



JOURNAL

CIBSE

The official magazine of the Chartered Institution of Building Services Engineers

December 2010



Tall order?

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LOW CARBON
New homes fail the fabric test

MASTERCLASS
How to harness thermal energy

PIPES/FITTINGS
Concern rises over failures

The CIBSE Building Performance Awards
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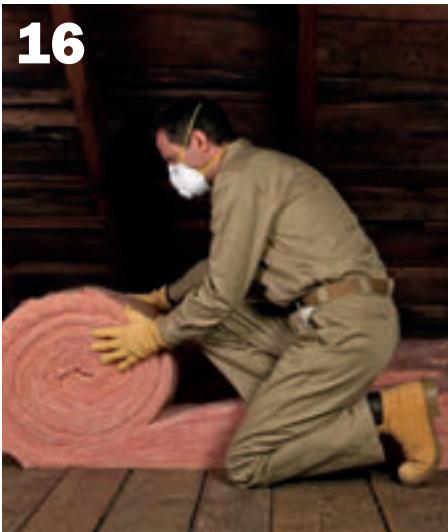
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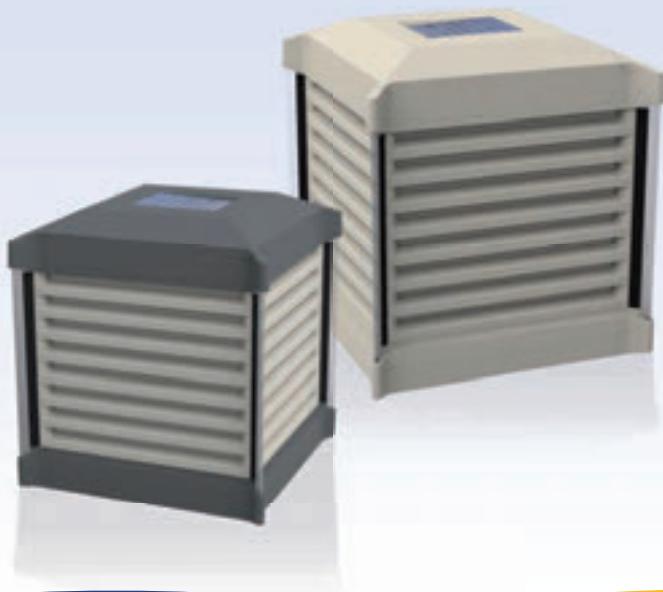


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From the editor



Green heaven – or heads in the clouds?

So we are now a little bit clearer about what the UK coalition government's Green Deal will entail. Energy Secretary Chris Huhne is offering three steps to energy efficiency heaven for householders and businesses, starting with an energy survey (good news for the low carbon assessor industry?), then involving pay-as-you-save finance packages that will fund insulation, solar panels, and other gizmos (see page 12). All well and good. Except that, all this won't fully take effect until autumn 2012 – which seems odd, as major companies, including retailers such as Marks & Spencer, are lining up to offer green deal-style services. The timescale is, perhaps, a recognition that the financing aspect of the Green Deal will take some time to pull together. The proposed Green Investment Bank, which is meant to support private-sector investment in high-efficiency technologies, research and installation, is still a long way from becoming a reality. With only £1bn of government money going into the bank, we are still none the wiser about where the needed multi-billion pound levels of investment will come from.

But it is very welcome that the government openly acknowledges the importance and urgency of improving Britain's existing housing stock. Housing Minister Grant Shapps emphasised recently that, with housing responsible for 'over a quarter' of CO₂ emissions, we 'need greener homes'. Indeed, Shapps announced important revisions to the Code for Sustainable Homes, which grades new properties according to their predicted levels of energy efficiency, emissions, waste re-use and more. One significant change to the Code shows the government is recognising

the importance of the quality of the fabric of new homes. The Code will now seek to 'incentivise' house builders by awarding more points to those who 'improve fabric efficiency' (according to new guidelines to the Code).

However, whether this will go far enough to prevent levels of heat loss that brand-new, high-quality homes are apparently experiencing, remains to be seen. Writing in this issue of the *Journal*, Professor Malcolm Bell of Leeds Metropolitan University argues for a 're-tooling' of the house building industry. This follows the

We need to ensure that new buildings do what it says on their design labels



findings of his research project on a housing development in York: the two-year study found that heat loss at the low carbon homes was between 50% and 100% higher than intended in the design. This is an extremely worrying statistic, and may suggest that many of the 'low carbon' homes being built are falling short of expected standards. Even if Britain achieves the target for all new homes to be 'zero carbon' by 2016, this will be an empty statistic if we can't be sure that these properties are, in operation, actually low carbon.

Amid Britain's debt mountain, it could be argued that the drive towards green heaven on Earth is, in any case, a little unrealistic. But what we have to avoid is having our heads in the clouds over what we're actually achieving when it comes to increasing the energy efficiency of buildings. We need a concerted programme of testing, reviewing, and fixing of new buildings, to ensure they do what it says on their design labels. Otherwise we won't learn from our mistakes, and house builders, unwittingly or otherwise, will continue to produce sub-standard building fabric.

Bob Cervi, Editor

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News in brief

Homes code revised

The UK government says it has removed the 'gold-plated' design features from the Code for Sustainable Homes in an attempt to make it more workable. Under the changes, developers are being encouraged to focus more on building fabric to improve energy efficiency.

£1bn for councils

Almost £1bn of government funding has been set aside for councils that welcome new housing developments in their area. Government will match the funding generated from council tax for any new homes built. A consultation on the proposals has now been published.

www.communities.gov.uk

'LEEDING' the world

One billion square feet of projects have now officially been certified with LEED, the environmental assessment methodology for the built environment. Another six billion square feet of projects are registered and currently working toward LEED certification around the world, according to the US Green Building Council.

Mott launches new tool

Multi-disciplinary consultant Mott MacDonald has launched the 'first' online construction cost and carbon tool, CapIT, with endorsement from the Institution of Civil Engineers. It describes CapIT as a single resource for civil engineering and building data. Subscribers can add their own items or change data. They can appraise different design options and identify the best solution considering both cost and carbon values. www.capit-online.com

RICS consults on Ska

The Royal Institution of Chartered Surveyors is consulting on proposed revisions to its Ska Rating assessment system for sustainable office fit-out and refurbishment. The Ska Rating was launched in November 2009. The new version will be released early next year and will include an evaluation to measure the impact and effectiveness of a project 12 months after handover.

Carbon scheme delayed after 'stealth tax' row

The UK government has delayed a key element of its carbon-reduction policy after the business sector accused it of introducing a 'stealth tax'.

In October's Spending Review, ministers announced that money generated from the Carbon Reduction Energy Efficiency Scheme (CRC) would go to the government rather than being distributed among better-performing companies.

Business lobby group the CBI attacked the proposals as being tantamount to a carbon tax on companies.

The CRC has also required participants to buy carbon credits in advance, relative to how much energy they consumed, with effect from 2012. The date of introduction had previously been 2011, but was put back a year by the Labour government.

The coalition government has



Companies still face a CRC 'tax'

now further delayed the introduction of the credit-buying requirement until 2013 – another delay that will be seen as an apparent attempt to ease the burden of the CRC 'tax' on business.

Energy Secretary Chris Huhne told delegates at the CBI conference last month that a UK-wide

consultation on the second phase of the scheme has been launched, meaning participants would not need to register to take part until 2013.

Property group Land Securities welcomed the consultation but said a number of questions remained around the CRC.

Dave Farebrother, environmental director at Land Securities, said: 'It's good that they're consulting, but from our point of view, most of the questions they're consulting on are fairly academic – they don't really affect the operation of the scheme or some of the fundamentals of it.'

Points that Land Securities will make in its own response to the consultation include its belief that the CRC scheme shouldn't be a tax, it should be a true trading scheme, and all tenancies should be metered, with sub-metering left up to individual landlords.

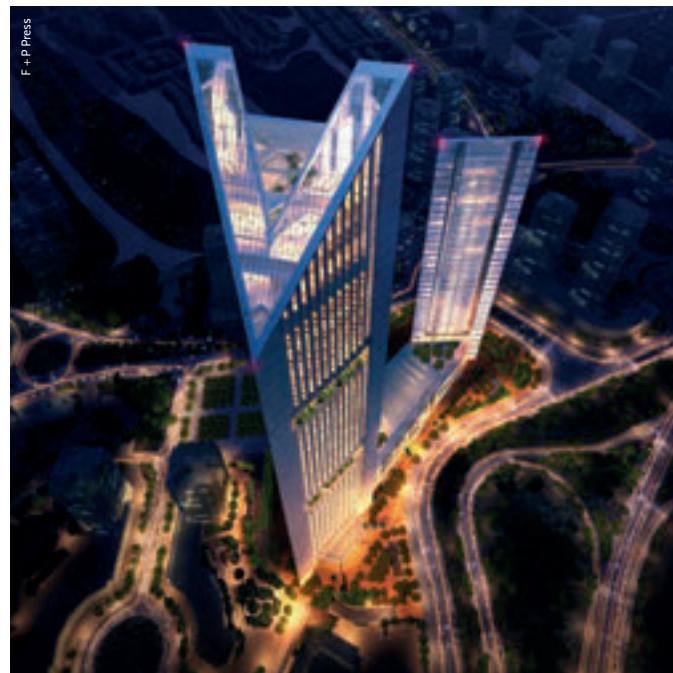
New homes 'escape' rules

Builders are set to save millions of pounds by exploiting a legal loophole that allows them to build hundreds of thousands of new homes to outdated energy efficiency standards.

A survey by the LABC, the body representing local authority building control teams, revealed that builders plan to construct 178,401 new homes to the old 2006 Building Regulations standard.

This is despite the new Part L 2010 of the Building Regulations becoming law on October 1. The LABC said: 'House builders have been able to bypass the new law simply by registering before the October deadline their intention to start work on a new site. This way, the entire scheme is allowed to comply with the old regulations.'

A spokesman for the Communities Department said: 'It is quite common that, just before new measures are brought in, there is an increase in applications – but some of these will be speculative. Even where the old arrangements apply, these are still good standards.' www.labc.uk.com



Putting humidity to good use

A project in Vietnam that uses a low-energy 'desiccant wheel' to mitigate the high levels of humidity has opened. The VietinBank Business Centre's new headquarters, a 300,000 sq m mixed-use development, comprises two towers connected by a seven-storey podium building. The desiccant wheel system draws in humidity, separating the water from the atmosphere and exhaling hot, dry air, which can then be cooled by ground water and released back into the buildings. The project was designed by architects Foster + Partners.

Low carbon homes are underperforming, says study which calls for action plan

An overhaul of new-home construction in Britain is needed if national 'zero carbon' targets are to be met, an extensive study has found.

Researchers discovered serious failings in a new housing development in York, which performed significantly below its expected energy efficiency standards.

Heat loss was 54% higher than the design intentions, despite the homes being developed with high levels of insulation.

The solar thermal panels installed suffered numerous operational problems, and the performance of the ground-source heat pump was significantly less than designed for.

The findings are published by the Joseph Rowntree Foundation in a report, *Low carbon housing: lessons from Elm Tree Mews*, produced by Leeds Metropolitan University researchers.

If zero carbon is to become a reality, many processes and cultures within the industry and its supply



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Are new low-carbon homes being built to the design standards? A study has highlighted high levels of heat loss in new houses

chain need to change, the report argues.

Designs of new homes need to give greater priority to the as-constructed performance and to supporting low carbon lifestyles, it says.

Services design should focus on the whole system performance, and planning and control of construction needs to be improved and include in-production testing.

The report's authors state: 'If national zero carbon housing goals are to be achieved, the performance gap must be closed.'

'There are encouraging signs that this is being taken seriously by sections of industry and government.'

'Closing the performance gap will require significant improvements in the way that homes are procured, designed and constructed so that

they provide households with homes that meet their needs while enabling low carbon lifestyles.'

The report recommends a 10-year programme of radical change to transform the industry, which includes a clear regulatory framework, a programme of research, education and training, and a national 'feedback loop'.

**www.jrf.org.uk
See Opinion, page 23**

Infrastructure plan aims to 'unlock' investment

The coalition government has published the UK's first 'infrastructure plan', which it claims sets out the 'major economic investment' needed to underpin sustainable future growth.

At a CBI conference, Prime Minister David Cameron launched *National Infrastructure Plan 2010*,

setting out 'the infrastructure Britain needs and how we will unlock some £200bn worth of public and private sector investment over the next five years to deliver it'.

He said: 'The economy has been too reliant on growth from a limited number of sectors and regions.'

The infrastructure investment programme will help rebalance the economy and give industries the right conditions in which to grow.'

Paul Skinner, chairman of Infrastructure UK, a division of her majesty's treasury, said: 'Infrastructure UK will play an active role in driving forward this agenda

across government. 'This initial phase of Infrastructure UK's work has validated the proposition that infrastructure development can be an important driver of the UK's future growth and competitiveness, and that there is real value in taking an integrated, cross-sector approach.' www.hm-treasury.gov.uk

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CABE plans to continue working despite funding cut

The UK Commission for Architecture and the Built Environment (CABE) is exploring ways it can continue working after the government withdrew all its funding.

CABE said in a statement: 'We are now working with government and others to try to find a way to ensure the kind of expert, impartial design advice for which CABE has been known remains available to councils, communities and developers across the country.'

It added: 'Meantime, CABE remains the government's statutory advisor on architecture, urban design and public space. We are continuing to conduct design reviews and to deliver many of our programmes.'

In October, when its government funding was pulled as part of the coalition's multi-billion pound spending cuts, the organisation said it was bitterly disappointed by the decision.
www.cabe.org.uk

Minister sticks by planning reforms

Government has pledged to push through the scrapping of regional plans in England, despite losing a court battle over the policy.

Following a judicial review of the policy brought by housing provider Caia Homes, the High Court ruled that Community Secretary Eric Pickles had acted unlawfully in unilaterally revoking the system of Regional Strategies, which set housing targets for English local authorities.

But Pickles said in a statement that the coalition government would be introducing a Localism Bill shortly that would 'sweep away the last government's controversial regional strategies'.

He said he would introduce 'powerful incentives' to build new homes, adding that a proposed 'New Homes Bonus' would be announced soon, and would take effect in April next year.

'Top-down targets do not build homes – they have just led to the lowest peacetime housebuilding rates since 1924,' Pickles said.

Sector's graduates struggling to find work, figures show

Construction and building graduates are increasingly struggling to find work after leaving university, according to the Higher Education Careers Services Unit (Hecsus).

Around 21,000 of last year's graduates in all subjects were still out of work – nearly 9% of the total, compared to 7.9% in 2008 and 5.5% in 2007.

More specifically, 10.9% of architecture and building graduates were out of work, along with 11.8% of those with mechanical engineering degrees and 11.9% of civil engineering graduates.

Electrical engineering graduates fared worst in the sector, with 13.3% failing to find work – this compares with 11% cent in 2008.

But Hecsus's deputy research director Charlie Ball suggested that the picture – across the board at least – is better than expected: 'Graduate unemployment hasn't risen as high as we feared and is some way off the levels of the last recession in 1992, when it reached 11.6%.'

'Prospects for graduates in the short-term look brighter, with unemployment likely to have



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Electrical engineering graduates fared worst in the sector, says Hecsus

peaked. Next year we expect to see a decline.'

Nick Mead, chair of CIBSE's Industry, Education and Training Group, said that all areas of the sector were affected by the recession, but consultancy had seen the biggest drop-off in recent months.

He explained that the difficult jobs situation is 'largely about confidence to employ' but said there was also an issue with the large range, and varying standards, of building services degrees.

He added: 'Students currently studying should talk to industry and to CIBSE to see what is required so they can choose the right course or add to their modules.'

Mead suggested that while studying, students should take up work opportunities in relevant companies not restaurants and bars including unpaid positions.

He added: 'Building services is extremely diverse, so jobseekers should look at the whole industry, from design to build to manufacture to operations.'

Concerns rise over school projects

Concerns over school budget cuts continue to grow after building maintenance company Rok, which employs 4,000 people, was taken into administration.

The Exeter-based company, which reported a £3.8m loss for the first half of the year, provides building services for schools, councils and housing associations.

At the time of going to press, administrators reported plenty of interest from other companies wanting to buy Rok's assets.

The administrators

PricewaterhouseCoopers said there was no one factor that had

led to the company's demise, but admitted that a dropping-off in orders and constraints in public spending have had an impact.

Meanwhile, local authorities are reported to be in talks with contractors over ways to cut costs by as much as 40 per cent, with many likely to have to abandon new building projects completely.

Salford council leader John Merry told the *Guardian* newspaper that he was now expected to go back to construction companies to renegotiate deals.

But, he added, 'no builder can work on the basis of that'.

Group aims to ease district heating path

A new task force looking into cutting the cost of district heating and other types of sustainable community infrastructure, has been set up by energy experts.

The Zero Carbon Hub and the UK Green Building Council are working together to investigate the cost-cutting measures.

Neil Jefferson, chief executive of Zero Carbon Hub, said: 'The need to have a suite of "off the shelf" legal and administrative frameworks to speed deployment and reduce costs is a key deliverable on the critical path towards 2016 and the work of this task group is vitally important.'

The group will eventually produce guidance.

Energy certificates 'have data errors'

Government testing of energy performance certificates (EPCs) has revealed that about 225,000 contain data errors.

The faults equate to about 6% of all EPCs lodged since September 2008. They were found by the Department for Communities and Local Government (CLG) during testing of its new free online application to encourage householders to model what energy efficiency improvements they can make to their homes.

According to a letter by CLG, a number of error types have been identified, one of the most significant being an incorrect boiler index code.

Advisers who produced inaccurate certificates for consumers have now been instructed to investigate any problems that may arise and to produce a new EPC free of charge within 10 working days.

Any consumer who has an inaccurate certificate will not be able to use CLG's new EPC Adviser tool because it uses the same data gathered to produce the EPC.

The tool links directly to the

EPC domestic register and works by retrieving the lodged data and calculating the potential effects of different energy efficiency measures on fuel bills and carbon emissions.

CLG hopes that enabling consumers to model the impact of different energy efficiency measures – and seeing for themselves the potential savings they could make – will lead to an increased take-up of the recommendations.

The tool has been designed to support all EPCs lodged since 21 September 2008, using SAP v9.82 software, says CLG.

Any EPCs lodged before that date will not be supported as they were created in a format that does not allow for consistent recalculation of EPC results.

Speaking of the new online tool, Richard Hipkiss, director of Information Prophets Ltd and a CIBSE Low Carbon Energy Assessor, said: 'The news of the application moves an EPC on a huge step from just being a compliance document to a more useful tool to drive energy reductions.'

The EPC Adviser service went live at the end of November.



Hot new idea wins SoPHE award

Grzegorz Jaroszewicz (left) receives his 2010 Society of Public Health Engineers (SoPHE) Young Engineer of the Year award from Ian Fellingham, chairman of the SoPHE education group, last month. This year's theme was 'Innovation in Public Health Engineering' and Jaroszewicz's entry on energy saving in the production of hot water by the reclaiming of heat energy from grey water impressed the judges. He will now enjoy a trip to New York and Niagara Falls. See page 20

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News in brief

Cameron commits to fund UK wind turbine sector

David Cameron has confirmed that he stands by the Labour government's pledge for a £60m funding package to help British ports manufacture and service wind turbines – particularly for use offshore. Cameron said: 'We need thousands of offshore turbines in the next decade and beyond, yet neither the factories or these large port sites currently exist. So we are stepping in.'

