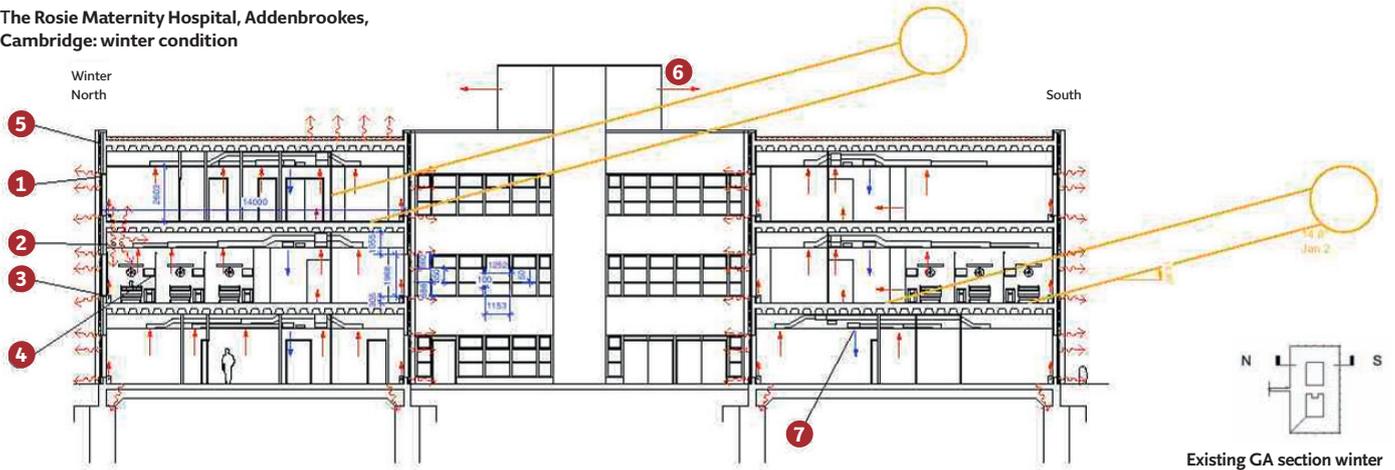
The March issue of the *Building Services Engineering Research and Technology*

Reduced concentration of pollutant ingress

Taylor *et al* and Milner *et al* address the strong interrelation between indoor temperature, IAQ, ventilation and energy consumption. Taylor *et al* show that higher internal temperatures during summer can increase pollutant ingress from outdoors as a result of increased ventilation to cope with the overheating. This same mechanism would lead to a reduced concentration of pollutants from indoor sources. Conversely, when ventilation is reduced, pollutant concentrations from indoor sources may increase, along with indoor temperatures.

Milner *et al* show that reducing infiltration rates in homes without an appropriate, >

The Rosie Maternity Hospital, Addenbrookes, Cambridge: winter condition



1. Air leakage through window frame
2. Heat gains from uninsulated HW and, particularly, steam supply pipes
3. Perimeter heating, HW supplied at 65°C
4. Internal gains from lighting, bed lamp and TV
5. Heat loss through poorly insulated fabric, essentially 50mm polystyrene at wall and roof
6. Warmed air exhausted at roof level
7. Air supplied mechanically at 21°C+, mean target temperature 24-25°C.

6 The UK will need to adapt to the changing electricity demand for cooling, as most of the housing will require some type of mechanical cooling by the 2050s

➤ associated ventilation strategy could have a negative effect on occupant health, with appreciable economic costs.

Taylor *et al* and Gupta *et al* examine the summer performance of various housing types and demonstrate that those retrofitted for energy efficiency can experience higher overheating risk than their non-retrofit equivalent. Specifically, Gupta *et al* question whether zero carbon homes as designed today will remain zero carbon in the future, based on their potential need for increased ventilation and cooling under a warmer climate. Chatzidiakou *et al* investigate the interrelation between indoor temperature, IAQ and ventilation in school buildings.

Nix *et al* undertake a weighted multi-objective assessment involving energy demand, cost, indoor temperature and IAQ to explore options for housing in Delhi. These, and the other papers, highlight the complexity of achieving healthy indoor environments while meeting energy efficiency targets.

Future performance

The future performance of various building types has been examined in a large body of research, especially since the release of the UK Climate Projections in 2009 (UKCP09). Its conclusions are consistent; indoor thermal comfort and IAQ will diminish unless building design practices address the issue now. In the special issue of BSERT, five studies look at the performance of buildings in the future, while one looks at the perception of the risk of overheating by industry professionals.

Taylor *et al* show that, as the climate warms, retrofitting for energy efficiency can increase the risk of overheating and poor IAQ. High demand for homes may result in more houses being converted into flats, which may increase vulnerability to these problems.

Short *et al*, Gupta *et al* and Virk *et al* look, respectively, at the future overheating risk of a

hospital retrofit, the UK's housing stock, and offices in the urban climate of London. In the case of the hospital, considerable overheating risk was identified under the current climate, which would intensify in the future.

Similarly, Gupta *et al* conclude that a new performance gap could result from not planning for future overheating and cooling systems. Based on that analysis, the UK will need to adapt to the changing electricity demand for cooling in the future, as most of the UK housing stock will require some type of mechanical cooling by the 2050s.

Virk *et al* examine the practical use of the new CIBSE *TM49 Design Summer Years for London*, which aims to provide a resource that will enable the industry to assess the thermal performance of its designs within the urban environment and for future climates.

Although the messages about future performance are consistent, the assessment of buildings' future performance at the design stage is still very limited. As part of their Low Carbon Futures project, Gul *et al* look at the way building design professionals are, or are not, addressing overheating risk. Key barriers identified were: the complexity of available information and the high resource demand for their use; the need for quick returns on investment on adaptation options; and the lack of legislative enforcement.

Recommendations for addressing the issue of overheating and IAQ

The consistent message of the papers is that, at some point, no passive and/or occupant behaviour measure will be sufficient to provide an acceptable indoor environment. The studies that looked at both thermal comfort and IAQ agree that the interrelationship between indoor temperatures, IAQ and energy consumption will result in trade-offs when interventions are considered. They have also highlighted the need to investigate strategies to understand ➤

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► the unintended consequences fully.

Design and operational improvements for schools are suggested by Chatzidiakou *et al.* Shading, thermal mass and night cooling are some of the passive measures proposed, while careful investigation of wind-driven infiltration is recommended to prevent indoor increase of outdoor pollutants.

In the study by Short *et al.*, a fully mechanical approach seems to be the only way to eliminate overheating in the 2030s, but with high associated increases in energy use. Other options incorporate natural ventilation with passive elements of solar control and heat recovery, while another introduces a low-energy, active cooling system.

Among the options examined for the office case study in the Virk *et al* paper are ‘cool’ surfaces – usually roofs and walls of light colour – and shading, while the orientation of windows is also considered. The options for a south-north orientation are sufficient in tackling current levels of overheating, but a combined strategy will be required in the 2050s to achieve acceptable comfort levels. Overheating is worse for the east-west-orientated building, with only a combined strategy sufficient under the current climate, and even that being insufficient for the future.

Taylor *et al* and Milner *et al* discuss ventilation options in retrofitted, airtight homes to deal with potential increases in indoor temperatures and concentrations of indoor pollutants. Taylor *et al* go on to discuss the reduction of heat gains from household equipment, the use of automated cooking extractor fans, and issues relating to internal solid-wall insulation as a retrofit option.

Gupta *et al* investigate various dwelling types and their Green Deal retrofit equivalents, as well as a Zero Carbon home. The performance of those dwellings is assessed for the 2080s. External wall insulation, low internal heat

gains and high internal mass appear to be beneficial in addressing overheating, but the risk remains significant. The study also assesses four active cooling options: fans; heat pumps with cooling capacity; air conditioning; and solar air conditioning.

Finally, Nix *et al* look at various options for improving thermal comfort and IAQ in flats in Delhi. A combined strategy of evaporative cooling with cooking ventilation and fabric interventions appears to be the most effective, but is viable only for the planned sector flats.

The papers in the special BSERT issue provide some reassurance that IAQ and overheating are being investigated by current research. However, the work also issues a caution that there is much to do if damaging impacts are to be avoided. **CJ**

ANASTASIA MYLONA MCIBSE, is the research manager at CIBSE. She guest-edited the *BSERT* special issue alongside **MICHAEL DAVIES**, professor of building physics and environment, UCL Institute for Environmental Design and Engineering



The BSERT special issue was funded by the Adaptation and Resilience in the Context of Change (ARCC). For more details visit www.arcc-network.org.uk BSERT is available for CIBSE Members to download for free from the CIBSE Knowledge Portal at www.cibse.org/knowledge



Future research

Several areas of useful future research are connected to the work presented in the special issue of *BSERT*.

1. What should be the performance criteria relating to overheating and IAQ? On the issue of overheating, indoor health-related thresholds are less well-defined compared with thermal comfort-based thresholds, and there has been little work in housing.
2. Given the intertwined complexity of occupant behaviour, buildings and the environment, how do we begin to optimise the performance of houses, bearing in mind

not only the performance criteria noted above, but also additional criteria – including energy demand and carbon emissions? How can we understand better the trade-offs between different possible ‘solutions’?

3. How can we improve the relevant models? There are several large-scale, field-based temperature-measurement campaigns that have taken place in dwellings. However, large-scale field studies involving pollutant measurements are sparse. More field-based work addressing temperature, IAQ, occupant behaviour and energy use seems vital in order to complement the modelling research.

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Metal ceilings with pipes cast into a concrete deck on the new fifth floor of Mansel Court



Mansel Court in south-west London is an exemplar office refurbishment that delivers comfort and energy savings for tenants, and potentially higher yields for investors. **Alex Smith** discovers that early input from building services engineer Skelly & Couch was key to its success

WIMBLEDON ACE

The government, in recent years, has implemented a range of regulations and incentives to cajole or bully the property industry into improving the energy performance of its commercial buildings. The Energy Savings Opportunity Scheme (ESOS) is the latest in a long line of policies designed to encourage building owners to invest in energy efficient and low carbon buildings.

Despite the legislation, the number of non-domestic properties being refurbished and operated as energy efficient buildings is low. Bruno Gardner, managing director at Low Carbon Workplace (LCW), blames this on a lack of knowledge about how to develop and operate low carbon buildings, and 'capability gaps' within the supply chain.

LCW was established to demonstrate that energy efficient buildings are compatible with

making a profit. The partnership between the Carbon Trust, fund manager Threadneedle, and property developer Stanhope uses investors' money to acquire and create energy efficient offices. The idea is to take down-at-heel buildings and turn them into high-value real estate, using passive design principles.

The aim is to increase the Energy Performance Certificate (EPC) to at least a B rating and so future-proof the premises against rising energy bills and upcoming environmental regulations – such as the minimum energy performance standard, which is set to restrict the letting of buildings rated F or G from 2018. The refurbished offices should provide efficient and comfortable spaces for occupants, and an attractive investment for landlords.