Atkins acquires Danish design consultancy

Multi-disciplinary consultant Atkins has acquired Gimsing & Madsen, an independent specialist consultancy in bridge and structural design based in Denmark. The group said that the move would boost Atkins' capability in bridge and tunnelling design and improve its ability to respond to opportunities in the Scandinavian road and rail sector.

Langdon awarded UK's first energy park

Peterborough Renewable Energy has appointed construction consultants Davis Langdon, an AECOM company, to oversee the building of the first sustainable Energy Park in the UK. Energy Park Peterborough will take in mixed waste and recycle and remanufacture it. The Energy Park will produce enough renewable energy to power 60,000 homes, as well as glass, building blocks, metals and compounds.

Efficiency deal for homes

EDF Energy, an electricity producer, has signed a deal with carbon reduction company, Sustain, to deliver energy-saving measures such as solid wall insulation, fuel switching and low carbon technologies, in low income areas through the government's Community Energy Saving Programme (CESP). The agreement will deliver these energy-saving measures for up to 3,000 homes in the UK.

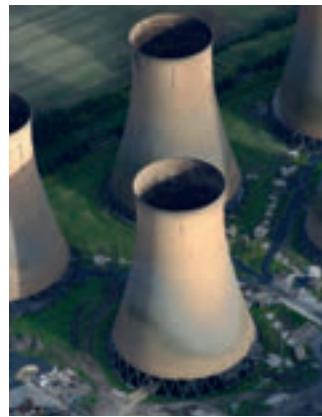
Don't throw bungs at green solutions, says energy boss

UK policymakers should stop giving inducements to green technologies such as micro-generation and start building new energy infrastructure, according to the head of a global supplier of power generators.

Energy policy in Britain is 'sailing perilously close to the rocks', said Rupert Soames, chief executive of Aggreko.

While the UK historically had an admirable energy policy, Soames said, the previous government believed that it could achieve energy policy objectives by sending signals to the market about particular favoured technologies by throwing them 'bungs'.

He told the Scottish parliament: 'We had bungs for windfarms, bungs for micro-generation, bungs for solar, bungs for tidal energy, and then negative-bungs for coal and nuclear. And each bung is



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Call for renewed power infrastructure

regularly tampered with or changed. Each bung, in isolation, is trying to achieve a laudable goal.

'But, in combination, these bungs produce not a symphony to delight investors and lure them to our shores, but a confusing and discordant cacophony.'

Soames warned that a third of the country's coal-fired capacity, two-thirds of its oil-fired capacity and three quarters of its nuclear capacity will be closed down – and that a disjointed national energy policy means there will be a lack of suitable investors in the UK.

He predicted that, without a massive and immediate programme of building power stations, with concrete being poured in the next two years, 'we will be in serious danger of the lights going out'.

Energy Secretary Chris Huhne said in a recent speech to the CBI that the government would be setting out its plans to 'reform the electricity market' before the end of the year.

'The current market framework is not fit to deliver the investment we need,' he said, adding that a 'seismic shift' would be needed to secure investment in clean technology.

Nuclear future 'at risk from skills gap'

The UK is lacking the skills required to deliver the new nuclear power stations needed for security of supply and a low carbon economy, energy industry experts have warned in a study.

The report, *Building Britain's Nuclear Future* by law firm Berwin Leighton Paisner and backed by the Nuclear Industry Association,

fears that not only is the UK lacking in skills, regulators will 'move the goalposts' once the framework to build the plants has been agreed.

There are proposals to build 10 new nuclear power plants in the UK, and up to 300 around the world, in the next 20 years, at an estimated cost of \$300bn.

Keith Parker, chief executive of

the Nuclear Industry Association said: 'Ensuring that the UK is well-equipped with relevant specialist skills is key.'

'This could be worth billions to the country and will provide thousands of highly skilled jobs at a time when other sectors are shrinking.'

www.blplaw.com



University students enjoy modern living – with all the green mod cons

The BREEAM Excellent rated 'student village' at Aston University has opened to students. The rooms in the £215m development are in two new apartment blocks of nine and 18 storeys, which have been built in five and seven-bed clusters. The village includes low-pressure hot water heating, automatic building controls and rainwater harvesting, installed by engineering firm JS Wright.



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News in brief

III wind for turbines

The biggest wind turbine maker in the world, Vestas, is to lay off 3,000 workers amid a fall in demand for clean energy. The Danish company, which has 12.5 per cent of the world turbine market, closed its UK factory in Newport, Isle of Wight, last year, and is to shut four plants in Denmark and one in Sweden, while reducing staff levels at others around the world.

20-year plan for Brent Cross

Detailed planning consent has been given for an urban regeneration scheme in London's Brent Cross. The £4.5bn, 20-year scheme will create 7,500 new homes, three new schools and a railway station – Cricklewood Midland. Work will commence in 2014 and some 27,000 jobs are expected to be created.

House prices slide again

UK house prices slipped, on average, by 0.7 per cent in October, according to the Nationwide Building Society – with warnings of further falls. The building society reported that the average house price was just over £164,000. Newspaper pundits predicted falls of between 5% and 10% during 2011, compared to growth of 5.9% at the end of 2009.

Construction deaths down

The construction industry remains the most dangerous despite fewer injuries and deaths last year, according to the Health and Safety Executive (HSE). There were 42 deaths in 2009-10, compared with 52 the previous year and an average of 66 worker deaths per year for the five-year period from 2004/05.

Clocking up carbon

Turning the UK's clocks back an hour at the end of October creates an extra 500,000 tonnes of carbon dioxide, according to a Cambridge academic. Dr Elizabeth Garnsey told the Energy and Climate Change Committee that reverting to Greenwich Mean Time caused higher energy use and demand in peak periods, according to *The Times*.

Warnings for sector as figures underline falling growth

A leading statistical body has admitted releasing incorrect figures for the growth of the construction industry this year, following a series of challenges from industry analysts and economists.

The Office for National Statistics (ONS) originally stated that the construction sector grew by 9.6% for the three months to June, compared with the previous three months.

But the ONS has admitted that construction output rose by 6.8 per cent. The ONS's most recent figures for the sector report 4% growth for the third quarter of the year.

Simon Rubinson, chief economist at the Royal Institute of Chartered Surveyors, said there were 'good reasons for maintaining a degree of caution on how well the industry will fare over the coming year.'

He added that 'anecdotal evidence continues to indicate that



Fears for construction sector rise

finance for development remains in short supply. This obstacle to growth is unlikely to ease in the near term'.

The Mineral Products Association's executive director, Simon van der Byl, pointed out that 'the 21% cut in public investment set out in the Comprehensive Spending Review will mean substantial reductions in

construction sectors such as health, education and roads, and will put huge pressure on local authority spending.

'These negative pressures are likely to outweigh what will probably be a slow and uneven recovery in housing, commercial and other private sector construction over the next two years.'

Separately the Chartered Institute of Purchasing and Supply has warned that the slowdown in the construction industry is threatening an economic recovery in the UK.

The institute's Markit/CIPS Purchasing Managers' Index (PMI) for October shows that the sector was unable to sustain recent growth.

David Noble, chief executive of the institute, said: 'Construction will have to look much harder for new contracts going forward, so it's no surprise that many are cutting jobs and reducing purchasing activity.'



Land Securities

One New Change opens

One New Change, the City of London's largest shopping complex, has opened. Designed by architect Jean Nouvel, the development comprises 31,000 sq m commercial and 21,000 sq m retail space. It complies with Part L of the Building Regulations 2006 and will realise the Mayor of London's target of generating 10% of its energy needs from renewable sources. Consulting engineers Hoare Lea designed the office and retail mechanical, electrical and plumbing systems.

Call for tower block fire assessment

A company specialising in fire safety is calling for an urgent review of high-rise living accommodation, following a television programme that exposed safety concerns about tower blocks.

The BBC's *Inside Out West Midlands* show recently reported on possible fire safety failures in recently refurbished blocks within the West Midlands area.

In particular, there were problems with antiquated alarm systems and fire extinguishers, and lack of provision of smoke-free exits.

The BBC programme claimed a fire officer visited one block that had been refurbished at a cost of £4.7m but he still raised questions over its fire safety.

Simon Jennings of SE Controls said: 'There is an urgent need to review all the UK's high rise living accommodation – 224 tower blocks in the West Midlands alone – to determine that safe levels of fire safety and smoke control are adequately provided. This inspection should be initiated by independent inspectors and cannot begin too soon. Urgent action is required.'



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CIBSE news

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Rewarding success

Members have been recognised for their achievements at this year's President's Award Dinner

Andrew Sparkes, from Coventry University, has won the CIBSE Undergraduate Award 2010, and the prize of £500, after impressing judges with his project on *Phase change materials for thermal energy distribution systems in buildings*.

The CIBSE Undergraduate Prize, sponsored by Hays Building Services, has been in existence for more than 18 years. It is designed to encourage students to develop their potential and aim for excellence. It is awarded to students in their final year of a building services course accredited by CIBSE, and recognises their academic achievements. Coventry University also received a trophy on the night, in recognition of its achievement.

The Happold Brilliant award was won by the Barlett School of Graduate Studies, University College London. This award recognises excellence in the teaching of building services engineering. The prize of £1,000, together with the trophy, is awarded

to encourage future excellence. Other awards given out on the night were:

Gold medals:

- Ronald Chin was awarded the Gold medal in recognition of the substantial achievements and contributions he has made to the development and enhancement of the building services discipline in Hong Kong, and his 31 years working at the Government of the Hong Kong Special Administrative Region.
- Donald Leeper was recognised for his vast contribution to the building services industry, and CIBSE in particular. He has practised in the industry since 1966. An honorary member of BSRIA, he has contributed to many research steering groups and has sat on the Department of the Environment's multi-disciplinary Review Panel for Construction Research. He has been a member of the CIBSE Council since 1994, and was president in 2005/06.



Donald Leeper accepts his Gold medal from CIBSE president Rob Manning

Silver medals:

- Colin Ashford received the silver medal in recognition of his contribution to CIBSE and the Home Counties and South East region, of which he is a former chairman, as well as being a council member.
- Lam Kam Kuen, an active CIBSE member in the Hong Kong region, has worked for the Hong Kong government for more than 35 years, specialising in the design of building services installations and the promotion of energy efficiency.
- John Kieran Purcell has worked at Varming Consulting Engineers for 40 years, and is currently chairman. He is an active member of the CIBSE Republic of Ireland branch, helping to promote the sector to school leavers.
- Sam Collard, an active member of the CIBSE North East region committee, has been chairman for two years. He has made a large contribution to the region and helped to raise the profile of the building services industry.
- Colin Bowen, currently vice chairman, has been an active member of the East Anglia region committee for 10 years. He also encouraged the formation of the region's young engineers committee.



Dr Kenneth Parker, of Coventry University; Mike McNally, from sponsor Hays Building Services; and Andrew Sparkes, winner of the CIBSE Undergraduate Award

Regional bronze medals:

- Leung Ka Yue is an active member of the Hong Kong region. He has organised social and technical activities for the institution, as well as jointly with peer institutions.
- Colin Howlett has been an active committee member of the Merseyside and North Wales region since 1974. He is currently adviser/advisor of the regional



Dr Dejan Mumovic (right) accepts the Happold Brilliant award from Rob Manning, CIBSE president, on behalf of the Bartlett School of Graduate Studies

Journal ranked as top benefit in institution's membership survey

The second CIBSE Member Satisfaction Survey took place last month and the results were very encouraging.

In total, 60% of members rated the value gained from CIBSE membership as very high or fairly high, and more than 75% said they were satisfied or fairly satisfied with their membership.

The primary reason for holding CIBSE membership for more than two-thirds of respondents was professional recognition, followed by 25% who highlighted access to knowledge and information. Professional development and a professional home/sense of



belonging were also rated highly. And 56% of members said they are planning to progress their membership grade.

The *CIBSE Journal* was rated top

of the membership products and services in terms of importance and satisfaction for the second year in a row, closely followed by the CIBSE website and then CIBSE membership services.

The top five CIBSE products and services were rated as:

- *CIBSE Journal*
- CIBSE website (www.cibse.org)
- CIBSE membership services
- Professional training and development opportunities
- Online CPD

Members rated publications as the area that CIBSE was most effective at delivering, with 86% believing they were very effective

or effective. The delivery of topical news and information also scored highly, as did specialist and technical information.

Since the survey last year, CIBSE has worked hard to improve its electronic communications, and both the website and the email newsletter have been re-launched. Responses to both have been positive, with 89% satisfied with the website and 85% satisfied with the email newsletter. CIBSE will continue to improve these communication tools to ensure that they deliver the topical and timely information that members are looking for.

Nurturing the next engineering generation

CIBSE has just published three new careers factsheets.

Supported by CIBSE Patrons, they were put together in response to Engineering UK's recent research into what influences young people's career choices.

Some 73% of young people surveyed cited parents as a major influence, so the new factsheet, called *Talking to Parents*, focuses on the importance of choosing physics and maths at A-level, long-term careers prospects in Building Services Engineering (BSE) and the high status that professionally

qualified engineers enjoy.

Fighting Climate Change addresses young people's increasing knowledge and concerns about environmental issues, highlighting CIBSE members as 'low carbon heroes'.

Finally, *Creative Design in BSE* responds to the finding that many young people who enjoy design and technology at school do not realise that these subjects have engineering applications.

These new factsheets bring the total suite to 12. They can be accessed through CIBSE's website,

at www.cibse.org, and hard copy supplies are available from arngguth@cibse.org

It's interesting that, although we live in an increasingly digital world, only 19% of young people report internet sites as a key influencing factor in their career choice. In contrast, careers advisers and teachers are cited as much more influential – and feedback from them reveals a continuing need for

hard copy resources, especially posters, which can be displayed in classrooms and libraries, and act as teaching resources.



Demand for our *Make a Difference* poster and factsheet remains strong, and – thanks again to CIBSE Patrons – we have been able to continue making this resource available, helping to maintain a high profile for building services engineering in schools.

CIBSE workshop – the Future of Building Regulations

The institution's recent workshop on the Future of Building Regulations explored what new revisions will be made to Part L in 2013.

The evening workshop started by reviewing the results of the recent CIBSE survey on enforcement, and summarised the institution's response to the minister.

The survey clearly demonstrated that Part L compliance is not comprehensively enforced by building control officers at present.

Brian Martin, from the Department of Communities

and Local Government (CLG), presented the programme of future development work on the Building Regulations, and said an announcement was due shortly on what measures will be considered in detail in the consultation, scheduled for late 2011.

A package of changes are expected to be announced in late 2012 and implemented in 2013. CLG has the following aims for the review:

1. Explore ways to increase compliance with Building Regulations, and ensure regulations are effective and deliver what they set out to do;
2. Reduce the regulatory burden;

3. Embrace localism and the 'big society' agenda.

The presentations and a report on the evening workshop can be found in the 'Presentations' section of the Knowledge Bank at www.cibse.org

Participants broke into groups to discuss the four key topics in CIBSE's response to CLG on the Future of Building Regulations, which were:

- Compliance and enforcement;
- Compliance criteria and better metrics;
- Are existing buildings dealt with adequately? and
- The simplification of the regulations and combining

them with energy performance regulations.

Key points raised include:

1. Buildings should be revisited after completion to review their carbon dioxide emissions;
2. Better enforcement is needed, especially when working on existing buildings;
3. Logbooks should be better policed and electronic versions required as standard;
4. Occupation should not be allowed until Building Regulations compliance is signed off; and
5. Part L and the Energy Performance of Buildings regulations should be merged.

Wholesale solution?

What sort of green 'deal' is being offered by ministers to UK consumers to cut their energy use? **Carina Bailey** reports on the latest proposals

Improving existing buildings has finally been set as a priority in the UK government's agenda. Energy and Climate Change Minister Chris Huhne last month set out 'three steps' by which householders and businesses could take part in the proposed 'Green Deal' programme. Full details of the scheme are yet to emerge, but legislation for the policy is expected to be introduced to parliament this month.

The deal is expected to be available from autumn 2012. From 2015, housing tenants will also be able to ask their landlords for reasonable energy efficiency measures under the forthcoming Energy Bill. This will allow local authorities to insist that landlords carry out the works.

However, there are fears that the initiative focuses too heavily on insulation rather than whole-house refits. And the latest announcement shows a high level of interest in 'selling' the new policy by household names, such as DIY specialist B&Q and energy supplier British Gas.

Even retail giant Marks & Spencer is advertising its 'M&S Energy' arm in the national press, offering to provide all your insulation needs, 'from expert advice to installation'. But what implications could the

involvement of high street retailers have for the building services sector?

The Federation of Environmental Trade Associations (FETA), which represents manufacturers, doesn't see this development as a problem. Director general Cedric Sloan says: 'Their size and funding may allow them to be the only "one-stop shop" available to the consumer to access all available schemes and allowances.'

However, he is concerned about exactly what works will be covered by the Green Deal: 'Our fear is that it will not take an holistic approach.'

'Rather, it seems to restrict itself to matters such as insulation. This in itself is not a problem. The problem arises if other relevant factors are ignored – for example, why insulate a home with a wasteful old boiler consuming too much energy?'

For the Green Deal to have the greatest impact, Sloan believes it must encourage a whole-house approach that analyses air leakage, heating, controls and insulation and then prioritises the most effective solution(s).

Simon Smith, UK director of buildings at building services group Ramboll, agrees that any measures that aim to insulate and improve the



Shutterstock

Will the Green Deal promote much more than home insulation and fail to improve overall efficiency, experts ask?

airtightness of a home need to be approached holistically.

He says: 'You have to make sure you don't create more problems than you're actually trying to solve. I actually think that cavity wall insulation is probably not enough, it's probably questionable. The breathability of a building could be affected if you're not careful.'

But one of the most important aspects of making the Green Deal work, emphasises Smith, is education. 'You have to know how to manage your house. People have got to learn if they have a heavily insulated and airtight building what effect opening the window has on the ventilation.'

John Alker, director of policy and communications at the UK Green Building Council, believes the main opportunities for engineers will come from retrofitting the non-domestic sector. He says: 'Almost any non-domestic building retrofit is going to need building services engineers.'

But Alker agrees that domestic work should be about whole-house packages that are capable of deep emissions cuts rather than simply insulation, adding that when it gets to this stage, it needs to be done by experts, not high street retailers.

'The idea of Tesco or B&Q sending out builders to do major retrofits is an idea that a lot of people would dread, unless they're working with teams of architects and engineers who really know what they're talking about.'

'The deeper the retrofit, the

more likely we are going to need somebody who fundamentally understands the home as a system, but at the moment, the jury is still out on whether the Green Deal is going to be the thing that delivers that.'

But David Frise, head of sustainability at the Heating and Ventilating Contractors' Association, is certain the key is to stick to basic measures, such as insulation, energy efficient lighting and low energy systems, such as condensing boilers.

'Once the basics have been mastered and widely applied, then we can look to add more sophistication, but it is crucial that we avoid green bling,' he says.

'Some of the legislation has pushed people into making the wrong choices and it is essential that the loans are not frittered away on inappropriate technologies that do not deliver.'

However, Nick Cullen, partner at Hoare Lea, fears that lack of competency to carry out the measures could be the biggest barrier to making the Green Deal a success.

He says: 'The UK has an incredibly diverse range of building types and their energy performance improvement will require skills in construction and the other trades but also an understanding of potential problems that can arise with energy retrofits, such as interstitial condensation or reduced ventilation. It would a disaster if in curing one ill we create a bigger one elsewhere.'

Three steps to getting a green deal

Step 1 – an independent energy survey of the property, giving clear advice on the best energy efficiency options, like loft and/or cavity wall insulation.

Step 2 – Green Deal finance to be provided by a range of accredited providers, which will be repaid through savings on energy bills, making properties cheaper to run from day one.

Step 3 – Homes and businesses to receive their energy efficiency package. Only accredited measures will be installed by appropriately-qualified installers, overseen by government, giving consumers confidence that the deal they are getting is high-quality and will save them money.

Source: www.decc.gov.uk

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Best performers

The actual performance of buildings is at the heart of the new-style CIBSE annual awards. We unveil the shortlisted entries for 2011

The CIBSE Building Performance Awards recognise, reward and celebrate the best performance, innovation and practice in building services. As with previous years, the 2011 awards will be held at London's Grosvenor House, and will take place on the evening of 9 February.

The awards now have a new name, but they build upon the scope and success of the CIBSE Low Carbon Performance Awards that were launched in 2007.

One of the most popular categories in the awards in terms of submissions, the **New Build Project of the Year Award**, will be presented to the building that most effectively combines construction materials with low carbon and

renewable technologies to improve performance and reduce carbon emissions throughout the life of the building. At the same time, the building must deliver the high levels of comfort and performance required by occupants. Similarly, the **Refurbishment Project Award** will honour the candidate that can demonstrate the use of outstanding design and construction to deliver energy efficiency.

Evidence of the actual performance of the building compared, where possible, with performance before refurbishment, will be a key factor in choosing the winning entry, which will also be expected to indicate the anticipated payback period on capital costs.

Meanwhile, the **Commissioning**



Winning line-up: the CIBSE Low Carbon Awards recipients in 2010

Project of the Year Award will recognise an organisation or project team that can best demonstrate the process that they undertook in commissioning a building, and the resulting benefits to the performance of the building, to the client, and to the users.

Looking more towards the successful operation of a building or group of buildings in practice, the **Building Operation Award** marks the achievements of the building manager or team responsible for delivering outstanding building

performance. The award is primarily focused on the ongoing programme for the management of existing building(s) to achieve improved performance. The winning entry will show thorough evidence of measured performance over at least a year of operation.

Achieving a positive impact on the actual performance of a building in practice is also very much about individual staff aptitude and training. Hence, the **Training for Building Performance Award** recognises an organisation that has excelled in

Awards: the shortlists in full (candidates in alphabetical order)

Building Operation (Sponsored by Gratté Brothers)

British Land Group: York House
Eli Lilly and Co: Erl Wood Manor
Power Efficiency: Midsummer Place Shopping Centre
Transport for London: head-office buildings

Building Services Consultancy of the Year (Sponsored by Balfour Beatty)

AECOM
Arup
Atelier Ten
Hoare Lea
Red Engineering Design
TACE
URS/Scott Wilson

Carbon Champion of the Year To be announced on the awards night

Client of the Year – Large (Sponsored by Imtec)

Better Buildings Partnership
John Lewis Partnership (submitted by Synergy BSS)
Joseph Rowntree Housing Trust

(submitted by Richards Partington Architects)

Royal Mail (submitted National Design Consultancy)

Client of the Year – Public Sector (Sponsored by Elya Fans)

Heart of England Foundation NHS Trust (submitted by Cynergin and ENER-G)
Metropolitan Housing Trust
Scottish Environment Protection Agency, Scottish Natural Heritage and the Joint Nature Conservation Committee (submitted by URS/ Scott Wilson)

Commissioning Project of the Year

EDP Consulting Ltd, Co-op foodstore

Hong Kong Polytechnic University, International Commerce Centre, Hong Kong

JV Tierney and Co, Criminal Courts of Justice, Dublin

Integrated Project Team

EDP Consulting

Hoare Lea

Metropolitan Housing Trust

Low Carbon Consultant of the Year

To be announced on the awards night, 9 February

New Build Project of the Year

Aedas Architects, Loxford School

Arup, Eleven Brindley Place

Arup Associates, Harlequin 1 (BSkyB)

BDP, Graham headquarters

Hoare Lea, The Scarlet

JPW Construction, Canolfan Hyddgen

Max Fordham, Bohozone Core Building 1

Red Engineering Design, Capgemini Merlin data centre

Richards Partington Architects, Temple Avenue Project

Steenven Varming, National Portrait Gallery, Australia

Passive (energy-related) Product of the Year

Blygold UK

eTRV

Laing O'Rourke and BDP

Passivent

Svenska Aerogel

Energy-using Product (Sponsored by FlaktWoods)

A O Smith Water Products

Jayhawk International

Long Vision (HK) Trading Company

PhotonStarLED (EcoStar)

PhotonStarLED (SmartNemesis)

Zehnder

Refurbishment Project (Sponsored by Vaillant)

AECOM, National Audit Office

Arup Scotland, Scotstoun House

BDP, Carrolls Building

Ernest Griffiths, Elizabeth II Court

Hoare Lea, Highbury Square

John Thompson & Partners, 23-25 Great Sutton St

Metropolitan Housing Trust, Victorian Properties Project

Training for Building Performance (Sponsored by SummitSkills)

ABS Consulting

Alumet Systems UK

CCL Consulting

Crown House

Technologies

TACE

using training and development to further the use of low carbon and sustainable technologies in their business, whichever part of the sector supply chain it operates in. This outcome can be demonstrated in terms of design, construction, commissioning or operation.

The value of integrated teams in achieving outstanding building projects is widely recognised in the industry. The **Integrated Project Team Award** rewards examples of teams that demonstrate outstanding project outcomes on one or more new build or refurbishment projects.

The two awards to **Clients** – one for large clients, the other for public sector organisations – recognise outstanding client-led initiatives to improve the performance of existing buildings, as well as gauging user feedback on the changes made.

The Building Services Consultancy of the Year Award, which is open to both large and smaller companies, will recognise the firm that demonstrates best overall performance in designing and delivering aspirational and sustainable buildings. The winner will have to show that they can work

successfully as a key and integral part of project teams that have delivered new/refurbished buildings that operate to the highest standards of low carbon performance.

Two awards recognise manufacturers and their innovative sustainable products. The **Energy Using Product Award** is aimed at building services products that use delivered energy themselves, for example in the delivery of heating or ventilation. The **Passive (energy related) Product of the Year**, by contrast, will be won by a product that doesn't directly use delivered energy, but which may generate energy itself or reduce energy demand – for example, solar heating or control systems or heat recovery units. Innovation in design/technology and evidence of performance will be key factors for both awards.

The awards night, on 9 February, once again promises to showcase the best advancements and achievements in low carbon performance across the supply chain. To book your table at the event, visit www.cibseawards.org or call 020 7324 2764. ●

The judges

Jon Ashford, Sainsbury's



Jon is head of energy and sustainability at Sainsbury's. He is also a member of the policy committee at the UK Green Building Council.

Paddy Conaghan, Hoare Lea



Paddy is a former senior partner and now consultant with Hoare Lea.

Hywel Davies, CIBSE



Hywel is technical director with responsibility for technical development of CIBSE's publications, guidance, and policy for engineers.

David Frise, HVCA



David is head of sustainability at the Heating and Ventilating Contractors' Association.

Bill Gething, consultant



Bill is an independent architecture and sustainability consultant, having been a long-standing partner at Feilden Clegg Bradley Studios.

Doug King, King Shaw Associates



Doug is founder of consulting engineers King Shaw Associates and a Visiting Professor at Bath University.

Rob Manning, CIBSE



Rob is president of CIBSE and a director of AECOM, where he heads up the company's healthcare sector.

Alan Tulla, SLL



Alan is the current president of the Society of Light and Lighting (SLL). He currently holds the SLL Diploma in Lighting.

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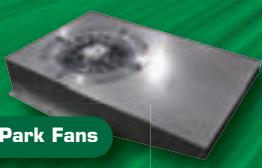
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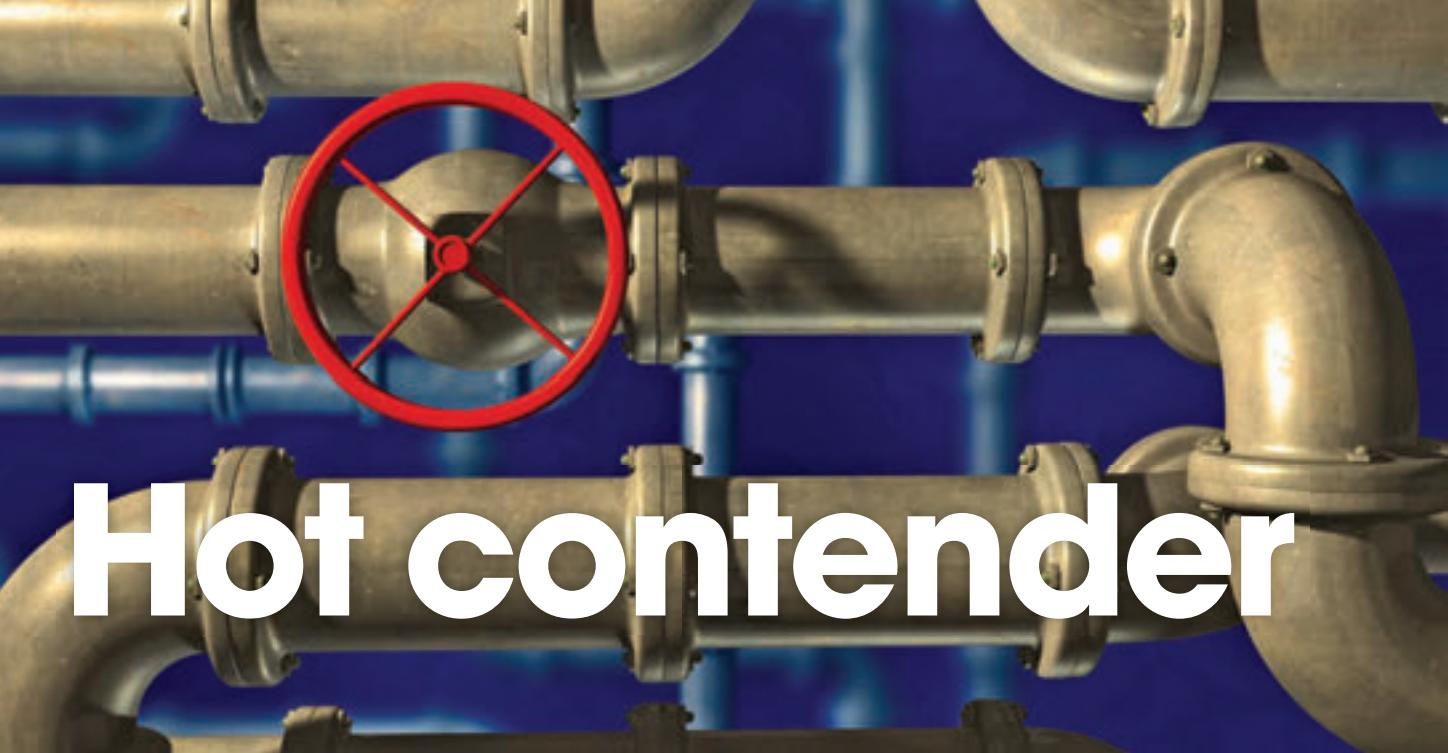
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Hot contender

Engineers should never forget to think outside the box, says Grzegorz Jaroszewicz, this year's Society of Public Health Engineers (SoPHE) Young Engineer of the Year award winner. He talks to **Carina Bailey**

You could say engineering is in Grzegorz Jaroszewicz's blood. The 27-year-old, who moved to the UK from Poland in 2008 when he joined Arup, is from a family of engineers. 'It seemed a natural decision for me. I decided to study environmental engineering after being slightly influenced by my oldest brother, who is a structural engineer!'

Jaroszewicz, known as Greg to friends, impressed the judges of this year's SoPHE Young Engineer of the Year Award with his entry. This year's awards theme was Innovation in Public Health Engineering. In the past he has also won the award as part of a team.

Now based at consulting engineer Hoare Lea's Bristol office, Jaroszewicz wins a trip to New York and a visit the Niagara Falls for his winning entry on saving energy in the production of hot water by reclaiming heat from grey water.

He says he is very proud of his achievement, which he says helped him to learn valuable lessons in engineering: 'Taking part in SoPHE YEA was, for me,

the best way to enjoy engineering, and discover that nothing is ever finished – there is always something that can be done better. It was pure outside-the-box thinking, something which all engineers should always remember to do.'

He adds: 'These competitions inspired me to push the boundaries of engineering, continue my research and look more critically at rigorous design schemes and other peoples' designing habits, because if something was designed in a certain way and it worked okay, it does not mean that we cannot do better in the future.'

Each award entry was judged on the quality of the proposal, its fitness for purpose, originality, potential benefit to the community and practical application. Ian Fellingham, who is chairman of the SoPHE education group and responsible for running the SoPHE YEA award, says: 'The research material presented [by Jaroszewicz] was convincing, and it was felt he demonstrated how this innovation could potentially reduce the energy consumption necessary in hot water systems in both domestic and commercial markets.'

To take part, entrants had to make an initial submission using only one single A3 sheet to convey their ideas in a conceptual form. These were then reviewed and the best entries invited to further develop their concept, for presentation in front of a judging panel.

Jaroszewicz's project, *Heat recovery unit from hot waste water*, concentrated on decreasing the amount of energy needed for hot water by preheating incoming cold water on its way to the hot water cylinder using the hot wastewater from sanitary appliances.

'The proposed heat recovery system is in principle very simple,' Jaroszewicz explains. 'Hot waste water collects in drains and flows to the wastewater

The Society of Public Health Engineers

The CIBSE Society of Public Health Engineers (SoPHE) was set up to provide a higher profile and focus for public health engineering, and a route to gaining professional status.

SoPHE aims to promote the art, science and practice of public health engineering, along with raising the awareness of the contribution engineers make to this sector. Through organised technical talks, evening events and newsletters, members are kept informed of specific developments and relevant updates on legislation, as well as having the opportunity to network with colleagues. Through the society, members are able to input into CIBSE publications and government consultations.

To find out more about joining, visit www.cibse.org/sophe

attenuation tank. Then, the hot wastewater flows through a heat exchanger.

'The heat reclaimed from the hot waste water is then transferred to the incoming cold water on its way to the hot water cylinder.'

'Additional benefits can be achieved by a grey water recycling facility, as grey waste water is already separated from foul water.'

Reducing energy from building services was a key driver for Jaroszewicz in his project, and he felt that nothing like this had ever been attempted before. 'Since buildings are better insulated, energy consumption for space heating has been drastically reduced. On the other hand, hot water consumption has been increasing annually.'

'The usual measures for reducing energy consumption are renewable energy sources, but their installation costs and payback period might put off possible customers. And up till now nothing has been done to reclaim the energy used for hot-water generation. That is why I decided to focus on one of the biggest energy eaters in our homes: hot-water generation.'

'I believe that installing a heat recovery unit may result in 50% savings on the energy consumption for hot water generation, cut CO₂ emissions, and end-users will have to pay just half of the energy bill. This would make it one of the most profitable investments

that can be made in the field of energy savings and people could not afford not to use it.'

Jaroszewicz's interest in the competition was first ignited in 2009 when he entered the award as part of a group with his Arup colleagues at the time. This year, he was no less enthusiastic. 'When I finally saw what the challenge was, I immediately started intense research. I must admit that it was extremely motivating for my day-to-day job, and I found that the more time I was spending on this project, the more satisfying it was.'

The most challenging part of the entry process, he says, was trying to cram all his ideas onto one A3 sheet of paper.

Jaroszewicz has a history of winning. He studied at the University of Life Science and Technology in Bydgoszcz, Poland, and received an MSc in engineering, specialising in building services. In 2007, at university, he was named Best Graduate of the Year, and he came third in the Best Thesis of the Year.

He is now a member of two professional engineering bodies, becoming a chartered engineer with the Polish Chamber of Engineers and a member of CIBSE in 2009. A few months later he was registered as a chartered engineer with the Engineering Council. His ambitions for the future, he says, include working on 'challenging projects, to keep learning and continue my research and broaden my knowledge on sustainability'. ●



"If something was designed in a certain way and it worked okay, it does not mean that we cannot do better in the future" – Grzegorz Jaroszewicz



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Letters

Centres of excellence have different faces

I welcome CIBSE's positive response to the publication of *Engineering a Low Carbon Built Environment* as outlined by Stephen Matthews in last month's CIBSE News ('We are meeting future challenges', page 18). The substantial funding to support two further visiting professors of building physics can only have a positive impact on our industry and the education of our future recruits. I am also grateful that CIBSE is supporting the present work to establish the economic case for centres of excellence to act as focuses for knowledge, teaching and research in the field.

Unfortunately, the diagram published with the article could lead to the belief that the centres of excellence are *fait accompli*, as many will recognise that it represents Bath University. I would like to assure colleagues at other universities, particularly those presently contributing to the design for the centres, that this is not the case. Developing the model for centres of excellence is ongoing work, based on the experiences and capabilities of a number of different universities, not just Bath. My apologies for the error.

Doug King FInstP FCIBSE

We are natural collaborators

In the article 'Professional engagement', it was suggested that different engineering professionals be encouraged to develop interdisciplinary and collaborative skills in order to be innovative (November *Journal*, page 35). Typically, a building services engineer will have a common building services education and then, at some point, decide to opt for mechanical, electrical, controls or some other speciality. By contrast, engineers in heavier industries such as oil and gas, petrochem and power generation specialise more, which makes interdisciplinary and collaborative skills more difficult to develop.

Some of the best engineering and project managers in these heavier industries have building services backgrounds. These people are often regarded as a little suspicious because they are not dyed-in-the-wool piping or process engineers, but what they do have is neutrality and, most importantly, a knack for understanding the needs of every discipline in the team, to get the project moving. So,

there is certainly something to be said for building services engineering training.

Bill Lenehan, Hamburg

Rewarding future in engineering

I read the *Journal* article 'Unequal start' with great interest (November *Journal*, page 28). To gain entry into one of the engineering professions, young people need to study the basic subjects for A Level (or equivalent). To that end, the Society of Professional Engineers has launched its charitable arm

my own 60 years of working life. So, let us do what we can to encourage young people into the undoubtedly rewarding world of engineering.

David G Parratt JP, LLB, FRICS, FCIArb, DipICArb, FBEng, FSPE, PEng, MAE, MSLL

Unified voice for the profession

Further to the letters from Ian Brown (September) and Andrew Ramsay (October), which highlighted the question of national leadership in the engineering professions, it

may be of interest for readers to know that in recent years the professional engineering community has been working together to present a unified voice to the UK government and the devolved assemblies.

To my knowledge there are currently two such bodies. The first, Engineering the Future, is a broad alliance of engineering institutions and associated bodies, including the Engineering Council, EngineeringUK and the Royal Academy of Engineering, which work together to present engineering policy to government.