Occupants are offered support from the Carbon Trust to ensure the building



PROJECT TEAM

- **Client:** Low Carbon Workplace
- **Building services engineer:** Skelly & Couch
- **Architect:** Duggan Morris
- **Contractor:** Willmott Dixon
- **M&E Contractor:** Halsion
- **Cooling mat sub-contractor:** Uponor



IMAGES: MARK HADDEN



By augmenting the ceiling heights of the existing building, Skelly & Couch sought to improve air flow, daylight and psychological wellbeing

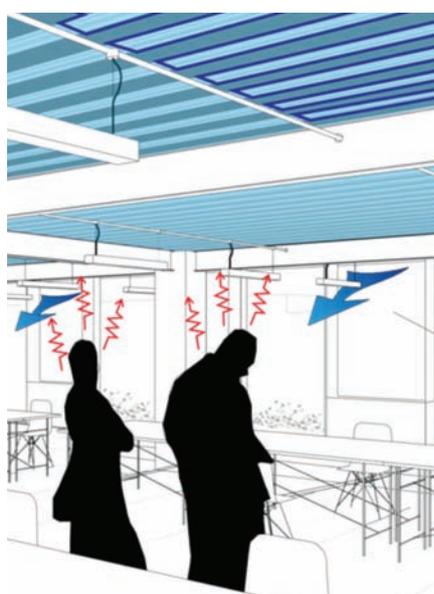
‘Rental income and the agent view is still driven by traditional air conditioning,’ says director Mark Skelly. ‘There are alternatives to traditional cooling that can be accepted by the market, but it is still hard work.’

Skelly was keen to make the most of the thermal mass of the existing 300mm concrete slab to reduce overheating and cooling loads. To control the temperature of the slab, Skelly & Couch bonded a Clina micro-capillary mat cooling system directly to the ceiling, using highly conductive plaster. The mat carries tubes of cold water from roof-top chillers and keeps the concrete soffit at a constant radiant temperature of 20°C. ‘This is a good temperature,’ says Skelly, ‘as it avoids condensation in the plaster, and means you cannot accidentally over-cool the space.’

One benefit of the capillary mat is that it can take advantage of free cooling – daytime cooling loads can be reduced by coolth stored overnight or when the external temperature falls below 18°C.

By coupling the mat directly with the soffit, Skelly & Couch was able to maximise the floor-to-ceiling heights. This improved the amount of daylight coming into the offices and improved airflow. This was key because the cooling strategy in summer depends on occupants opening panels in the façades to facilitate cross-ventilation.

‘Occupants can tolerate higher temperatures with low radiant temperatures and some air movement,’ says Skelly. ‘By



The exposed, radiant-chilled ceilings provide comfort conditions by absorbing heat given out by people and computers

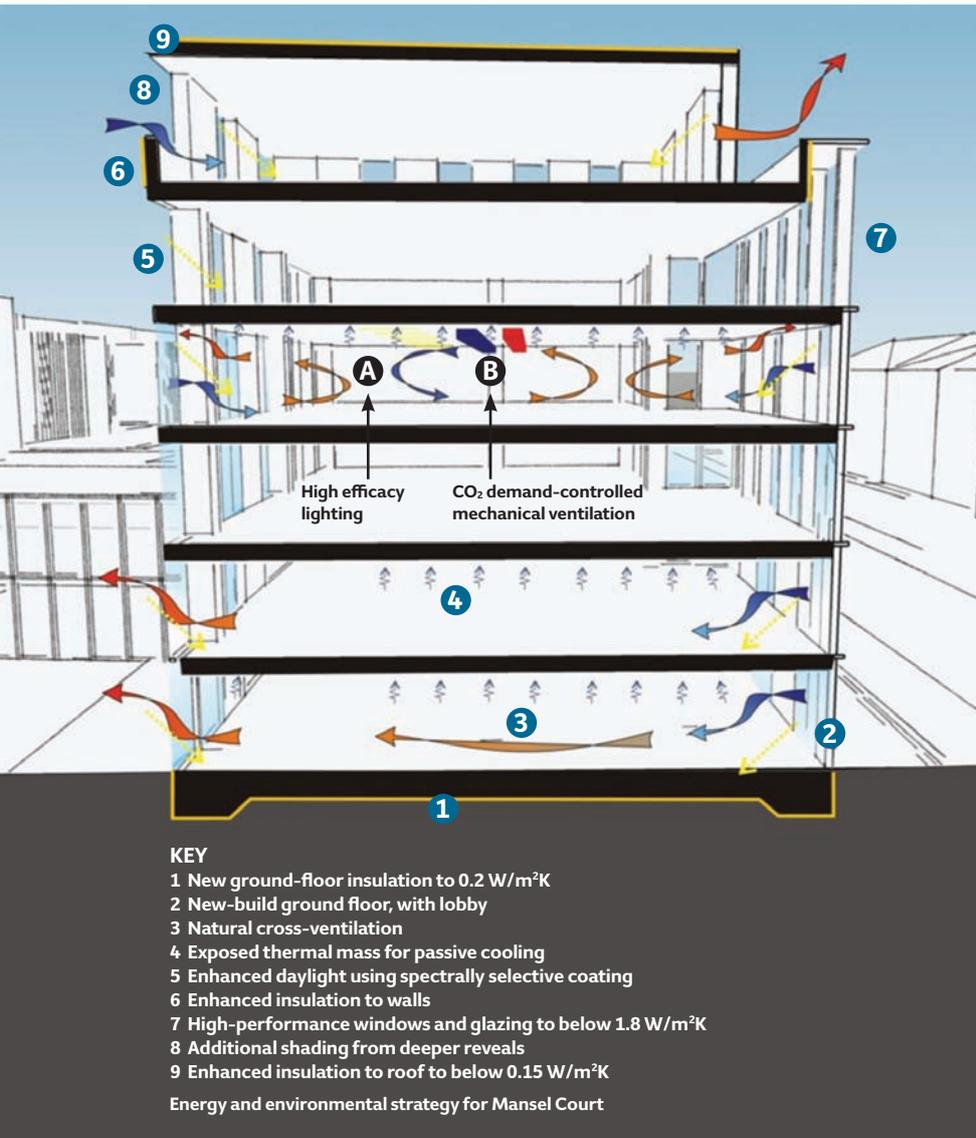
is operated properly. Sub-meters and occupancy sensors are used to monitor energy consumption, and building users receive monthly reports on energy use.

Mansel Court, in Wimbledon, is one of five offices that LCW has acquired and transformed into energy efficient properties (four others are in development). The 1970s in situ, concrete-framed office block has been extensively remodelled, at a cost of £5.4m, and there have been significant changes to the building envelope, which forms an integral part of the new building services strategy.

Architect Duggan Morris increased the lettable floor area by 60% by raising the number of storeys from four to five, and adding a rear extension where there was once a car park. Four storeys at the front of the building have also been extended three metres towards the street. Identifying ways

to reconfigure buildings to increase their value is a key strategy of LCW, and helps fund investment in low-energy design.

Although the driving principle of LCW is passive-led design, it accepts that buildings have to be commercially viable – and, for the UK property market, that means providing tenants with air conditioning. This was the challenge for building service engineer Skelly & Couch – to design an environmental strategy that combined passive design with the requirement for mechanical cooling.



ENERGY RESULTS

Energy consumed on occupied floors (gross internal area)

- Heating: 62 kWh/m² per year
11.5kgCO₂/m² per year
- Electricity: 90 kWh/m² per year
44.5kgCO₂/m² per year
- Total: 152 kWh/m² per year
56kgCO₂/m² per year

► augmenting the ceiling heights of the existing building, we sought to improve air flow, daylight and psychological wellbeing.’

The capillary mat is usually specified to provide heating and cooling, and is insulated to maintain water temperature. At Mansel Court, the mat is designed to cool the concrete soffit so there is no need for insulation. Skelly says using capillary tubes for heating would turn the concrete into an uncontrollable storage heater. ‘Stored heat would be wasted by tenants opening windows to cool down,’ he says. Instead, a gas-fired condensing boiler provides heat via trench heaters on the ground floor and via radiators on the floors above, where maximising room height made trench heaters inappropriate.

The extensions and fifth-floor ceiling do not have exposed flat concrete soffits. It was cheaper to use conventional metal ceilings, so – rather than using the cooling mats – cross-linked polyethylene (PEX) pipes were cast into concrete decks. Duggan Morris was keen

to mark the extensions differently from the original building by giving them an exposed metallic finish, but Skelly persuaded the client to paint them white to help reflect natural daylight into the interior.

A key element of LCW’s strategy is to support tenants before and after they move in. Fit-out guidance is offered to ensure that the tenants’ plans do not compromise the building’s low-energy strategy. For example, at Mansel Court there are strict limits on where partitions can be positioned to ensure that ventilation is not compromised and pipes aren’t penetrated.

To enable tenants to create cellular office spaces, there are 200mm breaks in the capillary mat where partitions can be installed. This channel also allows for the fitting of lighting, control sensors, wireless access points, smoke-detector heads and anything else the tenant may want to hang from the ceiling, such as projectors.

Tenants are prohibited from enclosing the entire central floor spaces, as the deeper parts of the plan require cross-ventilation to keep summer temperatures within acceptable limits. A central ventilation spine allows a degree of partitioning in these areas.

Keep it simple

Skelly & Couch was involved in the design of the building from an early stage, a trait common to all LCW projects. ‘Early engagement of all parties involved in a development is essential for a successful building that performs well from day one,’ says Jonathan Winston, occupier support manager at the Carbon Trust.

‘Input from building services engineers means design issues can be resolved before they become conflicts in the construction phase, or are constrained by other design decisions.’

An important input from Skelly & Couch was making sure the building was easy to use. ‘The brief was to not make the building too complicated,’ says Skelly. ‘Too much control can have a revenge effect.’

Everything was designed with a domestic level of control, he adds. For example, radiators have straightforward thermostatic valves. A central control system cools the offices, and the space can’t be over-cooled because the system is designed to cope if windows are opened. Skelly & Couch also advised LCW on the format of a user guide.

Soft landings ensures LCW has a continued involvement in the building, and lessons learned are fed into subsequent projects. ‘Experience and feedback accumulated



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through each development help us continually to refine our approach,' says Winston. 'We are looking at ways to take technology forward.'

One concept being trialled in the next development is the use of an occupancy counting system, instead of CO₂ sensors, to control fresh-air ventilation rates. Winston says it should provide more robust information for the control system about how much ventilation is required. 'The data is not subject to interference from open windows and other draughts,' says Winston.

Occupancy sensors are used at Mansel Court, but they don't trigger changes in heating and cooling automatically. They are simply monitored by LCW, which tweaks the systems in response to changes in occupancy patterns.

Winning returns

Winston argues that the LCW model is good for consultants, tenants and investors. Building services engineers are valued as a member of a fully integrated design team, and investors benefit from their expertise in creating low carbon buildings.

'Investors can make a positive difference with their funding, while also benefiting

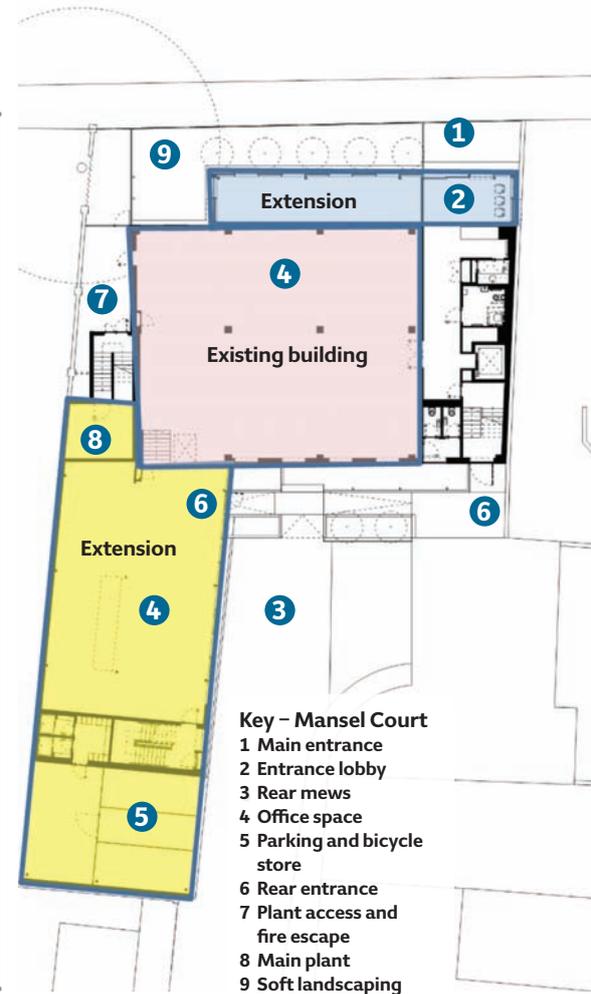
from attractive commercial returns,' he says. 'As tenants become more aware of the many benefits of energy efficient buildings, we are starting to see evidence that they command a rental premium over "standard" buildings.'