The second body, Education for Engineering (E4E), which I chair, acts to provide a single, coherent voice from the profession on education and skills. We have representation from all 36 engineering institutions and work together to influence the government's education and skills policy to improve the supply of engineers and technicians for the future needs of the country and to support our economic recovery.

The full E4E briefing can be found at www.educationforengineering.org.uk/e4e-briefing.pdf

Doug Oughton FREng HonFCIBSE
Consultant, AECOM



called Exciting Engineering. The object of this charity is to encourage young people to plan early enough for a satisfying life-long career. It is hoped that, through publicity and talks to schools and careers conventions, young people of both sexes can be persuaded to study the 'hard' subjects of mathematics and science.

When I was failing in maths at school, those who encouraged me to try harder have earned my immeasurable gratitude because my ultimate success has led me to a lifetime of satisfying work. My father, who was a senior local government officer, came home from work one day and said: 'I've had a wonderful day today: I've done some civil engineering.' I have never forgotten that comment and I have found it to be true in

CIBSE Journal welcomes article proposals from any reader, wherever you are – whether it be letters, longer opinion pieces, news stories, people or events listings, humorous items, or any ideas for possible articles.

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Getting real on 'zero'

New homes continue to be built to 'low carbon' standards but, asks **Malcolm Bell**, how do we know if they are anywhere near this definition without ongoing performance testing?

In 2006 the UK government took the bold step of declaring that the UK could achieve zero carbon new housing within 10 years, and this was enthusiastically embraced (at least in public) by leaders in the house building industry. Four years on, the definition of 'zero carbon' is still under discussion. Meanwhile a number of supposedly low and zero carbon developments are under construction – but the extent to which their design claims will be supported by good performance data remains alarmingly unclear.

Indeed, if our recent research is anything to go by, such 'zero carbon' housing may turn out to be anything but. Detailed monitoring carried out in the last five years on two new housing developments, Stamford Brook in Cheshire and Elm Tree Mews in York, tell similar stories of a serious shortfall in the performance of both fabric and services.

Trials at the two developments – both of which were conducted by my research group at Leeds Metropolitan University – showed fabric heat loss to be 50% to 100% higher than intended at design stage. The system efficiencies of the properties were also well below those assumed in the modelling. Monitoring at Stamford Brook suggested a gap of around 25% between designed and actual carbon emissions. At Elm Tree Mews the gap was about 80%.

These results are echoed by other studies. In the last five years we have measured heat loss from almost 20 dwellings. Not one performed as designed. The worst performer was 120% higher than predicted; the best just over 10% higher. The average was about 60%.

These numbers are very disturbing – and do not bode well for meeting the UK's carbon targets. While recognition of the problem does seem to be increasing within government, the industry and the Zero Carbon Hub – the advisory body that is working on a definition of 'zero carbon' – action remains sluggish. (Almost three years on, I am still waiting for the government to publish the Stamford Brook report!)

Where do the underlying problems lie, and what should be done to tackle them? The forensic analysis undertaken at Elm Tree Mews and Stamford Brook sheds light on these questions. We found that design

is not undertaken at the right level of detail, detailed calculation seems to be avoided, and there is little understanding of as-constructed performance of whole systems or the tolerances involved.

In addition, construction planning does not include detailed work sequencing such that one operation does not hinder another and reduce performance. Commissioning of services does not involve stringent performance measurement of all aspects of the system. Residents are often left bewildered by controls – as are professionals, too, sometimes! The performance claims made by the supply chain rarely take into account the real conditions in which products are applied.

The solutions to all these hindrances lie in building an effective feedback system based on well-run and independently verified performance measurement regimes. Without feedback there is no learning and no improvement.

The design and construction team at Elm Tree Mews had a very difficult job when faced with no data or guidance on the real performance of the fabric and services systems they were working with. They did the best that could be done and their pioneering efforts should be applauded.

The feedback that can be provided by schemes such as Elm Tree Mews needs to be repeated so that we learn what level of as-constructed performance is possible, what process control is required to ensure robust performance, and what approach to measurement and monitoring will ensure that the gap is closed and kept closed.

What is required is nothing short of a re-tooling of the industry and its processes, led by good feedback: while the government can make substantial improvements to regulation and the building control regime, this will not work unless everyone in the industry, including its academics, takes responsibility for ensuring compliance. ●

Malcolm Bell is Downing Professor of Surveying and Sustainable Housing, Centre for the Built Environment, Leeds Metropolitan University



66
What is required
is nothing short
of a re-tooling of the
industry and its
processes
99

All change for the regs

A new consolidated set of building regulations for England and Wales was published in September. **Hywel Davies** discusses what this means for building services engineers



The last few months have seen significant changes to the Building Regulations, not least the latest revisions to Part L. While these are not on the scale of the 2006 revisions, there is plenty of detail under the surface. It is important to remember that Part L – which is legally binding – is just a few paragraphs. It states that ‘reasonable provision shall be made for the conservation of fuel and power’ and that ‘Fixed Building Services [shall be] energy efficient [and] have effective controls’.

The four new Approved Documents – ADL1A&B for new homes and work to existing homes, and ADL2A&B for other new buildings and existing buildings – are accompanied by two new compliance guides for domestic and non-domestic building services. Much of the detailed guidance relating to specific ‘fixed building services’ systems (the lighting, hot water, heating and cooling and ventilation systems) is now in the compliance guides rather than the Approved Documents (ADs).

The ADs and compliance guides are officially sanctioned to provide guidance on how to comply with the Part L requirements, and they explain what ‘reasonable provision’ could look like. But they are not prescriptive, except where they quote the regulations, and each document makes it clear that there is freedom to make reasonable provision in other ways, as long as the Building Control Officer accepts the alternative solution.

In September this year the 2010 edition of the Building Regulations was laid in parliament, thereby consolidating the last 10 years of change and revision into one ordered set of rules. They now contain 54 specific regulations, covering control of building works, notices, plans and certificates, supervision and self-certification, energy and water efficiency requirements, information provision, testing and commissioning, and transitional provisions.

The first thing to note is that when you take the 2010 Approved Documents and compare them to the 2010 Building Regulations, the regulation numbers do not match! The ADs were produced to provide guidance on the 2000 Building Reg, and subsequent amendments.

So, for example, those used to doing carbon emissions

calculations to comply with Regulation 17C now need to turn to Regulation 26. Energy performance certificates, formerly required by Regulation 17E, are now in Regulation 29. Regulation 20C, covering commissioning, has gone to Regulation 44.

And one item has moved from being Requirement L1(c) in Part L to being a regulation in its own right

– Regulation 40:

‘information about use of fuel and power’. So the requirement to provide a building log book is now a regulation in its own right. The regulations most relevant to electrical suppliers and installers are: those addressing commissioning, which is a requirement of regulation 25 for all fixed building services;

and information about use of fuel and power, which is covered by regulation 40. Regulation 17, which covers the issue of completion certificates by building control, may also be relevant where electrical installation is the sole or main work undertaken. Regulation 13 covers the requirements to deposit information with plans when they are submitted to building control.

Another detailed consequence of the new regulations is a series of consequential amendments to the Energy Performance of Buildings Regulations – to align the cross-references in these to the new Building Regulations. It really serves to demonstrate the logic and scope to streamline the various regulations for energy performance of our buildings by pulling the two sets of regulations together into one single, coordinated set of rules.

It may be asking too much, but if UK government ministers are serious about reducing red tape and regulatory burdens, then combining these two sets of regulations would certainly make everyone’s life – not least in building services – a whole lot easier. ●

Hywel Davies is technical director of CIBSE



Combining the two sets of regulations in 2013 would make everyone's life – not least in building services – a whole lot easier



WEBLINKS

- Planning Portal, for all Approved Documents...
www.planningportal.gov.uk/buildingregulations/approveddocuments/
- The page that has links to the Building Act, Sustainable and Secure Buildings Act, Building Regulations 2010
www.planningportal.gov.uk/buildingregulations/buildingpolicyandlegislation/currentlegislation/
- The front page for the Building Regulations area of Planning Portal:
www.planningportal.gov.uk/buildingregulations/
- Building Regulations 2010
www.legislation.gov.uk/uksi/2010/2214/made

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Space invaders



The global recession may have delayed construction of some of the world's most ambitious skyscrapers, but new projects continue to soar ever higher. **Mark Jansen** looks at some key challenges these structures pose for specifiers of services

London's skyline has been transformed by the tall buildings that have shot up in and around the City. Notable examples are the cone-shaped 'Gherkin', behind which looms the much older Tower 42 (formerly the NatWest Tower). Left of these is an artist's impression of the even-taller 47-storey Leadenhall Building, yet to begin construction



Super-tall buildings provide building services engineers with the luxury of plenty of room to play with when specifying installations, right? Wrong. A recurring challenge for design professionals working on these structures is that, paradoxically, as they rise higher, so the services tend to demand a bigger share of the available space. And this outcome, not surprisingly, is resisted by developers wanting to maximise the amount of lettable area.

The net-to-gross space ratio in a tall building is usually just 60% to 70% compared with 80% for low-rise

developments, according to Bernard Antieul, regional director at consulting engineer hurleypalmerflatt. Tall buildings need a large core to house the multiple lifts, toilet pipework, heating and chilled water pipework, ventilation ducts, escape staircases and electrical equipment used by the occupants.

Services engineers are usually brought in at the start of design work and are under constant pressure to pare back the space they take up. 'Each time you have a new building layout, you have to go back to square one and redesign those cores, and on a tall building you could >

The proposed Leadenhall Building is to provide sky-high office space in the City of London. Work on the development is due to begin next summer



> easily do that 25 or 30 times,' adds Antieul, whose CV includes work on Land Securities' 38-storey 'Walkie Talkie' at 20 Fenchurch Street in the City of London, and Riverside South, the new headquarters building for JP Morgan at Canary Wharf, which will boast towers of 45 and 37 storeys respectively. The downturn has meant that both projects are delayed, although the design work on each is well advanced.

“Solar photovoltaic cells, with their long payback periods, are expensive. Solar thermal may produce some hot water, but the real energy need in tall buildings is for cooling”

Pump it up

The challenge of getting water for sanitation and ventilation systems to the top of a tall building is dealt with by having a series of pumps and valves at intermediate stages along its height. This avoids the need for massive pumping power and pipe thicknesses to deal with enormous water pressures at the base of the column.

However, this process also creates a new space demand, as does the need to have several electricity substations dotted around a tall building, as opposed to a single sub-station in the basement, which would suffice for a low-rise. The result is more plant floors.

Antieul points out that plant floors can require greater floor-to-ceiling heights than is typical for other floors and this irregularity must somehow be incorporated into the external look of the building, rather than crudely concealed with some louvre shading.

In addition to pumps, plate heat exchangers are also placed at intervals up the building to break the pressure in the water column while transferring warmth. However, as Arup associate director James Thonger notes, several degrees may be lost each time the warmth is passed through an exchanger. The solution may be to use bigger exchangers, but this comes at an extra cost, requiring a fresh cost-benefit analysis. There is also a trade-off between the number of pressure breaks that may be desirable and the space they take up.

Building services engineers must compensate for the thermal expansion and contraction of pipework on tall buildings, because the movements become much more significant. Pipework is broken into sections and independently supported at the top, middle and bottom.

Flexible joints resembling a concertina are one way to absorb the movements; another is to fit short horizontal sections, forming a series of right-angled bends, along the vertical length of the pipe, although this takes up more space. Thonger points out that wind-induced movement of a tall building can interfere with the lifts and a great deal of design and calculation work goes into limiting it.

A 500mm riser in a 50-storey building will easily weigh 40 tonnes, so serious thought must go into how it will be supported. The decision will affect the

construction sequence. If a riser is suspended from the top of the building core, there is less need to reinforce the base and there could be big savings in weight and stress on the structure.

However, the advantage of supporting it from the base is that the building contractor can begin installing pipework at the same time as erecting the core, rather than wait for the core to be completed. 'We have to

"All design thinking is going to have to change. The standard office specification is going to look very different in 10 years' time"

weigh one up against the other; it's a very significant question,' says Nigel Clark, technical director at Hilson Moran, which is advising on 288-metre Pinnacle in the City of London, currently under construction, as well as the 67-storey Tameer Towers in Dubai, also under construction.

Renewable limits

Antieul says it is difficult to incorporate low-carbon features into a tall building. Solar photovoltaic cells, with their long payback periods, are expensive. Solar thermal may produce some hot water, but the real energy need in tall buildings is for cooling. The opportunities for ground-source cooling are limited by the small footprint of the building and, typically, its urban location. Open-source cooling using cold water drawn up from an aquifer is also limited, because the small footprint of the building means that lukewarm water will soon be drawn back into the system.

Plans for the 150m tall Strata residential tower at Elephant & Castle in south London feature three 9m wind turbines built into the top, which the developers Brookfield Europe have claimed will provide 8% of its electricity needs. Antieul says this may well be possible, but believes turbines are unsuitable for commercial towers because they consume much more power than residential towers – as much as 15MW. Even a 60-metre turbine can only generate a maximum of 750kw, he argues.

Office computers create a large cooling load for tall buildings; this load can only be reliably met by mechanical ventilation, Antieul says. High wind speeds and 'deep' floorplates mean that designers (and tenants) tend to reject natural ventilation for such structures.

Natural option

However, natural ventilation is being offered as an option to potential tenants of The Pinnacle in the City of London, due for completion in 2012. Hilson Moran's sustainability director, Matt Kitson, says tenants who take up the offer will be able to cut their energy consumption by around 5%.

The Pinnacle features a single-glazed outer skin and a double-glazed inner skin, with solar shading in between.

External air circulates between the inner and outer skin to help cool the building. The outer skin also acts as a brake on the external wind speed, which helps to make natural ventilation viable.

A mixture of mechanical and natural ventilation will be offered from floors 12 to 50, after which the external wind speed becomes too high. The lower floors are sealed because of the wind turbulence caused by surrounding buildings, noise and pollution at street level. At the higher levels, the building management system will ensure that the mechanical heating and cooling systems are turned off when the windows are open.

The viability of natural ventilation depends partly on having the correct ratio of building width to floor height, which at The Pinnacle is a useful five to one, Kitson says. The building's orientation is also well suited to London's predominantly south-by-south-west and north-east winds. Kitson is convinced that mixed-mode ventilation has a big future, not least because of tightening environmental legislation. 'All design thinking is going to have to change. The standard office specification is going to look very different in 10 years' time.'

Logistical test

Antieul says there can be competition for space at the very top of a tall building. Engineers may want the roof for cooling towers, air handling plants, electricity substations and transformers, while the developer wants >

A depiction of the Shard, currently under construction near London Bridge station in the capital, presented a challenge to its lift designers (see next page)



> a restaurant or public viewing gallery. If the gallery or restaurant wins, the engineer may be forced to conceal the plant at some mid-point inside the tower, where it takes up more space and has to suck air in from outside and expel it again, using more energy.

Tall buildings also present a serious logistical problem when plant needs to be replaced. How do you move the old plant out and the new plant in when the plant room is 30 storeys up in the air? The goods lift may not be big enough and a mobile crane may be unable to reach the higher floors. The issue must be considered at design stage, yet Kitson says it is frequently overlooked in the Middle East: 'In probably half the high-rise buildings [there], you can see they haven't thought about the plant replacement strategy. When you go around some of these buildings you think, "I wonder how they're going to get that out of there when it breaks down?".'

Antieul says the solution often amounts to bringing a small crane into the building in pieces, using the goods lift, then assembling it on the roof. The small crane is used to hoist a larger crane onto the roof, which in turn lowers the redundant plant to street level and lifts the new plant in. The services engineers must ensure at the building design stage that the spot where the crane will be erected can take the likely loads. Space also has to be left to enable transformers, for example, to be moved through doors and along corridors, should they need replacing. 'You can end up with what looks like wasted space, but actually, it's not,' says Antieul.

Clark at Hilson Moran argues that such strategies can be expensive and says there are alternatives, such as running a goods lift at slower than normal speed, to increase its weight-bearing capacity. 'We've done most of our tall buildings entirely with goods lifts,' he says. ●

Elevator strategy has its ups and downs

Designing lifts for a tall buildings is complex and time-consuming. Lift design firm Lerch Bates has been working on the 72-storey Shard London Bridge project in central London since 2000: 'It just takes hours and hours of sitting with the architect, working through the core design,' says project director Chris Manning.

The Shard, currently under construction, will have six escalators and 35 lifts to serve a maximum daytime population of 5,855 people. In order to minimise space taken up by lifts in a tall structure, it is highly desirable to locate the bulk of the population in the lower floors. Over half the occupants of the Shard – all office workers – will be located in the first 28 storeys. These floors will be served by nine double-deck lifts, which feature

two lift cars fixed one atop the other, travelling up and down a single shaft and stopping at two separate floors simultaneously.

Access to the hotel, located on floors 35-52, will be via another two double-deck lifts which take guests from the ground floor straight to reception on floor 35, where they will transfer to a local lift to reach their rooms. The apartments, on floors 55-65, are also served by express lifts from the ground floor.

While there was continual pressure to save space, the lifts must also retain sufficient capacity to meet industry-wide performance criteria, such as being able to transport 15% of the office population within five minutes. 'It's like a battle – the architect is always asking "How much would we save if we cut back this much here", but we can't because we're working to the performance criteria,' says Manning.

One pinch point was Lerch Bates' insistence on a machine room exclusively for its own equipment, which meant other M&E services had to be routed away from it. 'We don't want a hot water engineer coming into the lift machine room – it's a safety issue,' says Manning. 'It took a lot of design coordination to get there.'