Monitoring since completion in December 2013 has proved that Mansel Court is performing well. It produces 56kg CO₂/m² per year, which means the building tenants are well on the way to achieving the LCW Standard. This requires occupiers to meet best-practice emissions benchmarks or to demonstrate year-on-year improvements.

If the rental values of LCW's projects also improve, then it has demonstrated that an investment in energy efficiency – and the skills of building services engineers – is as profitable as it is sustainable. This is an important message for company directors, who are now considering the energy-saving suggestions highlighted in the audits produced as a requirement of ESOS. **CJ**

References:

- 1 *Breaking the 'circle of inertia' on energy efficiency in the commercial buildings sector*, Viewpoint, Carbon Trust, October 2014.



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FLORENCE NIGHTINGALE: NURSE AND BUILDING ENGINEER

The Lady with the Lamp was one of the first to recognise the importance of air quality in the treatment of hospital patients, and her recommendations on ventilation rates are similar to today's CIBSE guidance, says SE Controls' **Chris Iddon**

“Oh! The crowded national school! We should have parents saying... I will not send my child to that school, the air-test stands at ‘Horrid’ – Florence Nightingale

In a future issue, the CIBSE Heritage Group will be writing an article on heating and ventilation pioneer Wilson Weatherly Phipson. The article will acknowledge the cooperation between Phipson, Alfred Waterhouse and Florence Nightingale in devising designs for wards for Liverpool Royal Infirmary. More information at www.hevac-heritage.org

The 195th anniversary of the birth of Florence Nightingale takes place this month. She is credited with being the founder of modern nursing, but less well known than her contribution to medicine is her work on ventilation and hospital design.

The first chapter of Nightingale's seminal book, *Notes on Nursing* – first published in 1859 – focuses not on patient care, but on ventilation¹. She writes: ‘The very first canon of nursing... : keep the air he breathes as pure as the external air, without chilling him.’

Nightingale continually emphasises the importance of ventilation in ensuring the swift recovery of patients and reducing cross-infection. She had considerable first-hand experience of the reduction in infection rates and health benefits that improved ventilation provided.

In the mid-19th century, it was acknowledged that – as well as expelling

exhaled carbon dioxide – other unhealthy organic miasmas should be removed as quickly as possible. This later became established as germ theory.

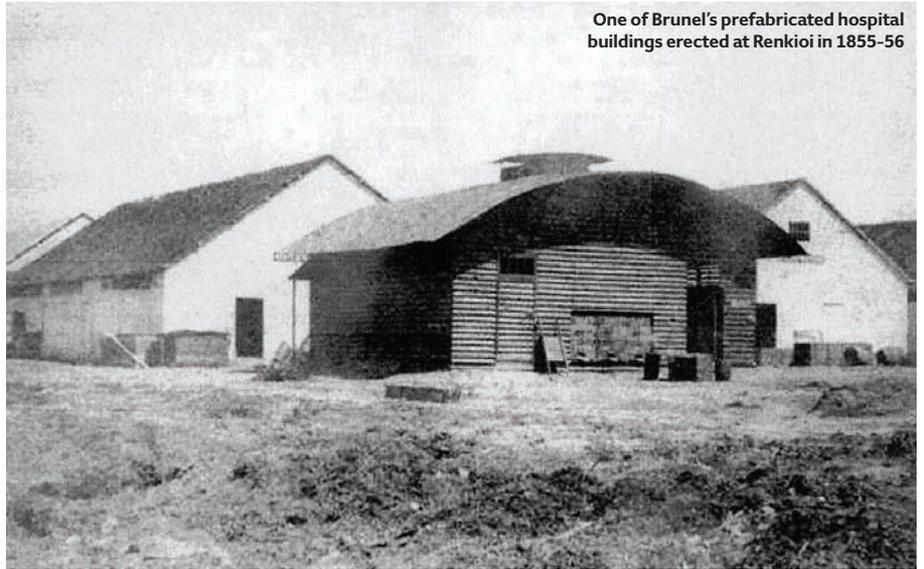
Nightingale wasn't the first to identify the importance of ventilation in hospitals. Her conclusions in *Notes on Nursing* were the culmination of 15 years' work initiated by David Boswell Reid. His comprehensive ventilation systems devised for hospitals in London, Copenhagen, Chicago and New York, long before the Crimean War [1853-1856] thrust Nightingale into the public spotlight. However, she used her high profile to promote the need for ventilated wards.

Indoor health

In her 1863 book *Notes on Hospitals*, Nightingale praises natural ventilation as the best method of introducing fresh air, but concedes that poor design leads to uncomfortable draughts. In crowded spaces,



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One of Brunel's prefabricated hospital buildings erected at Renkioi in 1855-56

she suggests using mechanical ventilation to meet the necessary ventilation rates². She goes on to say that one of the most common causes of unhealthiness in hospitals at this time was the defective arrangement of ward space, which led to difficulties with ventilation and daylighting.

Interestingly, Nightingale quotes the rates of ventilation that should be expected: 'It was supposed that 600 ft³ of air per hour [4.7 l · s⁻¹ per person] were sufficient for a healthy adult. Subsequent experience, however, has shown that this is by no means enough. As much as 1,000 ft³ [7.81 · s⁻¹ per person] has been found insufficient... It is highly probable that the actual quantity required will be found to be 1,500 ft³ [11.8 l · s⁻¹ per person].'

These ventilation rates are very similar to the recommended 8-10 l · s⁻¹ per person rates that we find in CIBSE Guides A and B. For sick wards, the ventilation rate recommended by Nightingale is between 2,500 and 5,000 ft³ per hour dependent upon the ailments [19.7 to 39.3 l · s⁻¹ per person].

Her preference is for 'windows to be more or less open when weather permits', with open fires producing radiant heat. However in cold or 'boisterous' weather, she suggests

the use of alternative methods, such as air shafts and Sherringham ventilation units.

The most famous episode in Nightingale's life was the Crimean War, during which she was horrified by the poor conditions of barracks and infirmaries used by the army. Almost 80% of British deaths during the conflict were caused by infection rather than on the battlefield; this Nightingale attributed to poor ventilation and hygiene.

After she made a plea to the British government, Isambard Kingdom Brunel was commissioned to design a hospital and he drew up plans for the prefabricated, modular timber Renkioi Hospital, built on the Asiatic bank of the Dardanelles, in Turkey. The design took Brunel six days to complete and had a capacity of 1,000 beds.

The design incorporated roof-ridge tile ventilation and windows that opened, and included forced ventilation to move air under the ward using fans (this was never operated because it was not required in the Turkish climate).^{3,4}

The facility was under the management of Dr Edmund Alexander Parkes, who became an influential hygienist and professor at University College London. He worked with Surgeon-Major Francis de Chaumont in the mid-1870s, and they undertook experiments

to ascertain ventilation rates for inhabited space⁵. By measuring carbon dioxide levels using lime water (see panel, 'Measuring CO₂ with lime water') and making notes on the 'freshness' of the air, they determined acceptable CO₂ levels that are remarkably similar to those used today in CIBSE guidance (see Figure 1).

They also wrote *A Manual of Practical Hygiene*, which brought together all the understanding on ventilation of the day, which – despite its age – reads like a contemporary work on ventilation. The manual included reports on poor air quality in schools (recording figures of 3,100ppm CO₂)⁶ and descriptions of ailments, including headaches, heaviness, inertness and nausea, in poorly ventilated spaces with elevated CO₂ levels – very similar to what we now term 'sick building syndrome'. It also proposed that care should be taken to ensure that flow rates in buildings do not cause draughts, stating that a velocity of 1.5 ft · s⁻¹ [0.45 m · s⁻¹] was deemed imperceptible to all.

Expelling the 'horrid'

The consensus in the late 19th century was that around 8-11 l · s⁻¹ per person of air should be provided to ensure adequate ventilation in buildings – with natural ventilation being the

CIBSE guidance on acceptable CO₂ levels

	CO ₂
Fresh	600 ppm
A little close	800ppm (equivalent to around 10 l · s ⁻¹ per person ventilation rate)
Close	1,000ppm (equivalent to around 8 l · s ⁻¹ per person ventilation rate and the standard target ventilation)
Very close	1,200 ppm
Very bad	1,300 ppm

Figure 1

Nightingale decries mechanical ventilation that results in constant internal temperatures, suggesting air temperature variations are necessary to maintain health



Dr Edmund Alexander Parkes managed Renkioi hospital

preferred method, although one that could be objectionable in winter.

Today, schools designed with windows that open manually have been shown to have very poor indoor air quality (IAQ) during the heating season because occupants keep windows closed. There is also a perception that opening windows wastes heat energy, ignoring the need for ventilation.

Readers conversant with the Priority Schools Building Programme output specification will know that contemporary thought comes to conclusions on school ventilation similar to those of our Victorian predecessors, and we await the latest version of the Education Funding Agency's *School Ventilation Guide*, due to go to consultation this year. This will further explain and clarify the requirements for delivery of good air quality all year round, maintaining CO₂ levels at 1,000ppm for mechanically ventilated spaces and 1,500ppm when naturally ventilated, while mitigating draughts and summertime overheating risks.

Current evidence appears to reiterate the findings of Nightingale and her contemporaries about the importance of the internal environment in relation to air quality, temperature and daylighting, as evidenced by the recent *Clever Classrooms* report from the University of Salford⁷.

Nightingale decries mechanical ventilation that results in constant internal temperatures, suggesting that air temperature – as is 'nature's method' – should vary with the seasons because variations are necessary to maintain health in healthy people. There is possibly some truth in such reasoning,

as designers are realising the health and wellbeing of building occupants is improved if they have a 'connectedness' to the outside.

In the recent CIBSE Natural Ventilation webinar⁸ on health and wellbeing in buildings, Chris Trott, of Foster & Partners, informed the audience that humans are designed for change, and building designs should provide natural stimulus and connection.

Energy improvements may be available, but they may be small; productivity benefits are better economic drivers for designs with increased natural connectedness.

Nightingale states: 'Oh! The crowded national school! Where so many children's epidemics have their origin. What a tale its air test would tell! We should have parents saying... I will not send my child to that school, the air test stands at "Horrid."¹¹

In her time, it was quite a challenging process to measure room CO₂ levels and she wished for the day when there would be a simple air test. Well, that day is now! CO₂ sensors are relatively inexpensive and the logging of CO₂ data can give a good indication of the indoor air quality. Lamentably, we may still find they read 'horrid' unless we learn from best practice and ventilate correctly to ensure that all air tests stand at excellent. **CJ**

References:

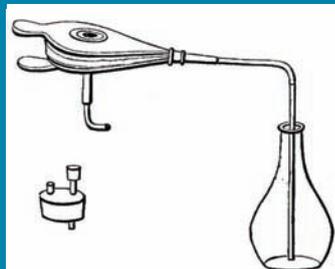
- 1 F Nightingale, *Notes on Nursing: What it is, and what it is not*, Harrison London, 1860
- 2 F Nightingale, *Notes on Hospitals*, third, Longman, Brown, Green and Longmans, London, 1863
- 3 C P Silver, 'Renkioi: a forgotten Crimean War hospital and its significance', *Vesalius*, 10 (2004) 55-60
- 4 I Brunel, *The Life of Isambard Kingdom Brunel, Civil Engineer*, Longmans, Green and Co, London, 1870
- 5 F S B F de Chaumont, 'On the Theory of Ventilation: An Attempt to Establish a Positive Basis for the Calculation of the Amount of Fresh Air Required for an Inhabited Air-Space', *Proc R Soc*, London 23 (1875) 187-201
- 6 T Carnelley, J S Haldane, A M Anderson, 'The Carbonic Acid, Organic Matter, and Micro-Organisms in Air, More Especially of Dwellings and Schools', *Philos Trans R Soc London B* 178 (1887) 61-111. doi:10.1098/rstb.1887.0005
- 7 P Barrett, Y Zhang, F Davies, L Barrett, *Clever Classrooms*, 2015
- 8 Webinar on health and wellbeing, CIBSE Natural Ventilation Group, February 2015, <http://bit.ly/1F0Kmbw>
- 9 M Pettenkofer, 'Volumetric estimation of atmospheric carbonic acid', *Q J Chem Soc*, London 10 (1858) 292. doi:10.1039/qj8581000292

CHRIS IDDON MCIBSE is a natural ventilation design manager at SE Controls



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Integrating combined heat and power (CHP), condensing boilers and heat pumps in commercial heating systems

This module explores some of the factors likely to influence the operational success of integrating different heating technologies

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The condensing boiler

A condensing boiler is equipped with sufficient heat exchange capability to reduce the flue gas temperature to below its dew-point temperature. By doing so, it is possible to recover a proportion of the available latent heat by condensing water vapour from the flue gas, which is a product of combustion.

Unless the condensing boiler is installed in such a way as to allow some of the superheated vapour in the flue gas to condense (as in the example shown in Figure 1), thus liberating energy, it will be lost to the atmosphere. The temperature of the water returning to a condensing boiler needs to be less than approximately 55°C so that the water vapour will condense – cooler temperatures will provide increased latent heat recovery, potentially adding 9% to the useful boiler output.

The modulation of the output of a burner

is important not only in terms of matching condensing boiler output to load – which, in turn, improves seasonal efficiency – but also because as burner output decreases, the efficiency of the heat exchanger increases, since the ratio of heat exchange area to input power increases. So at minimum burner input, losses are at their lowest and heat exchanger efficiency at its highest. This phenomenon means that modern condensing boilers are generally more efficient at their minimum output rather than at full output.

The combination of beneficial condensation and operating at partial load is illustrated in Figure 2. This shows the example performance (in net efficiency) of a condensing boiler with modulating output for different pairs of flow and return temperatures.

There are many heating systems – including individual buildings and 'district' schemes – operating at 'traditional' flow and return temperatures of 80°C and 60°C. Even when a 'condensing' boiler is operating at 80°C and 60°C return, its extended heat transfer surfaces mean it will still reduce the flue gas temperature (and so gain additional sensible heat), and so will always be more efficient than non-condensing boilers. However, compared with other temperature ranges, in this generalised example there are likely to be real benefits

in operating efficiency at lower operating temperatures (as demonstrated in Table 1) and at part-load operation.

As long as the return temperature is below 55°C, at least some of the latent heat that would otherwise be lost will be recovered and, if the boilers are operating at part-load for a large proportion of the time, there is the greatest opportunity for best efficiency.

Gas-fired CHP or electrical heat pumps can be used in conjunction with condensing boilers as a means of providing a low-carbon and cost-efficient base load.

Gas-fired combined heat and power

Grid-supplied power delivers electricity to end-users with an overall primary energy efficiency of approximately 35% to 40%. A proportion of the loss – around 7% – is caused by the transmission losses though the electrical supply grid, but the remainder is down to the conversion efficiency at the power station.

The simplified example in Figure 3 indicates how localised generation through the use of combined heat and power can potentially provide a more effective use of primary energy. The benefit of CHP is highly dependent on the relative performance of the grid, the available fuel supply and the useful consumption of generated heat and electricity. Buildings that



Figure 1: Commercial stainless steel condensing gas boiler. Yellow line shows gas path to meet combustion air, and then counter-flowing to the system return water that enters (shown as blue) at the base of the boiler, where the flue gases are coolest and where condensation takes place in the combustion gases that are leaving (Source: Elco)

are suitable for CHP schemes are those where there is a consistent demand for heat – probably beyond that of a simple ‘9am-to-5pm’ office.

CIBSE AM12² recommends that for successful CHP integration, the system should be designed to operate at maximum load in preference to boilers for the longest cost-effective period.

Electrical and heating demand profiles for a simplified fictional building are shown in Figure 4. The diagrams include the output of a possible (and exaggerated) CHP solution – both heat and power output – of a spark-ignition gas-engine powered CHP that typically produces about twice as much heat energy as electrical energy.

In this example, the heating demand fluctuates widely throughout the year, but the electrical demand stays reasonably constant and the summer base load is greater for the heating than the electrical demand. In ‘Option A’, the CHP will run continuously, thus ensuring a good payback for the machine. However, some electricity will need to be purchased, and a significant amount of heat is required from associated boilers. A larger unit would offset some of the carbon liabilities and provide a more cost effective solution, as electricity generated at source is more carbon efficient.

In ‘Option B’, the CHP unit selected is too large. Most of the heat demand is met, so the boilers will be smaller, and some electricity will be supplied back to the grid (sold at only 30-50% of the price of incoming electricity). But if the unit is run all year, there will be excessive heat rejection. The CHP could stand idle during the summer, but that is unlikely to be carbon or financially efficient. It could be linked with an

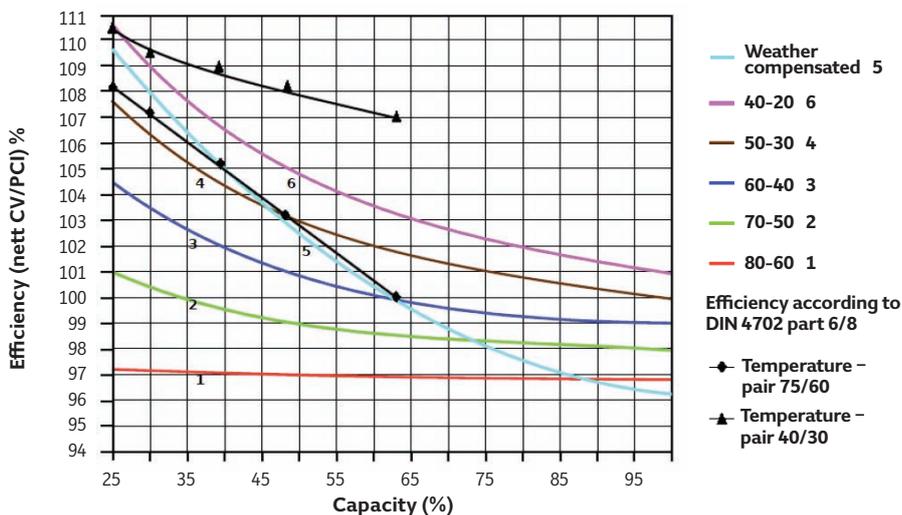


Figure 2: Comparative performance of modulating output for a condensing boiler at different flow and return temperatures (Source: Elco)

Return water temperature	Potential condensing boiler gross efficiency	Example load type
40°C	92%	Radiators sized for lower temperature
35°C	94%	Underfloor heating
30°C	95%	Swimming pool water
20°C	97%	Pre-heating of domestic hot water

Table 1: Systems designed to operate at lower temperatures will enhance boiler efficiency

absorption or adsorption chiller for summer cooling – known as ‘trigeneration’ – although without that facility, it is unlikely to qualify as ‘Good Quality CHP’ (as defined by the UK’s CHP Quality Assurance Programme³), as heat will be wasted.

In this case, ‘Option C’ provides a better balance. Some heat rejection in the summer may be permissible, as the advantages of meeting the electrical demand outweigh the implications of wasted heat. The installed boiler power is less than ‘Option A’.

And, naturally, a different set of demand profiles will require specific analysis –

30 to 60-minute banded load data is considered appropriate to undertake such an exercise.

A concept example of CHP (with potential additional heat pump) integration is shown in Figure 5, as developed from CIBSE AM12. Integrating a thermal store enables the CHP to operate for longer and provides easier control.

However, an actual design will still necessarily have reasonably complex control requirements to ensure: minimum flow through boilers; back-end protection; opportunity for CHP ‘excess’ heat rejection; and, importantly, its most effective operation (the boilers would not be used to charge the store).

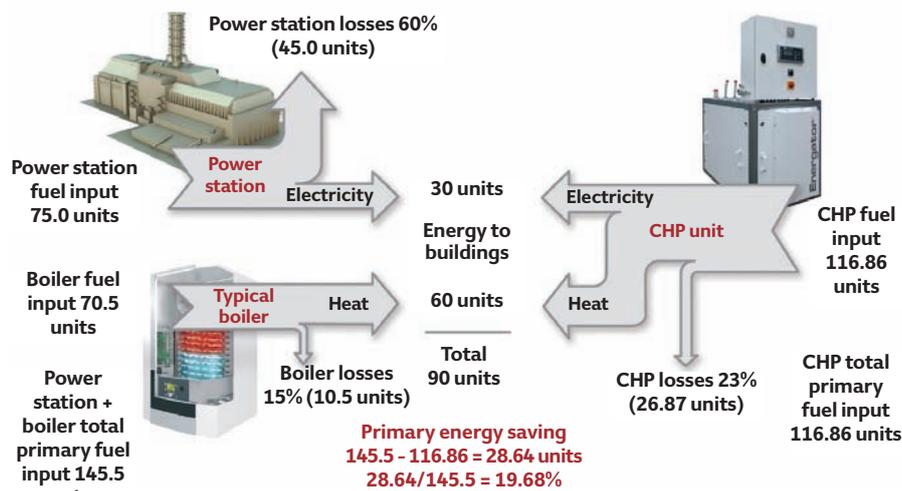


Figure 3: Simplified comparison of production of heat and electrical energy for use in buildings’ CHP compared with grid power and local boiler. Note: values used are variable, depending on location and application (Source: Elco)

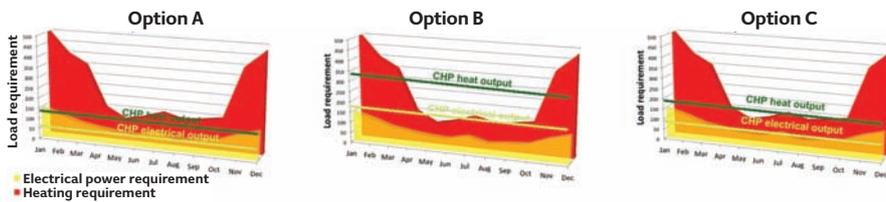
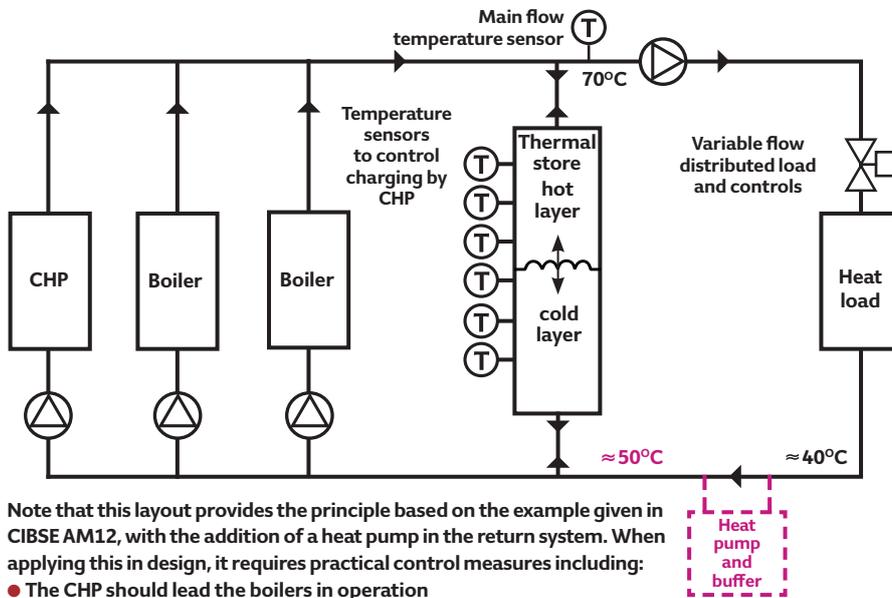


Figure 4: Example of building heat and electrical load profile with different CHP capacities



Note that this layout provides the principle based on the example given in CIBSE AM12, with the addition of a heat pump in the return system. When applying this in design, it requires practical control measures including:

- The CHP should lead the boilers in operation
- The CHP engine will require ‘back-end protection’
- The charging of the thermal store will be from the CHP only
- The flow into and out from the buffer will require control

Refer to section 9.4 of CIBSE AM12, 2014 for further detailed information.