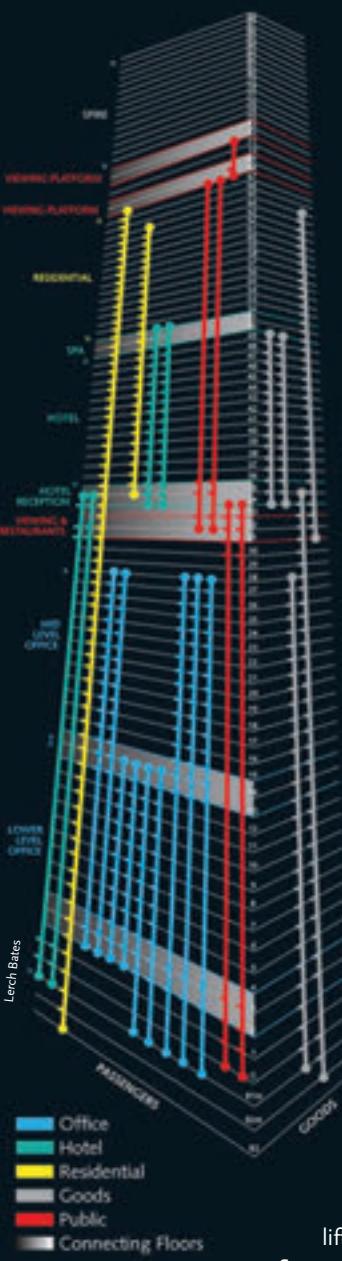
■ We start with the lifts, then the toilet and ventilation strategy, then you usually have to go back and tweak your lift strategy, then someone usually says 'Your net to gross ratio is terrible, you have to do better'

– James Thonger

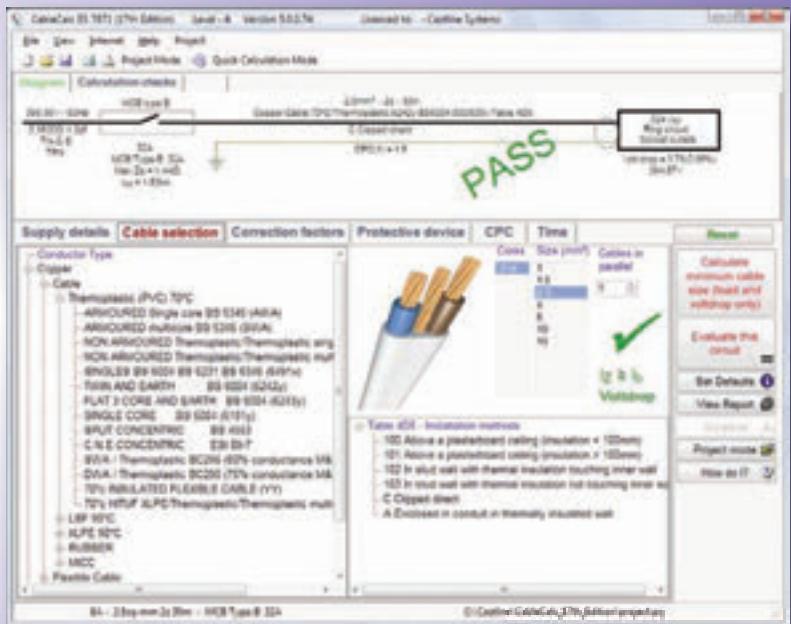
To make best use of space, toilet blocks are frequently sited in the lift lobby on each floor, where there is often room to spare because many of the lobbies conceal lifts that pass through without stopping. The engineer will try to arrange the toilet blocks one directly above the next

from floor to floor, to make the most efficient arrangement of pipework. However, higher up the building, there is less space in the lift lobbies, as more of the lifts are stopping, so the toilets have to be moved to other parts of the floor and the pipework starts to zig-zag.

'You really don't want to do that,' notes James Thonger of Arup. He adds: 'We start with the lifts, then the toilet and ventilation strategy, then you usually have to go back and tweak your lift strategy, then someone usually says "Your net to gross ratio is terrible, you have to do better."



Elevator plan for the
Shard London Bridge

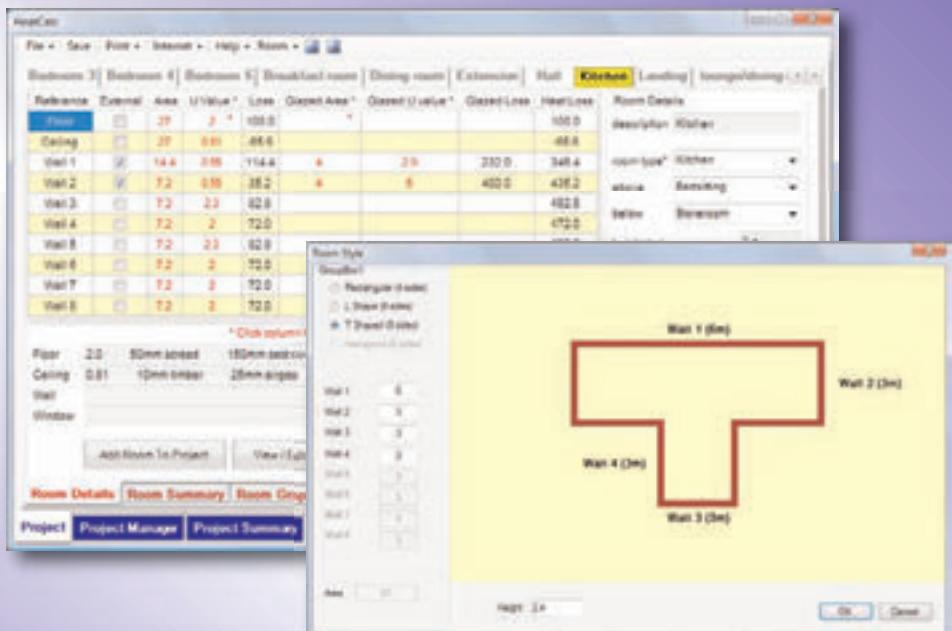


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The tall building of the Commerzbank Headquarters in Frankfurt, featuring its triangular shape and vertical 'villages' of office floors



Up in the air

The natural-ventilation strategy adopted for an office tower development in Germany has shown that it can cut energy consumption. By **Joana Carla Soares Goncalves and Klaus Bode**

A key feature of tall commercial buildings, particularly offices, is their high energy demand. The Frankfurt headquarters of German financial group Commerzbank, completed 12 years ago, has proven that energy savings are possible from applying natural ventilation; almost a decade of monitoring the building's energy consumption has shown how a naturally ventilated tall office building can minimise energy use substantially and offset the

impact of increased occupation density, compared with the standard current European practices.

Tallness is at the heart of the ventilation strategy of the 258m-high mixed-use Commerzbank building, which has 56 floors and a total built area of 100,000 sq m. The tower is divided into four vertical office 'villages' each comprising 12 storeys and three gardens, with one garden lying at each orientation of the triangular floor plate (see figures 1 and 2).

The concept of the vertical villages, with the central atrium surrounded by offices and semi-open spaces – together with the effects of cross-ventilation from the stack effect – underpins the ventilation strategy of the internal zone of offices facing the atria. Each village has openings on the three orientations of the building. Each floor plate is divided into three environmental zones: the external zone facing the external façades; the internal zone facing the atria; and the intermediate zone between the two.

In the external façades, double-glazed windows with internal blinds open directly to the outside, protected by a glass panel wind shield. While the external and internal zones are effective for working stations in cellular offices, the intermediate zone is intended for meetings.

The internal environmental conditions of the Commerzbank building are controlled by a mixed-mode system that enables the offices to be either naturally ventilated or air conditioned, according to external climatic conditions and occupants' requirements. The air conditioning system was designed to guarantee thermal conditions that would not exceed 26°C in summer (overriding natural ventilation when necessary). Windows only shut automatically under conditions of high wind speeds, external temperatures above 25°C and internal temperatures below 17°C.

Occupation changes

Since 2002, given the satisfactory conditions of the microclimate inside the villages, the control of the windows of the internal zones has been left to the occupants, who were used to opening the windows for natural ventilation. With more control over environmental conditions given to the occupants, who were familiarised with naturally ventilated working spaces, there have been occurrences of even higher temperatures in summer than the initial figure of 26°C – showing that the occupants could tolerate slightly higher temperatures than the ones predicted in the design, rather than closing windows and going for the artificial cooling.

In other words, the control of the internal environmental conditions was simplified as the building became increasingly 'manual', resulting in even higher energy savings.

In 2002 the nine weather stations that were originally located in each garden were replaced by a single one at the top of the building, aiming for better accuracy in recording wind data compared with the measurements taken from inside the gardens, and, therefore, achieving more precision in the control of the windows on the three external façades. The change to one weather station again simplified the control of the



internal environmental conditions.

An increase in the number of working stations in 2008, raising the population of the building from 2,400 to just over 2,800 occupants, led to changes in the internal layout of the usable floors, resulting in a partial opening of the cellular office plan into an open-plan space.

The two new zones of the floor plate, combining cellular offices and open plan, safeguarded the natural ventilation strategy, further improving the overall environmental performance of the building with the elimination of the 'middle zone', and enhancing performance towards a fully naturally ventilated tall office building. For this reason, regardless of the extra load of computers and other equipment, the impact of the increase in the population and the change in the layout on control of the internal environmental conditions, involving both lighting and air-conditioning loads, was minimal.

Energy sources

All electrical energy consumed by the building is imported directly from the grid, which means that there is no in-house power generation; energy for all heating requirements (space heating and hot water) is provided from the local district heating network.

For the air conditioning periods on hot days, the majority of normal cooling demand (i.e. normal operation and not standby mode) is met by absorption chillers, also served by the district heating system, with minimal electrical energy used by the chillers and electrical energy demand primarily associated with the chilled water distribution system.

Meanwhile heating of office >

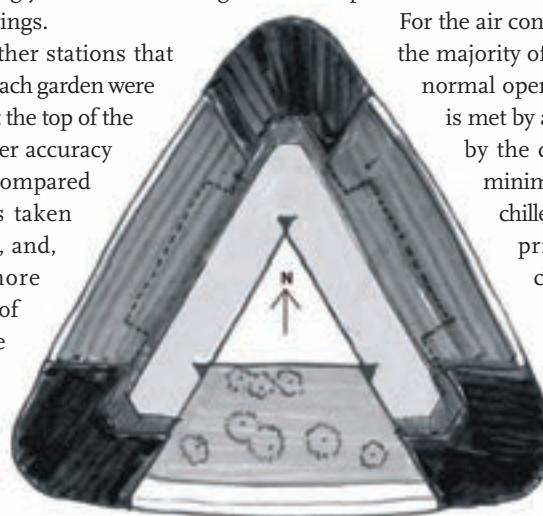


Figure 2: Schematic drawing of the triangular floor plate with the two office wings and one side occupied by the communal space.

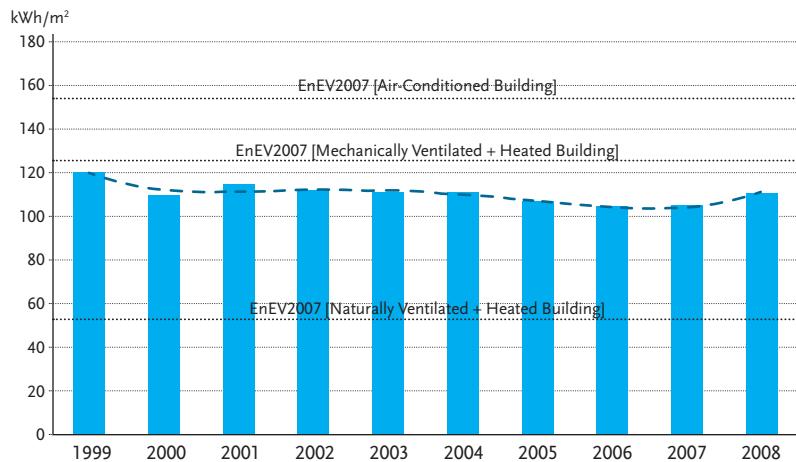


Figure 3: Yearly electrical energy consumption of Commerzbank against German benchmarks (1999 onwards)

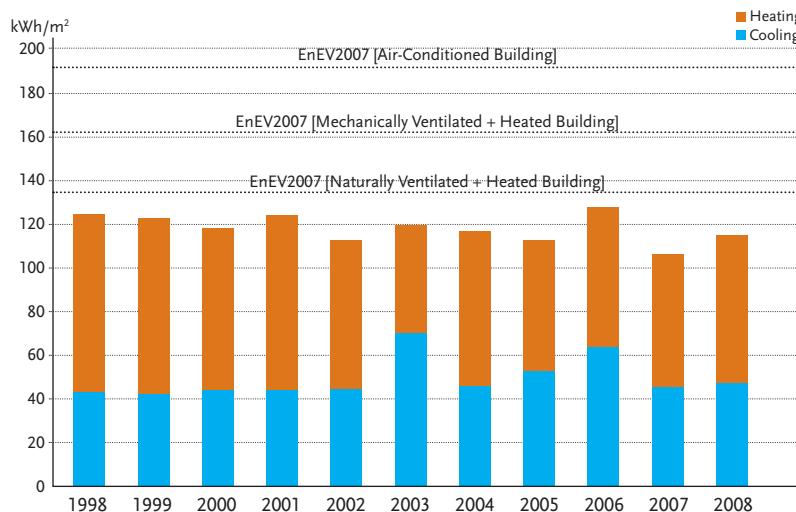


Figure 4: Average yearly energy consumption for heating and cooling Commerzbank, with average figures for 1999 to 2008 compared to German benchmarks

> accommodation is by means of low-level radiators, on the external perimeter of the office floor plate, integrated into the structural enclosure.

The design concept of the building systems for environmental control separated mechanical ventilation from active cooling and heating, aiming for higher rates of energy efficiency. When in air-conditioned mode in summer or winter, the ventilation use for fresh air is distributed to all floors from centrally located air-handling units with heat recovery.

Energy performance

The total annual electrical energy consumption has varied slightly over the last ten years, ranging between 105 and 120 kWh/sq m. It is worth noticing that the annual electrical energy consumption figures are below the national benchmarks (EnEV 2007) of not only equivalent air-conditioned offices (155 kWh/sq m) but also just below the benchmark for offices that are mechanically ventilated and heated (125 kWh/sq m), but not artificially cooled (see figure 3).

The annual thermal energy consumption figures are below all of the national benchmarks (EnEV 2007) for equivalent air-conditioned offices (190 kWh/sq m).

m), which are mechanically ventilated and heated (160 kWh/sq m), but not artificially cooled, as seen in the case of electricity consumption and, surprisingly, even lower than naturally ventilated office buildings (135 kWh/sq m) (see figure 4).

In this scenario of comparative analysis, it is worth noticing that the thermal consumption figures cover both heating and cooling, so the thermal performance for heating alone should be even more impressive when compared with the other references. Nevertheless, such statistics need to be considered in the light of the fact that for substantial periods of the year the building is naturally ventilated, thereby keeping annual cooling demand figures down.

Conclusions

Tall office buildings can be naturally ventilated and height is not necessarily an impediment or a complicating factor in the design of the building. The analysis of the Commerzbank building's energy consumption shows how natural ventilation can reduce energy consumption in such an environment. Moreover, minimising the complexity of controls and

"The control of the internal environmental conditions was simplified as the building became increasingly 'manual', resulting in even higher energy savings"

allowing more freedom of choice to occupants already used to natural ventilation are important factors in this reduction: this suggests that office buildings can be less dependent on sophisticated automation systems.

The Commerzbank building's rearrangement of the office space for the open-plan layout also enhanced the effectiveness of natural ventilation, eliminating the 'internal zone', which used to be mechanically ventilated for the entire period of occupation.

The building has also had an impact on its locality; regarded as an 'environmental/good quality tall building', it has influenced neighbouring tall buildings in the financial centre of Frankfurt to go through a total retrofit of their facades in order to incorporate natural ventilation. The success of natural ventilation is not purely related to the opening of the facades, of course, but it should be acknowledged that this is a positive change in the attitude towards the environmental paradigm of tall office buildings. ●

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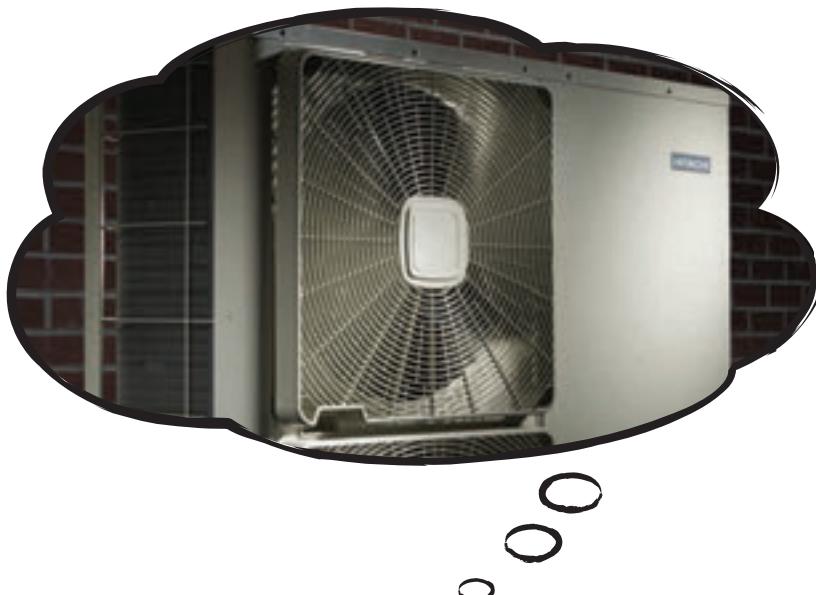


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10 things you should know about replacing pumps

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At Grundfos Pumps we understand the importance of pump replacement, not just because of the energy savings but also because of improved comfort levels and the overall carbon footprint benefits.

Why you should consider a pump replacement?

In the main, it is very rare for anyone to consider switching a pump for any other reason than it has developed a problem that means it has reached the end of its life. Yet there are many other opportunities when to do so would result in better comfort and/or performance levels, improved energy efficiency and therefore reduced emissions. So looking at replacing either individual pumps or whole pumping systems prior to when it's absolutely essential can have a short pay-back period.

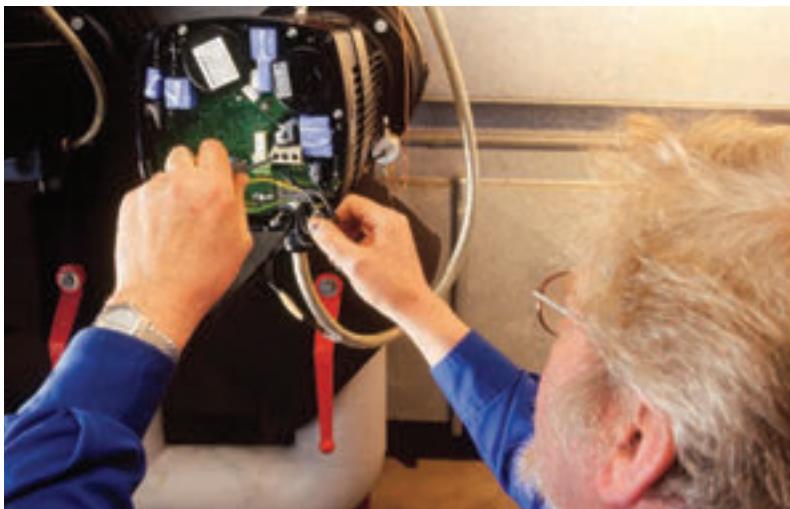
Did you know?

- Pumps currently consume 12% of global electrical power
- Switching to high efficiency motors would save 5% of the total electrical power consumption (equal to the total annual energy consumption of 11 million people)
- 90% of pumps use 60% too much energy
- 85% of LCC costs are attributable to the energy costs in the usage phase

so ensuring that they are as energy efficient as possible offers pay-back on lots of different levels so always **e-place don't replace**.

Like for like?

Pumps in commercial premises require replacement for many reasons. When this happens, it offers the opportunity to review the system and make sure it is delivering the most efficient solution for that particular building against its individual blueprint. Whatever the circumstances, it is worth reassessing the situation as depending on the application there are large financial savings to be made by taking the opportunity to change to a more efficient option.. However, our experience tells us that, for the most part, pumps are directly replaced with a 'like for like' solution, without any extra consideration and this means that the opportunity to optimise on a replacement selection is lost.



Are the pumps correctly sized?

All circulators and booster pump applications were sized for an original duty of flow against a pressure. The first consideration should be, *is the pump suitable for the current duty requirements?* The pump may be over sized and nameplate information may not reflect the original design duty of the current operating duty and hence the replacement duty requirements. A review of the current system requirements will often lead to a more efficient pump selection, with the benefit of reduced energy consumption.

Has the building undergone any change of use?

The building may have changed its configuration and/or main use since it last had an M&E fit-out, or indeed may be about to change its use and these factors can have a major impact on what pumps and pump duty's should be considered. In particular it is important to look at changes that may require additional pumps being added to the requirement. For example any change of use that results in more condensed living may require additional water boosting.