Figure 5: Schematic of example CHP in series with parallel boilers (based on CIBSE AM12, fig 9.4)

Heat pumps

The inclusion of a heat pump as an integrated element of the heat source for the main heating system is most effectively done if the recommendations of CIBSE AM12 are followed – designing systems with a return temperature of 40°C to allow application of renewable technologies. And just as with CHP, heat pumps are most appropriately designed as the lead heat source to maximise running time and potential savings in cost and energy. Heat pump performance will reduce as output temperature rises, as well as when the input temperature falls.

For typical electrically powered vapour compression (single stage) heat pumps, the thermodynamics restrict the economic upper limit of the working temperature to below 50-55°C. For higher temperatures that are used particularly for domestic hot water and traditional heating systems, a second heat source is required to raise the temperature to 60°C and beyond. So, if the heat pump heat source (for example, air or ground) is at a high enough temperature for effective operation, the heat pump will act as the lead-heating appliance and, if required, another heat source – such as boilers – are brought online to increase the temperature.

A heat pump could be integrated in a system as indicated in Figure 5, where it can act as the ‘lead’ heat source when effective to do so. This allows good year-round COP on heat pumps, together with suitable return temperatures to the boilers, allowing condensation of flue vapour.

Currently, finding both CHP and heat pumps on the same system would be unlikely, as they have similar requirements for success: to operate for long periods, and to act as a base load machine. Capital investment for both is

UK government incentives for assured quality installations

- CHP can attract Climate Change Levy exemption that can reduce the ROI period by one to two years
- Enhanced Capital Allowances for both CHP and heat pumps can save 7-8% of the capital cost over the plant lifetime (and can include auxiliary heating equipment)
- Renewable heat incentive available for metered heat pump heat
- Business rating exemption applies to CHP and associated plant

more expensive per kW of delivered heat than with condensing gas boilers.

Combining the technologies

When different heat sources are combined in one system there are considerations of flow dynamics, operational safety and temperature control. These are covered in CIBSE AM12 and in greater depth in CIBSE AM15.⁶

As the UK power distribution grid is ‘decarbonised’ – so improving heat pump viability – there may be more opportunity to benefit from an arrangement as shown in concept in Figure 5. The heat pump and CHP unit are not competing for the base load but both are contributing towards it. In low load conditions where the heat pump and CHP need to be supplemented by the boilers, the boilers may still operate in condensing mode, and will likely operate at part load.

This system also ensures that the heat pump and CHP will always run to their maximum potential.

The success of integrating the three technologies will depend on a proper understanding of the building load profiles and operation across the whole year. This will, in particular, enable the selection of CHP that maintains ‘Good Quality CHP’ status – and so provides benefits financially as well as operationally. Assured quality installations can attract substantial government financial incentives in the UK (see panel below). Return temperatures should be kept as low as possible to maximise the benefits of condensing boilers and improve the effectiveness of heat pumps, and the heating distribution system should be capable of operating on a wide flow/return temperature differential (at least 25-30K) to reduce energy use, costs and carbon emissions.

© Tim Dwyer, 2015.

- With thanks to Mark Ferris of Elco, who has provided the practical applications used in this article.

References:

- 1 Conversion factors – Energy and carbon conversions – 2013 update, www.carbontrust.com/media/18223/ct1153_conversion_factors.pdf
- 2 CIBSE AM12 Combined Heat and Power for Buildings, CIBSE 2013.
- 3 www.gov.uk/combined-heat-power-quality-assurance-programme
- 4 www.gov.uk/combined-heat-and-power-incentives
- 5 www.gov.uk/government/publications/use-of-chpqa-to-obtain-enhanced-capital-allowances
- 6 CIBSE AM15, Biomass heating, CIBSE 2014.

Turn over page to complete module ➤

Module 77

May 2015



1. What is the potential additional useful heat available by condensing boiler flue gases?

- A 3%
- B 6%
- C 9%
- D 12%
- E 15%

2. From the data in Figure 2, what is the expected net efficiency of the example boiler operating at 50% capacity with a 60°C flow and 40°C return?

- A 95%
- B 97%
- C 99%
- D 101%
- E 103%

3. What example load type is given to illustrate what could be used to give a return temperature of 35°C?

- A Pre-heating of domestic hot water
- B Radiators sized for lower temperature
- C Swimming pool water
- D Traditional radiator system
- E Underfloor heating

4. What is the maximum suggested return water temperature from the system to enable the effective use of technology such as heat pumps?

- A 80°C
- B 70°C
- C 60°C
- D 50°C
- E 40°C

5. What equivalent capital cost saving is predicted through the claiming of Enhanced Capital Allowances?

- A 1-2%
- B 3-4%
- C 5-6%
- D 7-8%
- E 9-10%

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Harmer Drainage announces continued developments

Harmer Drainage has appointed Steve Mascall as national sales manager for the new Harmer civil drainage division.

Mascall (pictured) has 25 years of industry experience, having started his career in the merchant sector and worked for some of the UK's most recognised building product manufacturers.

He will oversee a number of product launches, which represent major developments in the Harmer product offer to the civils drainage market. These include Filcoten channel drainage and SML below-ground drainage.

● Visit www.harmerdrainage.co.uk



Airedale reaches new heights

British manufacturer Airedale played a key role in a complex chiller logistics project, involving two helicopter-lift operations in central London.

Eight Airedale TurboChill chillers were manufactured in 18 sections to meet the helicopter's 3.2-tonne lifting capacity. The chillers were then reassembled with 50% less manpower than a usual split-down rebuild, within just one week.

They were also supplied with special acoustic packs to meet noise restrictions.

● Call 0113 239 1000, email connect@airedale.com or visit www.airedale.com/ChillerLogistics



Atlantic boosts efficiency of university's ring main system

University College London (UCL) has installed new boiler plant in its Torrington Place building. The plant, supplied by Atlantic Boilers, of

Lancashire, operates at 95°C flow and 75°C return, and contributes to the UCL ring main that serves scores of buildings. It leads all other ring main plants running at 95/75°C and raises the overall efficiency. The system was specified by Fowler Martin, of Ingatestone, and installed by Fredericks, of Dartford.

● Email info@atlanticboilers.com or visit www.atlanticboilers.com

Aquatech Pressmain introduces new energy-efficient AquaSpill pressurisation units

AquaSpill's AS series is designed for large district heating or cooling systems, where high system contents or operating temperatures rule out conventional sealed expansion vessels.

The modularised design means that standard configurations of pump, buffer and tank modules can be used. When system temperatures rise, the expanding water is spilled automatically into open-format tanks and, as the system cools, the water is automatically pumped back into it.

● Call 01206 215121



Danfoss launches energy-saving thermostats for underfloor heating

Danfoss has launched a new range of energy-saving room thermostats specifically designed for use with water-based underfloor heating (UFH) systems.

By providing precise control over room temperature, the BasicPlus2 room thermostats optimise the UFH system's energy consumption, while maintaining a comfortable temperature. Part of Danfoss's family of 230V room thermostats, the UFH range comes in a choice of Dial, Digital Display and Programmable Digital Display models to suit individual installation requirements.

● Call 0845 1217400 or visit www.heating.danfoss.co.uk



PEL's maintenance web portal provides instant account information

As part of its ongoing commitment to customer care, PEL Services – one of the UK's foremost providers of commercial fire, security and communication systems – offers an online customer web portal to complement its service and maintenance agreements.

The portal enables customers to access unedited details about their accounts, from anywhere in the world, in real time, 24/7. It allows them to gain invaluable information – including the products installed, service call reports, maintenance schedules and site attendance details – at a glance.

● Call 0333 123 2100 or visit www.pel.co.uk

Hamworthy Heating's new website makes life easier for customers

Commercial heating and hot-water specialist Hamworthy Heating has launched a new and improved website.

It has a simple design, easy navigation and extensive technical information for old and new products, and is responsive to mobile devices, making it easier for customers to view on the go.

The new website also provides more page content, to allow customers to get technical data on a product without having to download a pdf.

● Call 01202 662510, email pr@hamworthy-heating.com or visit www.hamworthy-heating.com.



Biddle keeps rail passengers in the Netherlands cosy

Biddle BV, a division of Biddle Air Systems, has been helping to keep out the cold at railway stations across the Netherlands with its CA range of air curtains.

Major Dutch railway operator NS Stations commissioned Biddle to supply air curtains for its new stations in Amsterdam, Rotterdam and Utrecht.

Passengers, shoppers and diners are already benefiting from effective heat retention at the two Amsterdam-based stations.

● Call 024 7638 4233 or visit www.biddle-air.co.uk



PCM Products offers passive cooling thermal energy storage (TES)

TES is the temporary storage of thermal energy for later use.

Overnight, cool energy is stored in 20-27°C phase change material-filled containers, and later used to absorb the internal and solar heat gains during the day, for an energy-free, passive-cooling system.

This technology offers an environmentally friendly, maintenance- and energy-free cooling solution, with short payback.

● Call 01733 245511 or visit www.pcmproducts.net



New CPD from ELCO UK puts the spotlight on CHP

ELCO UK has developed a new CIBSE-approved CPD to help building services engineers better understand how to integrate CHP, condensing boilers and heat pumps.

The module covers the extensive benefits of using CHP in commercial installations, as well as key considerations for achieving 'good quality' CHP status.

In addition, the new CPD addresses how to achieve optimum efficiencies from a condensing boiler alongside low carbon technologies, including analysis of flow and return temperatures.

● Visit www.elco.co.uk/cpd

Kingspan Tarec's provides premium finish

Luxury apartments at 375 Kensington High Street, London, are using Kingspan Tarec's next-generation Kooltherm FM Pipe Insulation system.

The system and Kooltherm insulated pipe support inserts were installed on all constant hot water and low temperature hot water services associated with the main energy centre.

FM Pipe Insulation offers thermal conductivities as low as 0.025W/m·K, while the insulated pipe supports can reduce heat loss by up to 10 times compared with wooden block supports

● Call 01457 890 400, email info.uk@kingspantarec.co.uk or visit www.kingspantarec.com



Dialight does it again by offering customers best-in-class energy savings

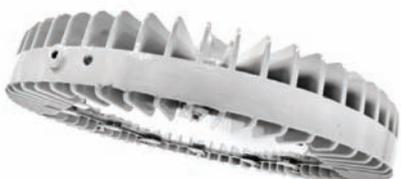
Dialight has released its Vigilant H2 Series LED High Bay lighting fixture, the highest-efficiency LED fixture on the market.

Delivering 140 lumens per watt, the H2 Series offers approximately 25,000 lumen output and features Dialight's in-house designed power supply.

It also comes with innovative reflector technology and a tempered lens, and is IP66 rated to operate in ambient temperatures ranging from -40°C to +65°C.

The product will be available for 120-277V and 347-480V applications and other variants.

● Visit www.dialight.com



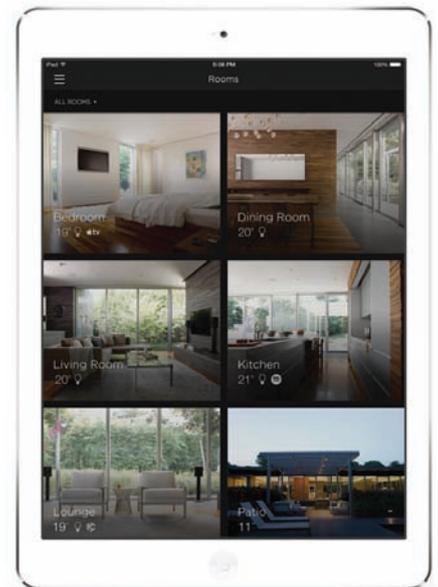
HBM paces ahead with its new compact force transducer

HBM has responded to industry demands by developing its new CFT-25kN force transducer, with a nominal force of 25kN.

Featuring a compact design, without compromising on accuracy, the new CFT-25kN is three per cent of the size of other transducers using similar sensors.

The CFT-25kN produces twice as high an output signal for the same measurement load in comparison to quartz - the standard material used.

● Call 0208 515 6000, email info@uk.hbm.co.uk or visit www.hbm.com/paceline



Meet the smart experts

Smart home systems specialists Cyberhomes will be exhibiting on Stand L230 of the May Design Series at London ExCel from 17-19 May.

Cyberhomes will have a working demonstration of a Savant control system on its stand, as well as the new Samsung 78in 4K Ultra HD TV.

Stand L230 is next to CEDIA, and visitors to Cyberhomes' display will have the chance to win an iPad mini.

● Call 0845 094 2718, email hello@cyberhomes.co.uk or visit www.cyberhomes.co.uk

Mikrofill chosen for Sloane Court East

After a mechanical survey/design of the plantroom at No1 Sloane Court East, London, Humphrey Clarke Consulting selected Mikrofill products.

Two Ethos 130kW wall-mounted boilers with premix burners provide a total modulation of 20:1, safeguarding optimum fuel efficiency and load matching. The stainless steel boilers also provide indirect LPHW to 2no HWS Extreme loading cylinders, while the unvented cylinders ensure a delta T of 30°C across the primary circuit. The new sealed boiler system was complemented by a Mikrofill 300 pressurisation package.

● Call 03452 606 020 or visit www.mikrofill.com



Westwood development centre stays on the rails with Jaga

The Network Rail Westwood Development Centre is a training facility for developing the leadership and management skills of Network Rail employees.

When its heating performance was in need of improvement, Network Rail turned to Jaga to provide an efficient solution to accommodate its specific

requirements. The company's quick-to-install products, combined with support and good planning, meant the centre was refurbished in a timely manner.

● Call 01531 631533, email jaga@jaga.co.uk or visit www.jaga.co.uk



New look for Kamstrup

Kamstrup, which makes highly accurate, quality energy-metering and remote-reading solutions, has launched a new logo and website.

With an exciting range of Renewable

Heat Incentive-compliant heat and energy meters, conforming to MID EN1434, Kamstrup can also offer full automatic meter reading (AMR) solutions.

Visit the company on Stand H26 at NEMEX, at the NEC, Birmingham, on 21-23 April.

● Call 01787 319 081, email info@kamstrup.co.uk, or visit www.kamstrup.com

Luxonic Airlux luminaires for One Pancras Square

One Pancras Square, part of London's King's Cross development, has been fitted with 900 of Luxonic Lighting's chilled beam luminaires.

The Airlux luminaires have been a popular choice for MSCB installations in similar commercial office projects, primarily for their efficient lighting distribution and sustainability. They are satin-lensed, small nose-cone



luminaires, specifically developed for seamless integration into chilled beam structures to provide controllable light outputs that

achieve the optimum lit environment.

● Call 01256 363 090, email info@luxonic.co.uk or visit www.luxonic.co.uk

ELCO boilers go online in new packaged plantroom



Two highly efficient R600 boilers from ELCO UK's floor-standing range have been installed in a bespoke packaged plantroom for Kier Group's latest project in Hyde Park, Hayes.

The gas-fired condensing units were

supplied to Packaged Plant Solutions, which designed the containerised system.

The boilers were specified and installed by Lorne Stewart, and chosen because of their compact footprint and high outputs. R600's can return efficiencies of up to 109%.

● Visit www.elco.co.uk



Marflow's prefabrication preferences

As part of its Prefabrication product portfolio, Marflow Hydraulics is offering smaller, standard items with a quicker turnaround time, along with larger, more bespoke items.

The company has released the Xterminator Lite, a more compact version of its classic valve, which comes as an off-the-shelf solution. It is available in left- and right-handed versions; has colour-coded handles, long levers and fewer leak paths; is suitable for vertical and horizontal coils; and has been designed for interchangeability.

● Call 0845 643 9096, email solutions@marflow.co.uk or visit www.marflowhydraulics.co.uk



Ideal Commercial Boilers expands its UK sales team with new appointment

Steve McDonald has joined Ideal Commercial Boilers as business development manager. His appointment expands the company's UK

team of sales and technical representatives.

McDonald (pictured) is responsible for accounts in the South West and South Wales, providing a consultative service to all of the company's customers in that area. He brings a wealth of industry experience, having worked in the plumbing and heating markets in a variety of sales and technical roles for 35 years.

● Call 01482 492251, email commercial@idealboilers.com or visit www.idealcommercialboilers.com

Heat recovery for comfort



Garfield House, a new central London meeting and conference venue, now uses Mitsubishi Electric Lossnay mechanical ventilation with heat recovery

(MVHR) units, and a City Multi R2 heat recovery air conditioning system.

Cool Systems Holdings, a specialist installer and Mitsubishi Electric business solutions partner, was asked to deliver on the contemporary brief, which required the creation of a comfortable environment for users and a system that fitted the ambience of the venue.

● Visit www.MitsubishiElectric.com



New fan range from Polypipe

Polypipe Ventilation has launched the new Silavent Sapphire range of bathroom and kitchen intermittent extract fans and decentralised mechanical extract ventilation (dMEV) units. They feature a contemporary design, coupled with quiet performance.

The UK-manufactured Sapphire range features axial and centrifugal dMEV, and intermittent axial, in-line and centrifugal bathroom and kitchen fans.

They are available as standard and Green Line energy efficient models, with low specific fan powers to comply with Building Regulations at an attractive price point.

● Call 08443 715 523 or visit www.polypipe.com/ventilation



New additions to Polypipe's Domus range

Polypipe Ventilation has added high-efficiency 90° bends and an inlet/outlet plenum, with integral flow-control device, to its Domus range of ducting systems.

Part of the Green Line range of energy efficient ventilation systems, the Domus 90° bends provide up to 60% reduction in resistance to air flow. The new plenum with integral flow-control device enables the inlet/outlet plenum to be connected directly to

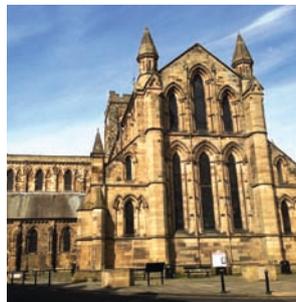
an architectural grille, taking away the need to fit a room-mounted adjustable air valve.

● Call 08443 715 523 or visit www.polypipe.com/ventilation

Remeha boilers go medieval

Remeha boilers are providing energy saving heating on a renovation project at 13th-century Hexham Abbey, in Northumberland, which will unite the medieval monastic complex for the first time in 500 years. To meet the need for a reliable, high-efficiency thermal energy source, TGA Consulting Engineers specified three Remeha Quinta Pro 90 gas condensing boilers on a free-standing, in-line cascade system with low loss header, installed by Vaughan Engineering.

● Call 0118 978 3434, email boilers@remeha.co.uk or visit www.remeha.co.uk



Sentinel Commercial calls for higher standards

After encountering a new commercial boiler system in which the heat exchanger failed after a few months, water treatment experts Sentinel Commercial are calling for higher standards in the commercial market. A considerable number of boiler breakdowns are caused by poor water-treatment chemicals and practices.

In the case mentioned, the remedial recommendations included replacement of the heat exchanger, flushing of the system with Sentinel X400, the addition of a Sentinel X100 liquid inhibitor, and ongoing protection monitoring using Sentinel SystemCheck.

● Visit www.sentinelprotects.com

JS launches Finesse recessed air curtain

JS Air Curtains is launching the Finesse, a discreet and high-performance recessed air curtain, suitable for a range of environments.

The Finesse delivers an air flow of up to 6,100m³/h, enabling it to seal doorways up to 3.5m high – and, with its easy-to-install, compact design, it fits neatly into a suspended ceiling system.

JS Air Curtains supplies an extensive range of air curtains, as well as bespoke solutions, for all commercial and industrial applications.

● Call 01903 858656, or email sales@jsaircurtains.com



Vent-Axia becomes Business Superbrand

British ventilation manufacturer Vent-Axia has been ranked as a UK Business (B2B) Superbrand for 2015. The award

follows independent research commissioned by The Centre for Brand Analysis.

To identify Superbrands, voters were asked to judge thousands of companies on quality, reliability and distinction. As a Superbrand, Vent-Axia is considered to have established the finest reputation in its field. Companies with this status are thought to offer customers significant emotional and/or tangible advantages over competitors.

● Call 0844 856 0590

Red Hot Rinnai

Continuous flow, tank-less water-heating unit manufacturer Rinnai has

launched its 'Red Hot' team for service excellence. The eight-strong group of key people from all parts of the company's operations have been chosen to handle customer requests without delay – ensuring efficient, fuss-free and unobtrusive service.

The 'Red Hot' team will be delivering service and information by building upon existing relationships, and are supported by integrated and specially designed IT systems that cover almost every possible customer need.

● Visit www.rinnaiuk.com



CDL opens Glasgow training centre

Toshiba distributor Cool Designs Ltd (CDL) is opening an air conditioning training centre in Glasgow, to serve Scottish installers.

The new facility, based in College Milton, East Kilbride, will offer the full range of Toshiba courses, covering theory and practical skills in installation, commissioning and troubleshooting. It is equipped with working examples of air conditioning systems, including Toshiba's SMMS mini-VRF, enabling delegates to receive a thorough grounding in the principles of variable refrigerant flow systems and related controls.

● Call 01355 234 776 or 0191 549 6964





New models from Weger Air Solutions

Five new models of Heat Pump Air have been launched by Weger Air Solutions UK.

All of the units are 'stand-alone', requiring only electrical power, so they are ideal for applications where hot

water, chilled water and gas are not available. Very high efficiency levels are achieved because there are two forms of sequential heat recovery: the integral heat pump system, plus either plate recuperators or thermal wheels. A microprocessor controller maximises energy savings through modulation.

● Call 01225 701 864 or email admin@wegerair.co.uk

New catalogue from CP Electronics has it all

The latest catalogue from CP Electronics is now available as a hard copy or download. It contains information on the company's range of programmable energy-saving controls, systems and connection products for lighting, heating and ventilation.

In addition to established CP products, the catalogue includes additions to the passive infrared (PIR) and microwave-detector range. There is also a focus on the services offered by CP Electronics, particularly commissioning, training and maintenance packages.

● Visit www.cpelectronics.co.uk



Grundfos links to St Andrews

Maintaining St Andrews golf course is the responsibility of St Andrews Links Trust, so when a pump station became increasingly problematic, the trust made the decision to replace it.