Glanded or Glandless circulators?

Heating and cooling circulator pumps form the majority of the replacement market. The market today favours the use of glandless circulators for heating applications because of their compact nature and low maintenance demands. Glanded mechanical seal style products however are more efficient and can be fitted as direct replacements for glandless circulators in some cases. Where conventional motors are used, these should also be EFF1 or better. Some manufacturers, like Grundfos, do offer these as standard for fixed speed solutions.

Check out variable speed pump options

New pumps offer greater efficiencies than previous generations, but to gain maximum energy and CO₂ benefits variable options should always be considered.

Today's preferred choice for variable volume systems are often permanent magnet circulators as they deliver significant energy savings over older style pumps, such as the Grundfos MAGNA, as they self adjust to the demands of the system.

How important is service access?

For glandless circulators the replacement heads are readily

available and are simple to change. On glanded pumps the two main service items are the motor and the mechanical seal. Today's pump designs facilitate easier replacement of wearing components. The choice of a major manufacturer who is able to provide service for the long term is important, as they will have a wide range of dedicated service kits and replacement motors available.

Can frequency converters be retrofitted into fixed speed systems?

The Grundfos CUE range of wall mounted frequency converters can operate in conjunction with centrifugal pump types in both new and existing application areas in a broad power range. This option means a system can be configured into a fully integrated energy efficient solution – pump, frequency converter, controller and sensor all perfectly matched to meet specific pump installation needs

When to exchange the pumps?

Ideally pump replacement timings should be planned, for example replacing heating stock in the summer months. However, emergencies do occur and then it is important to ensure you are getting the best longer-term solution but with readily available stock. This is where reputable pump manufacturer like Grundfos will be able to advise and assist with the best technical solution and supply this from a comprehensive UK stock-holding held with selected distribution partners.

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Damage limitation

Failures in pipe and valve fittings can cause major problems for clients – an issue that the UK contractors' association has investigated. Andrew Brister looks at the issues



Vitalic

Most pipe fittings, such as this one, are successful, but failures can occur

Pipework, pumps and valves aren't as sexy as photovoltaics or wind turbines, but get things wrong here and you could find yourself in deep water – literally. Water damage in buildings is on the increase and wreaks havoc on fixtures and furnishings. Oval, the insurance partner for the Heating and Ventilating Contractors' Association (HVCA), has reported an increase in water damage claims occurring as a result of the failure of pipework fittings. The HVCA is sufficiently concerned about this issue to make such failures the subject of the first of a planned series of Technical Notes to its membership.

'If something is not done to rein in these failures, HVCA members' insurance premiums are bound to rise,' says Russell Mott, technical officer at the HVCA. The association has now included an investigation of the extent to which firms are taking action designed to address the issue in its independent member inspection and assessment procedures.

Some of the problems are attributable to the surge in demand for compression and push fittings that have brought massive savings in costs and installation times on major building services projects. While such innovations are no doubt welcome in the drive to make construction more efficient, any technology has to be >

High-tech pumps can provide added sustainability features

> installed correctly. So what exactly is going wrong? The problem is down to a number of factors.

Unsuitable fittings

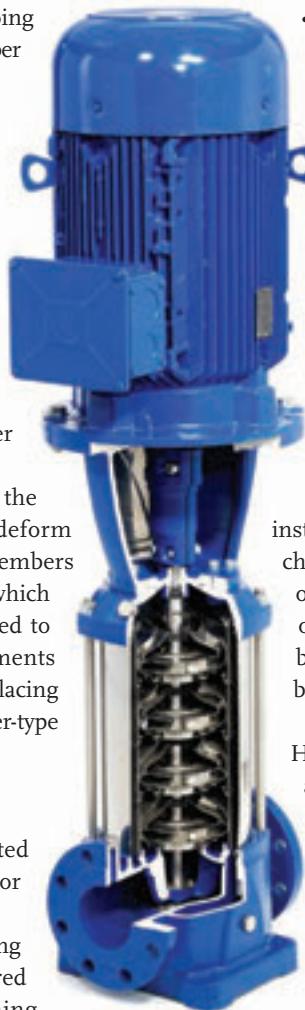
In one case, where a 54mm diameter compression fitting had become detached from the pipework, two factors were at work. Firstly, owing to the size of the fitting, and its inaccessibility, it was difficult to tighten it according to the manufacturer's recommendations and led to deformation of the copper pipe.

Secondly, there was evidence that the supplied brass olives had failed to deform so as to grip the pipe sufficiently. 'Members are advised to review the position in which compression fittings are to be located to ensure the manufacturer's requirements can be adhered to, and to consider replacing brass olives with soft (annealed) copper-type fittings,' advises Mott.

Improper installation

A number of failures can be attributed to a lack of care during installation. For example, cases have been reported of:

- Solder-ring and end-feed fittings being left unheated – and thus not soldered – and heating systems not remaining watertight largely due to the presence of flux;
- Push-fit fittings where the pipe has been insufficiently inserted to make a proper seal, or the pipe is damaged and the grip-ring in the fitting is unable to hold it in position;
- Swaged fittings where the swaging action has not been fully completed; and



• Compression fittings where the pipe is not fully inserted or the cap-nut has not been tightened to the manufacturer's recommendations.

'All of the above can be resolved by ensuring that operatives are fully trained on the range of fittings to be used, and in the operation of any special tools needed,' says Mott.

Of course, such systems have to be put in correctly. 'Any pipe jointing system is only as good as the engineer installing it,' says Andy Carter, product engineer at Victaulic. 'You need to know what you are doing.'

Victaulic offers free training on how to install its products correctly and visits sites to check that all is going smoothly. 'When I'm out troubleshooting, I'd say that 99 times out of 100, any installation problems are because the engineer hasn't been trained by us.'

Durapipe's marketing manager Mitchell Holmes agrees: 'Any shortcuts and you are asking for trouble.' Durapipe also offers free training advice on installation and how to deal with expansion of the plastic with temperature. 'Part of the problem is that there is no training for plastics in apprenticeships,' says Holmes. 'This is something we are addressing with SummitSkills.'

The HVCA's Technical Note argues that specifiers need to understand that any change in the make or type of fitting must be supported by familiarity training. Workers should also be supervised on the job to ensure they are following the correct installation procedures, and that a percentage sample of the work is subject to quality control inspection. >

Underfloor heating goes 'outdoor'

The £5m Tollymore National Outdoor Centre, sited on the edge of Northern Ireland's Mourne Mountains, is a new building designed for Sport Northern Ireland by Consarc Design Group. The centre has almost 1,000 sq m of underfloor heating and 6,000m of hot and cold water supply pipe, supplied by Rehau.

The main building features a roof finished in copper art membrane curved in three dimensions over the entire three storey structure which is supported by glue laminated timber beams. The building comprises meeting areas, training rooms and residential accommodation.

Below this is a lower ground area housing changing rooms, shower facilities



and a rolling pool for canoe training, with underfloor heating and pipework throughout.

According to Rehau, the project has been built with close attention paid to its impact on the environment and includes both a biomass boiler as the heat source for the underfloor heating system, and solar panels to provide heat for the hot water supply, as well as a rainwater recycling system. As a result, it has been awarded a BREEAM Excellent rating.

The pipework used throughout is Rehau's PE-Xa flexible pipe, fitted with the Everloc jointing system comprising a DZR brass internal fitting and a compression sleeve. White underfloor heating was specified for the project by M&E consultant Taylor and Fegan.

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A number of pipe-fitting failures can be attributed to poor installation

> Mains pressure

The third factor relating to water leaks identified by the HVCA was variation in mains water pressures. In particular, a number of HVCA members have highlighted situations where momentary pressure spikes have been recorded, causing fittings to become detached from the pipework.

This phenomenon has been ably demonstrated in a test rig set up by pump and booster set manufacturer Aquatech Pressmain. It applied a three-pump variable speed booster set to a 20m horizontal run of 54mm copper pipework – equivalent to the top seven storeys of a building. It found that compression fittings installed to the manufacturer's instructions failed catastrophically under hydraulic shock.

Hydraulic shock is caused by a rapid change in the velocity of a liquid contained within a pipe for example when water comes up against the top of a riser or a valve is rapidly slammed shut and the flow of water has to stop instantly. The high density of water means that an area of very high pressure is generated. This area of high pressure moves along the pipe as a shock wave, at the speed of sound in water: approximately 1,300m/s.

'Although we measured 62 bar, we know that the actual pressure could be more than double this,'

Valves: Remote commissioning from a PC

The latest breed of valves are making it much easier to reconfigure building services as occupancy rates change, even in cooling systems involving fan coil units or chilled beams.

'With a conventional design, recommissioning a fan coil or chilled beam system involves visiting each valve in the ceiling void, one by one,' explains Martin Lowe, technical manager with Marflow Hydronics.

'As a result, any such changes can prove costly and disruptive for the building owner, often resulting in no changes being made to the systems when the building usage changes. Clearly, this introduces inefficiencies that will lead to wasting energy.'

Marflow has introduced an addressable pressure independent control valve (PICV) which, it claims, has not only made it considerably easier to balance variable flow systems but has also enabled the use of remote commissioning from a PC. This means the valves are no longer difficult to adjust. And such solutions can be retrofitted to existing systems relatively easily.

'Initial commissioning is greatly simplified, as is any subsequent recommissioning,' claims Lowe. 'For example, in a recent project using this concept, a 1,400 fan coil system was commissioned in just four days and the building operator will be able to change the system whenever necessary.'

Lowe is concerned that the industry has been slow to adopt such innovations in the world of valves: 'It does seem strange to me that we embrace new technologies in just about every other walk of life, yet the industry has been slow to take advantage of new valve technology. I know it takes time for new ideas to "bed in", but I would suggest the time is now.'

says David Taylor, chairman at Aquatech Pressmain. 'We know this because we destroyed several 100 bar pressure transducers during testing – according to the manufacturer this takes circa 200 bar.'

Carter is well aware of the effects of hydraulic shock, but maintains that the grooved pipework couplings can withstand this: 'If you take our four inch coupling, then the working pressure may be 10 bar, with a maximum working pressure of around 50 bar. We build in a 3:1 safety factor so the system will support 150 bar easily.'

Aquatech Pressmain says it has developed technology that defends against damage from hydraulic shock: AquaVent and Repress. During booster set restart, the AquaVent automatically controls the air release to provide an air cushion helping to reduce the water velocity. The company claims that the Repress system ensures that the booster set cannot possibly generate any shock conditions by reducing the flow rate during the refilling of the rising main. ●

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Recovery mode



Masterclass

Professor Doug King

This month **Doug King** looks at energy and how to harness its properties

When we describe low-energy architecture and building services we often refer to ‘energy conservation’ to indicate how our worthy creations consume less. This terminology is common parlance; after all, conservation is the antonym of consumption, and so helps non-technical people to understand what we are talking about. Nevertheless, this usage is technically incorrect and I have noticed a worrying trend recently amongst engineers, myself included, referring to energy conservation in technical discussions when actually we mean something different.

Why is this important? Well, it is recognised that certain concepts can only exist once you have language to describe them. Thus, if we misuse terminology, our thinking can be misled and we can miss key aspects of the problems we are trying to solve.

So, what is wrong with the common usage of ‘energy conservation’? It is of course a fundamental law of the universe that *all* energy is conserved. Even when we use energy to do work in our building services systems, the quantum is conserved. How can we therefore conserve the energy further by installing heat recovery or similar systems?

In order to discuss energy utilisation in a meaningful way we must first use the correct terminology; particularly we must understand exergy and entropy in

It is commonly understood that chiller systems reject heat from air conditioning and this can inhibit our thinking about opportunities for energy recovery. We rarely make the conceptual leap that a chiller is exactly the same as a heat pump. In order to maximise the exergy gained from building systems, we need to start considering all systems as combinations of heat sources and sinks.



Doug King

relation to energy (see Figure 1):

- Energy is a quantity that may be understood as the ability to do work. Energy may be transformed, but it cannot be created nor destroyed. It may, however, be so degraded that it can no longer do useful work.
- Exergy is the measure of the work that can be extracted from a system as it changes to a state of equilibrium with its surroundings, or maximum entropy. Exergy is therefore a measure of the ‘free energy’ that is available to be used. It is actually exergy, not energy, which we consume.
- Entropy is a measure of the amount of energy in a system that is *not* available to do work; it is the reciprocal of exergy. Entropy is therefore a measure of disorder, as ordered systems have the ability to do work.

A closed system always tends towards a state of maximum entropy. However, if work is done on a system through the application of an external energy source, entropy can be reduced.

Although developed to describe the characteristics of heat engines in thermodynamics, the principles of exergy and entropy can inform the way that we think about energy conversion in many different systems. For instance, the input of external solar energy to our planetary biosphere maintains order against the natural tendency of biological matter to decay. Photosynthesis in plants processes simple molecules of carbon dioxide and water with solar energy (work) to form more complex carbohydrate molecules, reducing the overall entropy of the biosphere. Without this continuous input of energy, plants die and their substance decays back to a state of high entropy.

However, the input of solar energy, arranging atoms into complex carbohydrates, also creates exergy which can be used if the molecules are broken down again. We use plants as a source of external energy ourselves (food) to prevent the onset of decay in our own bodies. We also use plant matter as a fuel to create heat, consuming its exergy, releasing the carbon dioxide once more, and raising the entropy of the planetary system overall.

Electricity is an extremely valuable form of energy, as it can be converted to numerous other forms and delivers high exergy through the conversion. Nevertheless, nearly all of the conversion processes for electrical energy ultimately result in the energy being dissipated to the environment as heat; heat is in high demand for building services in the UK climate, and we consume astonishing amounts of fuel to create it, despite often being quite careless of it once it has been generated.

Although thermal systems in buildings appear simple compared with biological or electrical systems, we must still be aware of the exergy of heat sources in relation to sinks, in order to make the most efficient use of

energy. This means considering the temperatures of heat sources and sinks compared with the operating temperature ranges for building services (see Figure 2). In order to be of use – or worth recovering – a source of heat must have sufficient exergy to drive heat through the system we want to use it in; otherwise we will have to add energy from an external source. For example, extracting heat from a room at 25°C and sending it back at 20°C, is unlikely to prove effective because the exergy is very low and therefore little heat will be transferred. However, recovering heat from exhaust air to incoming fresh air at 10°C creates a much larger temperature difference between the source and sink, allowing much more exergy to be gained from the system. In other words, a greater quantum of heat is transferred, even though the resulting temperature is lower.

I am often asked why we cannot use heat recovery systems on the exhaust air from stack-effect ventilation. Well, if a building is naturally ventilated by stack effect, then it is the heat in the internal air that is providing the force to drive the ventilation in the first place. When the temperature inside a building is higher than outside, an energy gradient then exists. Given the opportunity, the system will adjust itself to restore a state of equilibrium, and in doing so has the potential to do work; there is exergy available as a result of the temperature difference.

In practical terms, the air inside is less dense than that outside as a result of the temperature difference, and this creates a pressure difference due to buoyancy. If the system is released, the pressure difference causes the mass of air to move through the building. By definition, moving a mass is doing work, and if we constrain the flow appropriately, we can harness this work to provide our required fresh-air ventilation.

Now, if we were to extract heat from the exhaust air, reducing its exergy to near zero relative to the exterior, we would remove its capacity to do work and the ventilation would stall. Warm air contains only a very small amount of exergy, and we must carefully consider the trade-off between heat recovery and beneficial work in ventilating the building.

Finally, if a heat source is close to, or at a lower temperature than the sink, as in a heat pump or chiller, then we must use external energy to do work on the system to transfer energy. The greater the temperature difference between source and sink, the greater the amount of work needed. Since external energy is added to the system, then it must be the case that the system exergy is increased. Thus, it is a criminal waste of exergy to install any refrigeration system, whether a heat pump or air-conditioning, without heat recovery.

When we can all discuss building services in terms of exergy and understand the implications for fuel consumption and increasing entropy, we will have set ourselves well on the road to a low carbon and energy secure future. ●

Doug King is principal of King Shaw Associates and Visiting Professor of Building Physics at Bath University

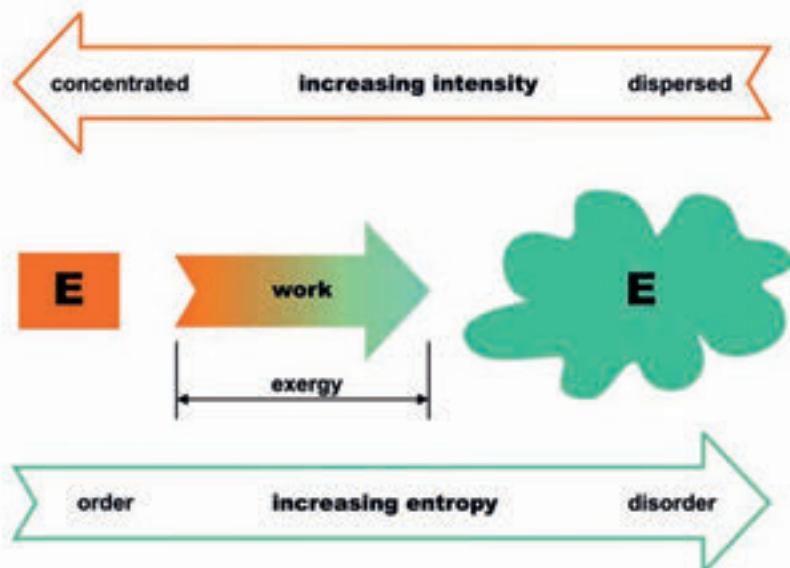
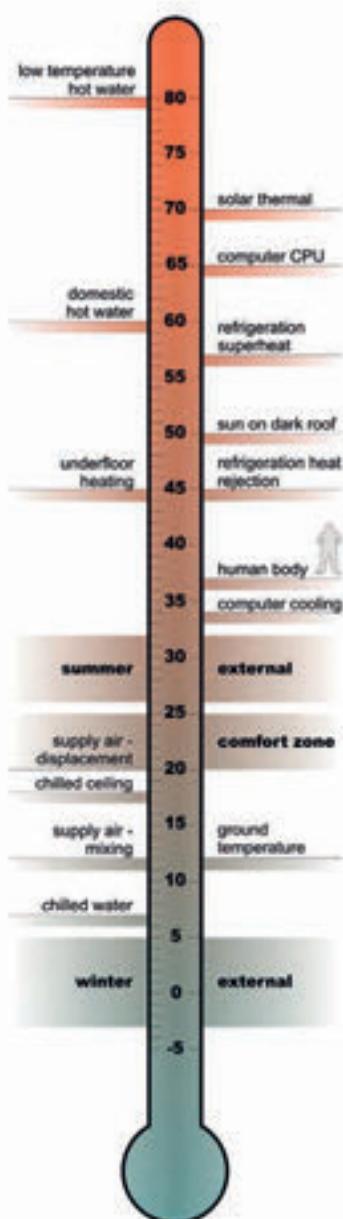


Figure 1: Exergy and entropy are inextricably linked in energy processes. As we use energy to do work, exergy is reduced and entropy increased

Figure 2: The human body and waste heat from electrical devices both have sufficient exergy to heat buildings. However, extracting heat from the outside air in winter using a heat pump requires considerable input of external work. High-grade heat sources such as boilers or solar thermal collectors can be used to heat domestic hot water, but heat recovery or heat pumps cannot do so unaided



It is a criminal waste of exergy to install any refrigeration system, whether a heat pump or air-conditioning, without heat recovery

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Travelling into time with psychrometry

Designers can use computer modelling and weather data to calculate loads across operational periods. But there is also a simpler method for making such assessments – incorporating weather data with a psychrometric chart

The use of computer modelling tools enables designers to evaluate options of building design and plant selections at the press of a button. Modelling software will use weather data as made available to it (such as the CIBSE Test Reference Year^[1]) and will attempt to calculate loads across the operational period.