Grundfos Pumps worked in partnership with MJ Abbott to design and develop the new pump station, to provide pressurised irrigation water to five of the most high-profile courses. The pump station needed to deliver a huge 575m³/hr at 8.5 bar to ensure it could meet peak demand, so Grundfos 5 x CR120-4 and 1 x CR120-8 pumps were selected. In addition, Grundfos CUE variable-frequency drives are linked to a bus network, which manages the operation of the pump station.

This has been operational for a year now and has continued to respond to all the demands made of it, including during last year's hot summer.

● Call 01525 85 00 00, email grundfosuk@grundfos.com or visit www.grundfos.com



HygroMatik humidifier keeps the music playing

HygroMatik has provided the Royal Conservatoire of Scotland with a steam humidifier to help conserve musical instruments when they are in storage.

The MiniSteam unit is for direct room humidification, and is perfect for small and medium-size spaces, such as the Conservatoire's instrument store. Controlling the air and moisture content is crucial to preserving the life of the treasured instruments, avoiding expensive repairs and unnecessary replacements.

● Call 02380 443127, email info@hygromatik.co.uk or visit www.hygromatik.com



New division at WF Senate

WF Senate has announced two significant developments in its lighting offering.

The company has created a specialist division, Lighting Design and Solutions (LD&S), which provides clients with bespoke service. LD&S works closely with customers to identify their exact requirements and achieve an energy-efficient, cost-effective lighting system. It also ensures designs conform to the latest CIBSE/SLL guides and British Standards.

Meanwhile, the Eye-Wi wireless lighting control has been introduced. It has already been involved in a series of successful installations.

● Visit www.wfsenate.co.uk



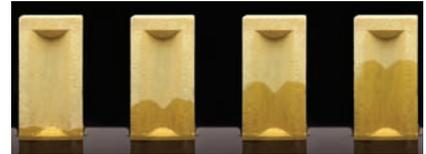
Einstein and Safeguard share the science of rising damp

What do Albert Einstein and rising damp have in common? Safeguard's seminar, Rising Damp: Causes and Treatment, has the answer.

The RIBA-accredited seminar aims to keep professionals up to date with the latest materials and systems, and can help them to meet ongoing commitments to continuing professional development (CPD).

Proving that rising damp is not a simple issue, the seminar shows that understanding the science behind the treatment is important – only then can informed decisions be made.

● Call 01403 210204



Bosch extends its heat plate exchanger range

Bosch, has launched a GB commercial plate heat exchanger to allow its range of GB boilers to be fitted to an open-vented system.

The new heat exchanger ensures boiler water and system water never meet directly, thereby offering long-term protection for the boiler.

Bosch's new product allows the boiler installation to be under a sealed system configuration, while existing heating systems can remain under a lower pressure, open-vent arrangement.

● Call 0330 123 3004 or visit www.bosch-industrial.co.uk



Wieland's Metalynx2 installed at Canada House

Wieland Electric's structured wiring system Metalynx2 was chosen to connect power and lighting at the newly refurbished High Commission of Canada building in London.

New power and lighting systems were installed by Bancroft, who specified Wieland's armoured cabling system Metalynx2. Its pluggable functionality allowed Bancroft to maximise on-site productivity, as installation involves simply plugging the system together. This can reduce connectivity time by up to 70% compared with traditional installation methods.

● Call 01483 531 213 or visit www.wieland.co.uk



Systemair launches AHU integrated heat pump

Systemair presents a new, energy-effective, fully integrated heating and cooling solution called DVU-HP, which uses a reversible heat pump system with a rotary heat exchanger. The HP and the heat exchanger are integrated in one section built into Systemair's air handling units. The DVU-HP is equipped with two scroll-compressors with stepless regulation from 5-100%, offering EER values up to 9.6. The heat pump uses R410A refrigerant and can provide a supply air temperature of maximum 15 degrees in cooling mode.

● Call 0121 322 0850, email info@systemair.co.uk or visit www.systemair.co.uk



New PAC vandal and panel readers provide solution to token cloning

Manufacturer of access control solutions PAC has added two easy-to-install and configure readers to its Oneprox GS3 range. Providing a high level of security in the most demanding operating environments, the readers effectively combat the issue of token cloning.

Designed to be used with the PAC 512 controller, the new PAC HF Vandal and HF Panel readers are certified to AES-128 standard and incorporate PAC's unique Oneprox Smart (Ops) technology, plus reading protocols MIFARE and DESFire EV1.

● Visit www.stanleysecurityproducts.com



Stokvis Econoplate used at Wokefield Park

Hot-water facilities at the De Vere hotel at Wokefield Park, Reading, have been brought right up to date with the installation of two Stokvis Econoplate E4B59+1R packaged plate heat exchangers. These offer very high flow rates direct from the boiler plant, with no need for storage, so cycling to maintain temperature and the risk of Legionella are negated. They offer excellent energy efficiency and output.

● Call 020 8783 3050, email info@stokvisboilers.com or visit www.stokvisboilers.com

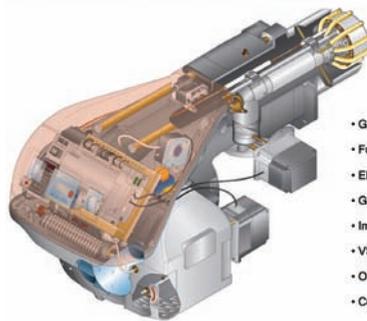
Riello to continue CPD courses

Riello has announced that it will continue its free CIBSE-accredited CPD courses throughout 2015. The three courses currently available cover specification of pressure jet burners, optimising performance of pressure burners, and specification of gas boosters.

Each course can be delivered as a separate one-hour presentation, or the pressure jet burner courses can be combined. They can all be delivered at the specifiers' own premises or at Riello's training centre in Huntingdon, Cambridgeshire.

● Call +44 1480 432 144, email cpd@rielloburners.co.uk or visit www.rielloburners.co.uk/cpd

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- Communication Option



CPD



Wavin impresses at Ecobuild

Representatives from Wavin, a manufacturer of plumbing, rainwater and drainage systems, have returned from Ecobuild 2015 having showcased a range of products, and sponsored a series of water management and efficiency seminars.

At the exhibition stand, team members demonstrated products, including the Hep2O range of push-fit plumbing and underfloor heating systems. Meanwhile, industry thought leaders came together at the Wavin-sponsored Water Theatre (pictured), which was built from AquaCell modular stormwater management units.

● Email info@wavin.co.uk or visit www.wavin.co.uk

Smedegaard at Scotswood

The Scotswood Energy Centre is to provide lower carbon heating and hot water to a community of 1,800 homes in Newcastle-upon-Tyne. The communal design will deliver significant energy savings.

Among the equipment at the centre is a bespoke pressurisation set from Smedegaard's GaardPress SpillPress range and two in-line, energy-efficient inverter driven pumps from the ECOflex range, by Smedegaard Pumps. The energy centre will ensure the houses reach level 4 of the Code for Sustainable Homes.

● Call 01278 458 686, email info@smedegaard.co.uk or visit www.smedegaard.co.uk



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Rauvitherm pipework employed in innovative scheme

Gaunts Estate, near Wimborne, Dorset, is the site of three new district-heating schemes, powered by separate anaerobic digestion plants.

To connect the plants to various buildings, 1,600m of Rehau's flexible, pre-insulated Rauvitherm pipework is being installed. The Rauvitherm jointing system uses Rehau Everloc leak-proof compression-sleeve technology to deliver a permanent, leak-free joint in underfloor heating and plumbing applications. It allows installers to make a joint in around half the time it would take to make a conventional joint.

● Visit www.rehau.co.uk



Industry award for Toshiba air-con training

Toshiba Air Conditioning has won a top training award for its national network of air conditioning training centres. The company was presented with the award for Training Initiative of the Year 2015.

The judges of the ACR News Awards said Toshiba's approach in rolling out 12 fully equipped facilities, and supporting its distributors to establish their own training facilities, was pioneering. The centres provide a comprehensive range of theoretical and hands-on courses.

● Visit www.toshiba-aircon.co.uk

100 years of Makita

Makita, the global power-tool manufacturer, is celebrating 100 years of technical innovations in 2015.

Globally, Makita has established 15 manufacturing plants, operating to ISO standards, and produces a range of more than 700 machines, for delivery in more than 150 countries.

Today in the UK, the Makita range of tools – powered by the most popular 18v lithium-ion battery – has reached the unique achievement of more than 100 products under a single battery.

● Visit www.makita.co.uk, follow @makitaUK or like MakitaUK on Facebook



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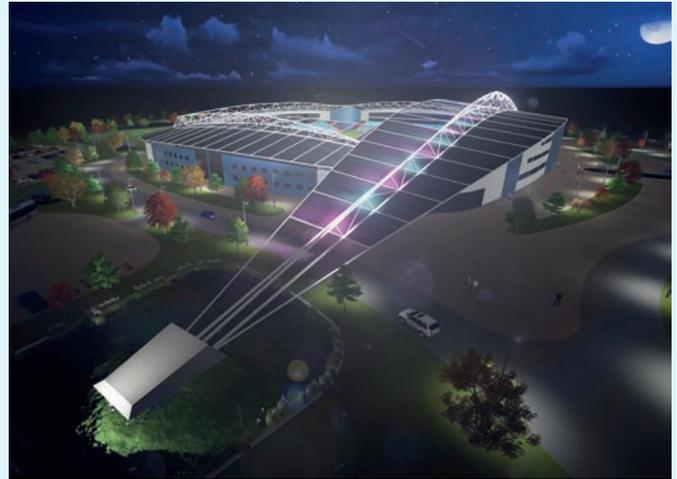
We are looking to expand our team and are seeking a Principal Mechanical Design Engineer based at our office in the heart of Preston City Centre. Our offices overlook Avenham Park with a short walk to Preston railway station.

We also have opportunities for Mechanical and Electrical Design Engineers at all levels.

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- ❖ Liaising with clients, colleagues and executive management
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- ❖ Undertaking design work, including multi-discipline detailed design
- ❖ Contract administration and project management



The successful candidate should possess the following:

- ❖ Relevant professional qualifications to member level.
- ❖ Chartered or working towards chartership with a relevant professional body
- ❖ Awareness and understanding of BIM / Revit / Hevacomp
- ❖ Understanding of sustainability engineering
- ❖ Commercial awareness
- ❖ Leadership and team working capabilities
- ❖ Excellent written and verbal communication skills

In return the company offers a competitive salary and benefits plus the opportunity to work in a professional, friendly environment on major projects covering many sectors.

Please contact **John Harkes (Operations Director)** on **01772 258511** and/or send your CV to john.harkes@bleazard.co.uk



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You must have a degree (or equivalent qualification or experience) in Engineering or Facilities Management and membership of a related professional body (e.g. CIBSE or RICS) to Chartered status. Experience in a senior leadership/management position within a Construction, Maintenance or Facilities Management environment, an ability to think and operate at both an operational and strategic level and strong commercial skills are all essential requirements.

Closing Date: 12 noon on 14 May 2015.

Further particulars and an application form are available on our website: www.uea.ac.uk/hr/vacancies/ or Tel. **01603 593493**.





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Senior Mechanical Design Engineer – Contract
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An instantly recognisable global name within the industry is looking to invite a Senior Mechanical Design Engineer to join their team on a ground breaking project in Doha. With almost 24 months' worth of work estimated and the opportunity to work overseas, this is an ideal project for someone with airport or hotel experience to really get involved and play an important role in the delivery of this exciting project.