In many cases the development and input of the underlying data set may be complex, and the incorporation of the air conditioning plant details can be challenging, particularly at early design stages. Alongside the computer model it is often useful to have a simpler method not only to aid understanding of the more complex outputs of the software, but also to provide swift feedback as a check of the overall validity of the model. Through the incorporation of appropriate weather data, a psychrometric chart can provide the tool to undertake such checks. This article will explain how to set this up, and explore some first examples of application.

Frequency-based weather data

As has been illustrated in previous CPDs,

the psychrometric chart is a useful tool to examine the properties and energy flows associated with air processes. However, when evaluating the comparative operation of different possible solutions, it is important not only to take into account the values of the operational psychrometry in design and part load conditions, but also to consider how frequently this might occur. The designer (whether aware of it or not) will already be applying frequency-based weather data when undertaking any building load analysis, even when calculating a simple steady state building heat loss.

Ready-made analysis

When calculating room heating loads using winter design conditions from the CIBSE Guide^[2] the selected external temperature would be based on historic weather data (as well as a knowledge of the building thermal inertia). The underlying data in 'binned' format (in 'bins' or bands of temperature), as shown in Figure 1, provides a basis on which the external design condition may be selected for heat-loss calculations.

So, for example, Figure 1 indicates the mean temperature averaged over 24 hour and 48 hour periods for a particular geographic location collected in 1K 'bins'. So considering the yellow shaded area, the -3C bin – this bin is the sum of historic occurrences of 24 hourly averaged outdoor temperature between -3.5C and -2.5C. Looking at the height of the yellow column, it occurs on the equivalent of just under one daily period per year. But, more importantly, this data or, if available, the numeric data used to create this graph, may be used to see how many 24-hour periods have a hourly averaged temperature below the bin of -3C. Adding up the (24-hour) columns to the left of the -3C column comes to about one occasion (ie one 24-hour period) when the temperature falls below -3C over the average year. According to the guidance in the CIBSE Guide, this would indicate that -3C was a reasonable temperature to use as the external design condition for heat losses (for low thermal inertia or 'lightweight' buildings) – a temperature where it gets colder on just one occasion in a year. When evaluating 'heavyweight' buildings, the >

> design condition is again selected based on this single occasion guidance but this time using the 48-hour data. (This method dates back to an article in the predecessor of this Journal by Jamieson in 1955 – see CIBSE Guide A2 for more detail.)

The effect of the time period used for averaging the temperature observations may clearly be seen by noting that the 48-hour data is far less extreme than the 24-hour data. The actual underlying data (as collected by the weather station) would be based on the same sets of hourly averages data; however, the longer averaging period will moderate out the high and low values. This moderating effect becomes more obvious as the averaging period is lengthened (for example, if a monthly or seasonal average temperature is considered).

So the assessment of outdoor design conditions for simple heat losses can be chosen from a knowledge of the outdoor temperature, with no need for the ‘complexity’ of a psychrometric chart. But these data are limited to just temperature: what if a better understanding is needed of the coincident external moisture content, or indeed some enthalpy data are needed to evaluate plant performance? And when considering mid-season and ‘summer’ building operation, the decisions that will affect the economic viability, selection and sizing of humidifiers, cooling coils and heat recovery devices will

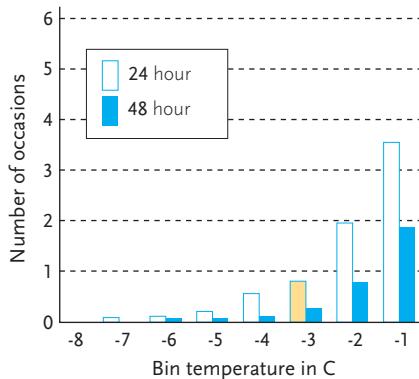


Figure 1: Example of binned average temperatures in occasions per year

depend on the frequency of both dry and wet-bulb temperatures.

Weather data

The historic data are available in tables that include (amongst other things) coincident wet-bulb and dry-bulb temperatures, and are ideally suited to act as a basis for the analysis of design conditions. (To purchase specific historic weather data see the CIBSE Guide J section 11 and the CIBSE web site for sources). CIBSE Guide A2, section 2.4 includes frequency data for summer months (June to September) for eight UK locations.

Figure 2 is indicative of a type of weather data that can be sourced. These were taken from data produced by the Meteorological Office^[3]. Many of the 35 main measuring stations are located in relatively remote areas

(such as airfields) so actual conditions required for building and system evaluation will need to take account of the local microclimate, compared with that of the nearest weather station. There may also be some concerns as to the effect of climate change on future, predicted values based on historic data. The CIBSE Technical Memorandum 34, *Weather Data with Climate Change Scenarios* provides extensive guidance based on a number of predictive models, and includes frequency data for UK summer months that can be compared directly with the current tables in CIBSE Guide A2.

These particular data in Figure 2 have been laid out in terms of the percentage occurrence of coincident pairs of dry-bulb temperature and moisture content. So, to take the yellow highlighted data as an example, over a year it might be expected that the dry bulb temperature of between 10.0°C and 11.9°C (ie a 11.0°C ‘bin’) would happen at the same time as a moisture content of 8.00 to 8.99 kg/kg (a 8.5kg/kg ‘bin’) for 0.78% of the hours in a year (about 68 hours per year).

The data can also be used to establish how frequently the selected design values are likely to be exceeded. In the right-hand column the totals of all the dry bulb/moisture content coincident pairs are given. So, for example, if we were selecting an external dry-bulb (bin) temperature of -3°C, the total frequency of temperature below that bin is 0.24 + 0.06 +

Weather data for example site – collected over 20 years. Hourly averages 0:00 to 24:00 – shown as %

Dry Bulb °C	0.00 to 0.99	1.00 to 1.99	2.00 to 2.99	3.00 to 3.99	4.00 to 4.99	5.00 to 5.99	6.00 to 6.99	7.00 to 7.99	8.00 to 8.99	9.00 to 9.99	10.00 to 10.99	11.00 to 11.99	12.00 to 12.99	13.00 to 13.99	14.00 to 14.99	TOTAL
-16.0 to -14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
-14.0 to -12.1	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
-12.0 to -10.1	0.0	0.01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01
-10.0 to -8.1	0.0	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02
-8.0 to -6.1	0.0	0.02	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.06
-6.0 to -4.1	0.0	0.01	0.23	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.24
-4.0 to -2.1	0.0	0.01	0.69	0.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.82
-2.0 to -0.1	0.0	0.01	0.75	1.45	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.21
0.0 to 1.9	0.0	0.00	0.56	3.65	0.76	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.97
2.0 to 3.9	0.0	0.00	0.35	2.52	4.24	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.15
4.0 to 5.9	0.0	0.01	0.17	1.19	5.00	2.92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.29
6.0 to 7.9	0.0	0.00	0.12	0.62	2.78	6.15	1.61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.28
8.0 to 9.9	0.00	0.00	0.06	0.42	1.28	3.77	5.68	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.21
10.0 to 11.9	0.0	0.0	0.03	0.22	0.73	1.73	3.67	4.67	0.78	0.0	0.0	0.0	0.0	0.0	0.0	11.83
12.0 to 13.9	0.0	0.0	0.00	0.10	0.48	1.04	1.84	3.08	3.58	0.97	0.00	0.0	0.0	0.0	0.0	11.09
14.0 to 15.9	0.0	0.0	0.00	0.04	0.23	0.78	1.16	1.77	2.42	2.68	0.94	0.03	0.0	0.0	0.0	10.05
16.0 to 17.9	0.0	0.0	0.00	0.02	0.15	0.50	0.93	1.31	1.51	1.49	1.49	0.53	0.03	0.0	0.0	7.96
18.0 to 19.9	0.0	0.0	0.00	0.00	0.06	0.30	0.65	0.93	0.94	0.85	0.69	0.39	0.10	0.01	0.0	4.92
20.0 to 21.9	0.0	0.0	0.00	0.00	0.03	0.12	0.34	0.54	0.62	0.63	0.41	0.22	0.08	0.02	0.0	3.01
22.0 to 23.9	0.0	0.0	0.0	0.00	0.01	0.05	0.13	0.30	0.34	0.32	0.24	0.12	0.06	0.02	0.0	1.59
24.0 to 25.9	0.0	0.0	0.0	0.00	0.00	0.02	0.07	0.12	0.16	0.14	0.13	0.08	0.03	0.01	0.0	0.76
26.0 to 27.9	0.0	0.0	0.0	0.00	0.0	0.01	0.03	0.03	0.05	0.07	0.07	0.03	0.01	0.01	0.0	0.31
28.0 to 29.9	0.0	0.0	0.0	0.00	0.0	0.01	0.01	0.02	0.03	0.03	0.02	0.01	0.01	0.00	0.0	0.14
30.0 to 31.9	0.0	0.0	0.0	0.00	0.0	0.0	0.00	0.01	0.02	0.01	0.01	0.01	0.00	0.0	0.0	0.06
32.0 to 33.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.01	0.01	0.00	0.00	0.0	0.0	0.0	0.02
34.0 to 35.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00
36.0 to 37.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TOTAL	0.0	0.1	3.0	10.4	15.8	17.4	16.1	13.8	10.5	7.2	4.0	1.4	0.3	0.1	0.0	100.00

Data is rounded – ‘0.00’ indicates an occurrence less than 0.01%

Figure 2: 24-hour weather data for example UK site

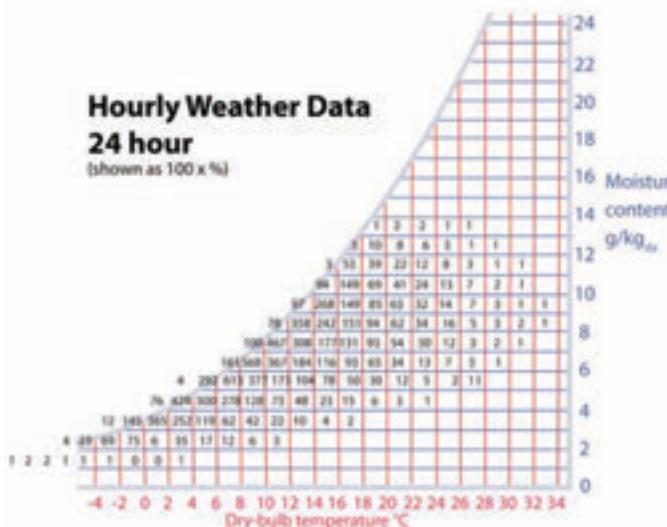


Figure 3: Example of psychrometric 24-hour, hourly weather data – frequency % x 100

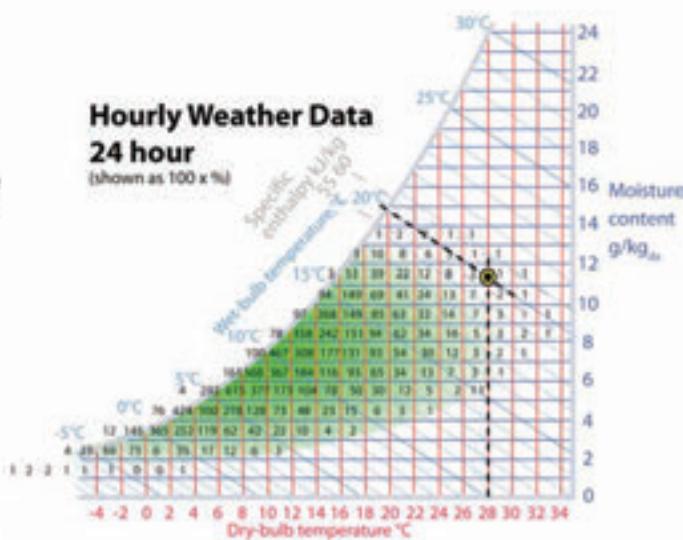


Figure 4: Summer external design point

$0.02 + 0.01 = 0.33\%$ (about 29 hours a year) – these data are highlighted in green.

Similarly the data can be quickly used to determine extreme summer time dry bulb temperatures that may be used, for example, to aid in the selection of an appropriately sized air cooled condenser.

Moving the psychrometric chart into the time domain

However, the application of the data becomes far more accessible, both visually and analytically, when it is superimposed onto a psychrometric chart. The data have been taken from Figure 2 and added to the outline chart as shown in Figure 3. (While doing so, the data were multiplied by 100 to remove the decimal places).

A couple of the data points appear to exist in the impossible area to the left of the saturation curve; this is due to the approximated sketch of the psychrometric chart and should not distract from the bigger overall picture. If meteorological frequency data is available in terms of coincident dry bulb temperature and wet bulb temperature, then this could have been as simply added to a chart, but using a grid based on the dry-bulb temperature and wet bulb temperature axes.

Immediately, looking at the chart, the data are transformed into a form that allows quick visual evaluations of conditions without any formal calculations. It can be seen that although there are significant tails on both the 'winter' and 'summer' conditions, the actual times that these are likely to occur are relatively few.

Inferred frequencies of occurrence of wet bulb temperature and specific enthalpy, together with any other air properties that are included in the base psychrometric chart, are now automatically available for analysis.

Visualisation in the fourth dimension

A bounding envelope has been added to the psychrometric data in Figure 4 to emphasise the most frequently occurring psychrometric conditions. The chart is now a tool that not only allows examination of the properties of air but also clearly includes the dimension of time.

A summer external design point is shown – this could be, for example, the summer design condition as proposed by the load calculation software, or the 'standard' as used by a designer for a particular location. The graphical representation provides, at the least, a swift visual check on the value, but also can inform and communicate the effect of alternative values on the consequent plant operation. This will not just be, as a standard psychrometric calculation, in terms of power, but by including the frequency information, and hence time, comparative energy use may be examined.

For example this design point of 28°C dry bulb/20°C wet bulb could be used as the starting point to undertake some sensitivity analysis on the size of a cooling coil in a full fresh air conditioning system (see the April 2010 CPD article for a reminder of the basic system and its psychrometry). The load on the cooling coil is determined by the incoming air enthalpy, and at the plotted condition this may be read off the chart (using the superimposed grey enthalpy lines) as 57 kJ/kg. In this case it can be readily seen that by increasing the design wet bulb by 1K to 21°C (maintaining the dry bulb design at 28°C), the system would operate within its capabilities for (about) an extra 10 data points (above that of the current condition). As each data point is equivalent to 1/100% of the hours in a year, this equates to (10/100) % = 0.1% of the time. And the

additional design load on a cooling coil to cope with approximately 3 kJ/kg increase in enthalpy difference is likely to be over 10% (based on a 'typical' cooling coil air leaving enthalpy of 30kJ/kg) – to meet the extra need for just $24 \times 365 \times (0.1/100) =$ six hours per year.

If the underlying data is available explicitly linked to each of the 8,760 hours in a year, then refined subsets of the data may be simply developed. This has been used to produce CIBSE Guide A, tables A2.7 to A2.15 as data for 'summer' conditions (June to September) that can be similarly superimposed over a psychrometric chart.

Conclusion

The application of simple tools described in this article are not advocated as a replacement for computer modelling, but can be used both to illustrate quickly and to undertake 'ball park' evaluations of different design options. They are particularly useful as a means of illustrating the impacts of system design decisions on those who have less extensive experience of HVAC&R operation.

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My thanks to Dr Roger Legg for his publications, which provided underlying material for this article

References

1. CIBSE Guide J Weather, solar and illuminance data Section 8, CIBSE, 2002
2. CIBSE Guide A2, Environmental Design, Section 2.3, CIBSE, 2006
3. Data after Collingbourne and Legg, *The frequency of occurrence of outside air conditions in the UK*, IoEE TM 58, South Bank Polytechnic, 1979

Module 23

December 2010

1. Referring to the data in figure 1, which of these should be the closest estimate of the outdoor design condition suitable for heat losses for a heavyweight building?

- A -7°C
- B -5°C
- C -3°C
- D -1°C
- E Above -1°C

2. Which CIBSE Guide is specifically related to weather data?

- A Guide A
- B Guide B
- C Guide C
- D Guide F
- E Guide J

3. What is the closest bin temperature associated with the lowest moisture content recorded in the example site Figure 2?

- A -16°C
- B -14°C
- C 0°C
- D 6°C
- E 9°C

4. Referring to Figure 2, which bin pair occurs most frequently?

- A 33°C & 9.5g/kg
- B 23°C & 13.5g/kg
- C 17°C & 12.5g/kg
- D 7°C & 5.5g/kg
- E -5°C & 1.5g/kg

5. If the design conditions in the example were relaxed from 28Cdb/20Cwb to 28Cdb/19Cwb, approximately how many fewer hours would a cooling coil be able to cope with outdoor conditions?

- A None
- B 0.3 hours
- C 3 hours
- D 30 hours
- E 300 hours

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Oventrop pressure control and balancing valves installed at Bombardier Aerospace, Belfast

The installation of Oventrop differential pressure control valves and matching double regulating valves, as well as butterfly isolation valves and strainers, has been completed at Bombardier Aerospace's new CSeries aircraft plant in Belfast. These components will simplify system balancing and commissioning of the factory's giant clean room for aircraft component manufacture. The installation represents one of Oventrop's largest orders for this type and size of valves in Northern Ireland.

● For more information call 01256 330441 or email sales@oventrop.co.uk

Heatrae Sadia launches the next generation Megaflo cylinder

Heatrae Sadia has announced the launch of the next generation of its market leading Megaflo HE unvented cylinder, the Megaflo eco.

It has been designed against stringent objectives to achieve the ultimate in quality and performance, and provide the best possible product.

The new Megaflo eco loses almost 30% less heat than the previous model, which is achieved by using thermal imagery testing techniques to ensure all areas of the cylinder are covered.

● For more information call 01603 420220 or visit www.heatraesadia.com



Toshiba announces its new VRF product – 'SMMS i'

Toshiba currently provides the Super Module Multi Series (SMMS) as part of its VRF system line-up. In addition to the SMMS, the company will release the 'SMMS i' that can deliver even higher energy-saving performance and permit longer piping, with a view to substituting existing counterparts such as chiller systems.

The 'SMMS i' was released to the Japanese market first (in June 2010), and the European and Asian markets in September 2010.

● For more information call 01372 220240 or email marketing.uk@toshiba-ac.com



BACnet Control from Titan Products

Titan Products has developed a range of application specific controllers. Designed for every control requirement, the controllers offer total flexibility. The BACnet range includes fan coil, VAV, room, natural ventilation and plant room controllers as well as BACnet to Modbus gateways. The controllers can be used as stand alone or as part of an integrated building management system and have an option for a built-in display. Each controller can be used in conjunction with Titan's RDU (room display unit).