Lead Sustainability Engineer
Gloucester
£50,000 Plus Benefits

Our client, who is experiencing rapid growth, is now looking for a specialist in building services sustainability. You will be experienced and commercially aware, seeking a role where you will be offered the opportunity to build the department. Working alongside architects and construction companies, this role will allow you to undertake full management of large projects including budget and delivery. A proven track record in establishing and maintaining relationships, as well as BREEAM accreditation is required to be considered.

Senior Mechanical Design Engineer
Warrington
£35,000-£40,000 Plus Benefits

An ambitious and self-motivated electrical engineer is required for our client, an internationally renowned, award winning engineering powerhouse. Working on some of the most publicised building services projects throughout the North West, you will have the chance to work in an autonomous client facing role where you will manage the delivery of said projects. Due to an increasing orderbook, you will have the chance to lead large teams to provide innovative design within the built environment in a range of varying sectors. This is a superb opportunity for a senior engineer looking to progress.

Associate Mechanical Engineer – Equity Potential
London
£60,000-£65,000 Plus Package

A small building services consultant is looking for an Associate level Mechanical engineer to join their expanding London team, and be involved in the planning and strategy decision making within the office. The company has recently employed some of the best talent in the industry in their London office, who are working on a number of notable local projects. Successful candidates will have the opportunity of equity within the business after 12 months of service.

Senior / Principal Mechanical Design Engineer
Oxford
£50,000 Plus Benefits

An award winning, medium sized building services and sustainability consultancy are currently looking for a Senior/ Principal Mechanical Engineer. This is a great opportunity to work in a client facing role working with prestigious architects and real estate developers in the South East and Middle East. Working within the commercial, residential and leisure sector you will be in charge of a small project team where you will coordinate MEP services. Great opportunity to join a rapidly expanding consultancy with the opportunity to be promoted to a very senior level.

Multi Skilled Engineer (Building Services)
Manchester or Leeds
£35,000-£40,000 Plus Benefits

Award winning real estate and property consultancy are looking for experts in multi skilled engineering. This idynamic role would suit someone from a consultancy background looking to build on the company's successful last twelve months. You will be joining an expanding team carrying out dilapidations studies and condition reports on all types of buildings within the commercial sector. The company are renowned for developing and rewarding staff and allowing them to progress to senior levels rapidly.

BIM Manager (MEP)
Central Manchester
£40,000-£50,000 Plus Benefits & Bonus

A rare and exciting opportunity has arisen for one of the country's largest and most respected building services consultancies. We are recruiting for an experienced BIM Manager to take charge of the BIM teams across the North-East, with great potential to be promoted to an Associate level role. If you have experience in the running and implementation of BIM systems then this is the perfect opportunity to advance your career to the next level.

Associate Director (Mechanical)
Hampshire
£65,000-£70,000 Plus Benefits

A renowned, award winning international engineering consultancy is looking for a Mechanical bias Associate Director to lead a team of Mechanical and sustainability engineers within their Hampshire office. This is a fantastic opportunity for a client facing mechanical engineer to work on projects with a number of the top AJ100 architects and top real estate developers in London and abroad. The role offers real potential to be promoted to a very senior level for the right candidate.

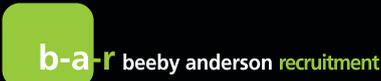
Senior Mechanical Design Engineer – Contract
Stockport
£30-£35 per hour Ltd

Our client has a great 12 month contract on offer for a Senior Mechanical Design Engineer working on some prestigious projects throughout the UK. If you have experience working on large scale residential and mixed use development projects, this would be a great opportunity.

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Associate Electrical Engineer Bristol, £52 - £58k + benefits

With a number of high profile project wins across the renewable energy and industrial sectors, our client, a well-established building services consultancy now requires a technical minded lead engineer to deliver projects and nurture and improve client relationships. BAR2577/CB

Senior Mechanical Engineer Saudi Arabia, to 30,000 SAR pcm

Fantastic opportunity for a Senior Mechanical Engineer to lead the design of some of the most exciting projects in the Middle East operating from the Riyadh office. My clients is one of the largest global professional services firm providing engineering consultancy, design, planning, project management and consulting services for all aspects of buildings, infrastructure and the environment. BAR2595/OE

Principal/Associate – Electrical Engineer

London, £55 - £75k + equity

Working for a specialist consultancy delivering large scale projects including the corporate HQ (\$800m) in Saudi Arabia for the region's largest petrochemical company. You will take ownership of, manage and deliver similar sized projects and be responsible for the full project life cycle from inception, to commissioning and final delivery. Would suit an entrepreneurial person wanting to progress to Board level, and share ownership. BAR2583/MO

Senior Mechanical Design Engineer

London, £40 per hour

We have registered an opportunity for an enthusiastic and client facing Mechanical Engineer. The role will be focused on commercial fit our projects that are some of the most prestigious sites in London. The Client is a respected company in the industry and they are highly regarded in the commercial sector. BAR/2367KB

Senior M, E, & PH Engineers Kent £37 - £40p/h

A multi-disciplinary company are growing across all of their offices while working on some of the most prestigious projects in London. You will be required to work in the office and onsite on an array of projects within their close-not team. You must be a fluent in the use of either Amtech or Hevacomp. BAR544/MA

Intermediate Mechanical Engineer

London, £30 - 35k + benefits

I am working alongside a world class multi-disciplinary engineering consultancy that is at the forefront of building services engineering. Their London office has an outstanding Building Services group, and recent project examples include aviation projects, major commercial and heritage projects in the Middle East, Premier League Football Stadia, as well as an ongoing portfolio of work in the local area. BAR2190/JA



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NATIONAL EVENTS AND CONFERENCES

CIBSE AGM and presidential address

7 May, London
AGM, followed by presidential address by Nick Mead.

CPD TRAINING

For more information, visit www.cibse.org/mcc or call 020 8772 3640

Fire sprinkler systems: Design to BS EN 12845

12 May, London

Low and zero carbon energy technologies

13 May, London

Standby diesel generator

14 May, London

Lighting and energy efficiency

14 May, Manchester

Design of ductwork systems

14 May, London

Introduction to commercial building services

19 May, London

Electrical services explained

19-21 May, Leeds

Gas safety regulations (designing for compliance)

20 May, London

Energy efficiency building regulations: Part L

20 May, Newcastle

ENERGY ASSESSOR TRAINING

For more information visit www.cibse.org/events or call 020 8772 3616

LCC design (EPC training)

12-13 May, Manchester

Lighting and energy efficiency

14 May, Manchester

Energy Savings Opportunity Scheme (ESOS) training

14 May, Bristol

HVAC

18 May, London

Air conditioning inspector training

19 May, Leeds

ESOS training

20 May, London

CIBSE GROUPS, REGIONS AND SOCIETIES

For more information, visit www.cibse.org/events

ANZ Region – NSW Chapter: Managing stress, workload and achieving a better work-life balance

5 May, Sydney

Hong Kong Chapter: Integrate 2015 Facility Management Conference: Hotels and Hospitality

7 May, Hong Kong

This conference will provide an opportunity to acquire insights into the hottest topics and recurrent challenges from local and international industry experts. www.cibse.org.hk/event.php

SLL and Merseyside and North Wales Region: LG8 – lighting for museums and art galleries

7 May, Merseyside

An evening seminar addressing lighting issues specific to museum and gallery buildings, presented by Paul Ruffles, of Lighting, Design and Technology. www.cibse.org/events

CIBSE membership briefings

11 May, Milton Keynes

10 June, Gamlingay

11 June, London

Briefings focusing on applications for the Associate and Member grades, and registration with the Engineering Council at the Incorporated Engineer and Chartered Engineer levels. The sessions are an opportunity to meet members in your region and hear a CIBSE presentation covering the main points of the application and interview process, followed by a discussion with CIBSE staff. www.cibse.org/briefings

Society of Light and Lighting masterclass

14 May, London

This year's masterclass theme is 'Light for Life', focusing on the relationship between light and wellbeing. With speakers Helen Loomes, Trilux; Kevin Stubbs, Thorn; Darren Smith, Phillips; and Dan Wills, Helvar. www.cibse.org/sll

HCNW Region: Building information modelling

14 May, London

John Sands, of BSRIA, introduces the UK government's BIM requirements, which demand collaborative 3D BIM – with electronic project and asset information, documentation and data – on government projects by 2016. Geoff Prudence, from the CIBSE Facilities Management Group, will outline the implications for facilities managers (FMs), and the success criteria.

East Anglia Region: Spring ball

15 May, Bury St Edmunds

HCNE Region: Low-voltage circuit breakers selection and harmonics

19 May, London

An evening seminar featuring Tim Campbell and Steve Summers, of Terasaki Electric (Europe).

South West Region: New edition CIBSE Guide M

19 May, Bristol

The new edition, which was launched in November 2014, brings together everything

designers and FMs need to know about maintaining and operating buildings. Speakers will cover the wider context of CIBSE's focus on facilities management, key elements of the document, and implementation in practice.

SoPHE: Engineering v legionella

20 May, Manchester

An examination of current regulations and ways of achieving regulatory compliance. Presentation by Paul Hartley and Angus Horne.

Society of Light and Lighting AGM

21 May,

SLL AGM, presidential address and awards, welcoming Liz Peck as incoming president. The AGM is restricted to SLL members, with everyone welcome to the awards. www.cibse.org/sll

UAE Chapter: annual dinner 2015

21 May, Dubai

www.cibse.org/events

North West Region and YEN North West: Gilberts (Blackpool) factory tour

21 May, Blackpool

Join us for a tour of Gilberts' recently completed factory and test facility, including demonstrations of its equipment, with the latest in grille and diffuser technology.

Intelligent Buildings Group: Wellbeing and health in buildings

27 May, London

www.cibse.org/ibg

ILEVE AGM

2 June, Derby

AGM, followed by a programme of presentations and a members' open forum.

ANZ NSW Chapter: Shedding some light on illumination challenges

2 June, Sydney

Seminar organised to coincide with the Vivid Light Festival.

Facilities Show, London

Facilities Show will be back for a second year at London ExCel from 16-18 June, and the event promises to be bigger and better than ever. There will be a host of new and exciting features, plus an educational programme running across the three days.

Visit CIBSE on stand R990, where members of the certification team will be available – along with the CIBSE Facilities Management Group – to provide a wealth of advice and knowledge on building services and energy management.

Geoff Prudence (pictured), chair of the CIBSE Facilities Management Group, and Stuart Carrick, vice-chair, will be presenting in the session 'Implementing effective maintenance strategies: The Guide M opportunity and the European opportunity', which takes place in the keynote theatre at 11.40am on 16 June.

Prudence will talk about using CIBSE Guide M to implement effective maintenance strategies across a range of buildings and environments. Carrick will then give his views on managing a portfolio and maintenance across a European sector.

CIBSE's head of certification, Andrew Geens, will chair a session on ESOS between 3.40pm and 4.10pm on 16 June, in the keynote theatre. He will be supported by CIBSE ESOS assessor Sebastian Gray and one of his clients. For more information, visit www.facilitiesshow.com



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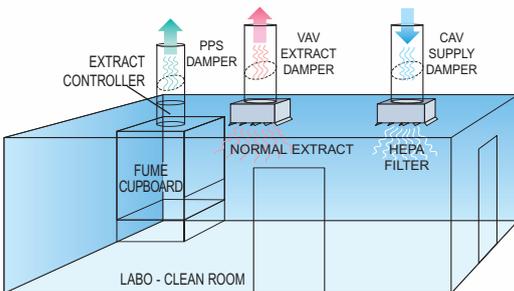


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Metal Damper

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Poly-propelene control and shut off valve incorporating the CMR Venturi Nozzle. This is essential when dealing with corrosive extract air especially from fume cupboard systems.



PPS Damper

PRECISION COMPONENTS FOR VENTILATION AND PROCESS CONTROL

CMR CONTROLS

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