● For more information visit www.titanproducts.com or call 0161 406 6480



Titon products are waves ahead at conversion of historic Beachy Head lighthouse

The recently opened Belle Tout Lighthouse hotel at Beachy Head has been fitted with Trimvent Select trickle vents and grilles and Titon Autolatch window restrictors. Defender and Sterling hinges by Securistyle and tri-coated RAIL espagnolettes by Maco have also been supplied by Titon. As part of the conversion the hotel was fitted with Accoya timber-framed windows that were chosen for their strength, durability and a minimum life span of 60 years.

● For more information call 01206 713800 or visit www.titon.co.uk



Retail therapy by Tour & Andersson

Tour & Andersson's (TA) hydronic balancing expertise has been implemented in the Alexandria City Centre Mall extension in Egypt.

The building, which has almost doubled in size as a result of the extension works, required an HVAC system that would be able to cope with the intensive cooling demands of the climate. TA was able to create a system that would sufficiently cool the building during the extremely hot summer months, when external temperatures can be as high as 40°C.

● For more information visit TA online at www.tourandanderson.com

Vulcan scale protector

IWTM UK has been awarded the UK agency for Calmat and VULCAN scale protection equipment by CWT International of Germany. Featuring patented 'pulse' technology, the units are fitted to the cold water inlet pipe of domestic and industrial buildings to prevent limescale formation in hard water areas.

Sized for water flow up to 500 cubic metres per hour, these units are a real alternative to water softening plant and do not affect the drinkability of the water.

● For more information call 07904 324009 or email stephen@iwtm.co.uk



Products & Services

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MCS certification for Dimplex Lab M heat pumps

The popular Dimplex LAB M range of air source heat pumps is now MCS certificated, meeting robust criteria for quality and performance. Dimplex believes this will extend the choices in renewable heat for public sector organisations, as well as the domestic sector. To make specification simple, the units are also available in a range of complete heat pump and water heating packages. The range is available in outputs from 7kW to 11kW and has been designed to keep installation costs to a minimum.

- For more information call 01489 773061 or visit www.dimplex.co.uk/renewables

Win a Hydropath winter warm jacket at PHEX 2010

Hydropath will be demonstrating its patented Hydroflow limescale conditioning technology on Stand 19 at this year's PHEX Show in Chelsea.

Five new models have been added to the existing commercial range, and all of the models have been re-sized to make specification and installation easier. Information on Hydropath training will be available and all installers who visit the Hydropath Stand 19 will receive a

useful 'KlippaLite' torch and the opportunity to be entered into a draw to win a Hydropath winter warm jacket.

- For more information call 0115 986 9966 or visit www.hydropath.co.uk



MHI air conditioning gets 'it' right at university

A VRF heat pump system from Mitsubishi Heavy Industries (MHI) has put high efficiency climate control on the curriculum at the University of Manchester.

Outdated air conditioning equipment serving a computer science laboratory in the Sackville Street



Building has been replaced with the latest two-pipe heat pump system from MHI's KX6 range, utilising eco-friendly R410A refrigerant and achieving a CoP of up to 3.4. The new MHI system will increase comfort levels for staff and students while reducing energy costs.

- For more information call 0207 842 8100 or visit www.mitsubishiaircon.co.uk

Thorn supplies new Scottish hospital

The new £300m Forth Valley Royal Hospital in Larbert is Scotland's largest NHS construction project and is lit by over 15,000 Thorn fluorescent luminaires.

Recessed asymmetric luminaires with solid optics illuminate the corridors. Using Tridonic "corridorFUNCTION" electronic dimmable ballasts they gradually dim to a lower light level if no movement is detected by the motion sensors, thus saving energy. As soon as someone enters the space the light is returned to its full level.

The scheme was installed by Crown House Technologies. Consulting engineers were DSSR.

- For more information call 0208 732 9800 or visit www.thornlighting.co.uk

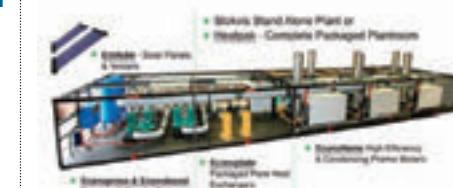


Heatpak packaged boiler rooms from Stokvis Energy Systems

Stokvis Energy Systems has been building packaged boiler rooms for many years and the company has now standardised its Heatpak units. They have a standard specification for various heating loads to ensure rapid delivery to site, generally six to eight weeks.

By installing a Heatpak on the roof or alongside a building, valuable building space can be utilised, and because of the relatively low unit weight, many rooftop structural limitations can be overcome.

- For more information call 0208 783 3050 or visit www.stokvisboilers.com



Stately home kept warm by wood

Whitfield House, a stately home nestled in the Herefordshire countryside, is saving money on its heating bills and making use of the acres of managed woodland that surrounds it, thanks to a wood-chip burning heating system from Euroheat. Comprising two 65kW HDG compact chips boilers, a chip store, hopper, and accumulators, wood-fired heating is saving the building's owners £25,000 a year – the amount they had previously been spending on oil. With the estate's trees felled, dried and chipped on-site, warmth is effectively generated for free.

- For more information call 01885 491100 or visit www.euroheat.co.uk



HCP's new website helps specifiers meet energy efficient heating demands

HCP, the specialist heating division of SAS International, has launched a new and improved website, which is now live. The site has been designed to provide the definitive online guide for specifiers and contractors, providing an ideal one-stop resource centre. The website allows instant access to a wide range of specific reference information, including the latest brochures on HCP award-winning products.

- For more information call 01424 712195 or visit www.hcp-sasint.co.uk



Products & Services

Telephone: 020 7880 6206 Email: darren.hale@redactive.co.uk

Cutting-edge Hitachi heating and cooling at Ireland's most popular tourist attractions



Hitachi Air Conditioning Group has recently had its innovative IVX and Set-Free VRF systems installed at

Ireland's top two tourist sites – the Guinness Storehouse in Dublin and Waterford Crystal Showrooms.

Installers of both projects opted for Hitachi's systems in order to meet the fundamental requirements of each site – high-performance, cost-effective heating and cooling, quick and efficient installation, energy-saving operation and long life-cycle. By using an effective combination of models, the installations provide the highest level of comfort for visitors.

● For more information call 01628 585394 or visit www.hitachiaircon.com



Megaflo Solar provides the solution at the Building Centre

A high-performance solar powered hot water system from Heatrae Sadia has been installed at The Building Centre in London.

The Building Centre was established almost 80 years ago and is an independent forum dedicated to the provision of inspiration and information to those involved in all aspects of building. When a refurbishment was required for part of the building, Heatrae Sadia's Megaflo Solar was selected to meet hot water demand for the hand-washing, toilets and kitchens.

● For more information call 01603 420220 or visit www.heatraesadia.com



Eco school ticks all the renewable boxes with Nu-Heat

A Nu-Heat integrated renewable system has been installed in a brand new eco school in Dartington, Devon – the first zero carbon primary school in the UK.

The school was designed by White Design after discussion with pupils, teachers and the community, and incorporates modern construction methods and natural materials. Insulation measures include wood fibre insulation, taped joints and energy efficient double-glazed windows with insulating argon gas. Heating is based around Nu-Heat's NIBE 2025 air source heat pump.

● For more information call 0800 731 1976 or visit www.nu-heat.co.uk



ENER-G introduces innovative air conditioning technology to UK

ENER-G has partnered with Advantix Systems to introduce DuCool liquid desiccant clean air conditioning technology to the UK. DuCool provides up to 80% energy savings and removes 91% of air borne micro-organisms, and 80% of particles larger than five microns, including allergens. It absorbs moisture from the air and then cools or heats the air to the required temperature. The technology is green, clean and can be refrigerant free, providing a more hygienic solution to de-humidifying and cooling buildings.

● For more information email james.hobday@energ.co.uk, call 07554 452359, or visit www.energ.co.uk.

Website shows how heating can help hit renewable targets

Mitsubishi Electric has launched a new website to highlight the benefits of a unique new range of commercial heating products. The website will help buildings hit renewable energy targets with more ease and flexibility than any other form of alternative heating, including biomass boilers. Available at www.mitsubishielectric.co.uk/commercialheating, the website details the efficiency challenges facing building owners today and highlights the versatility of use that the new range of heat pump boilers offer.

● For more information call 01707 282880 or email commercialheating@meuk.mee.com.



Marco environmental commitment continues as firm gains ISO14001 accreditation

Marco, the UK's largest manufacturer of Steel Wire Cable Tray, and uPVC Cable Management Company, has gained environmental standard ISO14001.

The recent announcement follows more than a year's worth of preparation by the Marco team, based in Anglesey, north Wales. This accreditation demonstrates a company-wide commitment to the environment through various schemes to reduce waste, re-use materials and recycle where possible. The benchmark highlights a proven commitment across the business to minimise the impact it has on the environment.

● For more information visit www.marcocableman.co.uk



Samsung's free DVM-Pro software a boon for specifiers

Designing a VRF-type air conditioning system or a single/multi-split system for commercial applications? It just got a whole lot simpler with the new DVM-Pro software from Samsung Air Conditioning.

DVM-Pro is a free program available on CD to help designers and specifiers select and order the best Samsung air conditioning solution for each project. And Samsung is now offering the program with a free 10 minute tutorial to ensure optimum specification every time.

● For more information call Jon Pettitt on 01932 455000 or visit www.samsungac.co.uk



Products & Services

Telephone: 020 7880 6206 Email: darren.hale@redactive.co.uk

The total solution from SE Controls

SE Controls' new brochure is intended to give specifiers of natural ventilation and smoke control systems a broad overview of the requirements and regulations covering such systems. The brochure covers the basic principles of each system and offers specifiers guidance on automation solutions. Now widely specified on a range of building types, the brochure shows examples of completed building projects in the residential, educational, commercial and health care sectors.

- For more information call 01543 443060 or visit www.secontrols.com



Office block cuts carbon emissions with climate control from Mitsubishi Heavy Industries

A VRF air conditioning system from Mitsubishi Heavy Industries (MHI) is encouraging better working productivity – and it qualified for a 25% grant from the Carbon Trust – for tenants of a large office block in Telford. Stratum House has replaced an inefficient gas central heating system with a heat recovery system from MHI's



KXR inverter range for simultaneous heating and cooling as and where required. The system achieves a CoP of up to 3.4, improving the building's overall energy efficiency.

- For more information call 0207 842 8100 or visit [www.mitsubishiaircon.co.uk](http://mitsubishiaircon.co.uk).



MHS Radiators strides ahead at premier sporting venue

MHS Radiators has supplied 22 Sunline radiant ceiling panels as part of a £38m investment at Basildon Sporting Village, Essex. The Sunline panels were installed in the eight-metre high ceiling of the sports hall and were specified for their ability to provide warmth and comfort from height. Generally the systems operate 3°C lower than convective systems without any loss of comfort – plus air movement is kept to a minimum, making them perfect for sports facilities.

- For more information visit www.mhsradiators.com



Grundfos is now on YouTube

YouTube is the world's most popular online video community. Founded in February 2005, it now provides a platform that allows people to connect, inform and inspire others across the globe and acts as a distribution platform for many original-content creators. Grundfos Pumps is using the YouTube channel to deliver a wide range of information, including corporate details, service videos and more in-depth solutions-focused innovative products in an interesting and informative way.

- For more information visit www.youtube.com/grundfos or call 01525 850000

BG Controls gives 'The Regis School' electronic panel solution

Award-winning building controls specialists, BG Controls, has installed a brand new Building Management System (BMS) in 'The Regis School' to optimise energy efficiency.

The £39m Building Schools for the Future (BSF) development includes a complete reconstruction of Bognor Regis Community College. BG Controls installed the BMS to monitor and control technologies such as natural ventilation, biomass boilers and gas boilers to maximise energy efficiency.

- For more information call Duncan Biggins on 01909 517460 or visit www.bgcontrols.co.uk



Dimplex on call – new number for business customers

It's now easier than ever to talk business with Dimplex, thanks to the launch of a new phone service dedicated to non-consumer enquiries.

The number, 0845 601 5111, is a direct line to sales administration, the heating design team, customer services and all the other support services. The change to 0845 601 5111 has been introduced as part of the company's commitment to customer care, enabling business callers to get through to their Dimplex contacts quickly on a different number from the one used by consumers.

- For more information call 0845 601 5111 or email marketing@dimplex.co.uk

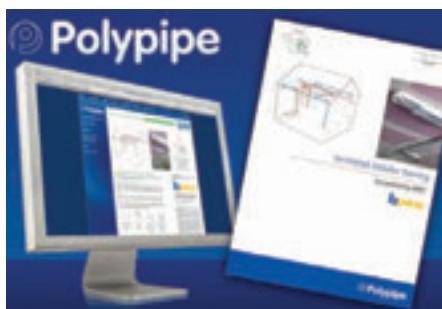
New training course website and brochure from Polypipe

Following the launch of the BPEC Ventilation Installer training course, Polypipe has launched informative support material in the form of a brochure and dedicated website section.

The training course was written by Polypipe Ventilation in response to the 2010 revision to Approved Document F of the Building Regulations, which came into force on 1 October 2010.

Buildings built to plans submitted from that date must have their ventilation systems commissioned and a commissioning report given to the local authority building control body; this must be carried out by a suitably qualified person.

- For more information call 08443 715523 or visit www.polypipe.com/installer-training



Products & Services

Telephone: 020 7880 6206 Email: darren.hale@redactive.co.uk



New Imro readers by BPT Security Systems make biometric security an affordable reality

BPT Security Systems (UK) has launched the very first biometric readers designed for use with its Imro access control systems.

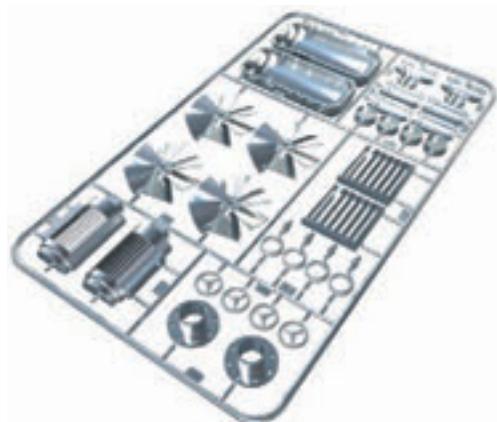
The new B-Sho Biometric readers are one of the most cost-effective biometric solutions on the market in terms of both capital cost and installation, claims BPT. Unlike other biometric readers, B-Sho has been specifically designed to integrate seamlessly with existing Imro access control systems without the need for additional equipment.

● For more information call 01442 230800 or visit www.bpt.co.uk

Flat pack cooling from ICS

ICS has launched a range of flat-pack chillers. Standard and bespoke units can be manufactured, tested and then systematically broken down for transport at ICS' 50,000 sq ft UK manufacturing facility in Southampton. The components are put on pallets and once delivered, units are taken in pieces to the required site to be re-built, re-tested and installed in the required location. Units can be built specifically for site, incorporating footprint restrictions, unit capacity, noise constraints, or a combination of these.

● For more information call 0800 1693861 or visit www.icstemp.com



Shiny and new: the aluminium catalogue from Titon

Leading ventilation and hardware expert, Titon, has released its brand new Aluminium Catalogue – a comprehensive guide to the company's wide range of fittings for aluminium windows and doors. With more than 70 pages, the catalogue is divided into three main sections for windows, doors and ventilation. They include Titon's own UK manufactured ventilators and handles, as well as products from market leaders Maco and Securistyle. The catalogue also provides an introduction to Sobinco's huge range of aluminium window and door fittings – exclusively distributed by Titon throughout the UK.

● For more information call 01206 713800 or email alum@titon.co.uk

Directory

Your guide to building services suppliers

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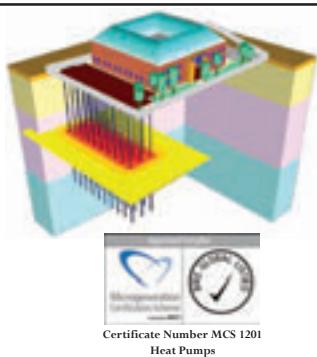
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Events & Training

NATIONAL EVENTS AND CONFERENCES

- **02 Dec 2010** Building Information Modelling (BIM): Who Benefits? London
What does the future hold for BIM?
www.cibsetraining.co.uk
- **07 Dec 2010** CIBSE ASHRAE Group, CIBSE HCNE and CIBSE London Centre Young Engineers – technical meeting London
Low carbon hot water solutions
andrew.saville@armville.com
- **09 Dec 2010** Fred Jamieson Memorial Lunch Belfry hotel
Plus the Trainee of the Year Award launch.
rowancrowley@yahoo.co.uk
- **09 Feb 2011** CIBSE Building Performance Awards London
The best-performing buildings and people in the sector.
www.cibseawards.org/home

SOCIETY OF LIGHT AND LIGHTING

- **27 Jan 2011** SLL Lighting Masterclass Cardiff
The Low Carbon Challenge
www.sll.org.uk

CIBSE REGIONS

- **03 Dec 2010** West Midlands Region Annual Dinner Birmingham
Annual social event.
tej.uppal@totalclimate.co.uk
- **06 Dec 2010** Visit to Stephenson College Leicestershire Further details will be advised.
densel.davy@ntlworld.com
- **08 Dec 2010** UV air sterilisation Bristol Presentation on UV air sterilisation.
millham.orchard@tiscali.co.uk
- **09 Dec 2010** Renewable Energy Tariffs Brighton A presentation on renewable energy tariffs.
a.miller@brighton.ac.uk
- **09 Dec 2010** Fire Precautions in Buildings London A technical presentation.
m.goodwin@dunwoody.uk.com
- **14 Dec 2010** Future Trends in Street Lighting London What will the future landscape look like?
jkane@cibse.org
- **14 Dec 2010** The New Part L Plymouth Ant Wilson presents the changes.
millham.orchard@tiscali.co.uk
- **13 Jan 2011** Making M&E

services easier and safer to install, use and maintain Bristol

An exploration of recurring issues.
millham.orchard@tiscali.co.uk

- **18 Jan 2011** Society of Façade Engineering – evening technical meeting London

Further details to be announced.
sfe@cibse.org

- **18 Jan 2011** Services Infrastructure & Smart Metering Northampton

Further details to be announced.
densel.davy@ntlworld.com

- **19 Jan 2011** CIBSE HCSE meeting: achieving practical carbon reductions in supermarkets Croydon Presentation by Tesco.
David Frank, 07801 869586.

CIBSE/OTHER TRAINING

- **08 Dec 2010** Air Conditioning Inspection for Buildings Birmingham How to undertake inspections.
www.cibsetraining.co.uk
- **09 Dec 2010** Dealing with multi-building sites and improving the accuracy of your DEC London Training for assessors.
www.cibsetraining.co.uk
- **13 Dec 2010** CPD Part L of the Building Regulations update for LCEAs London Looking at the updates to Part L.
www.cibsetraining.co.uk
- **14 Dec 2010** Providing renewable feasibility studies and retrofitting where appropriate London Pros and cons of renewables.
www.cibsetraining.co.uk

CPD TRAINING

- Visit www.cibsetraining.co.uk, call 020 7675 5211 or email eventbookings@cibse.org.
- BUSINESS SKILLS AND MANAGEMENT**
- **15 Dec 2010** Report Writing London
- **19 Jan 2011** Successful Design Management London
- ELECTRICAL SERVICES**
- **01-03 Dec 2010** Electrical Services Explained London
- **12 Jan 2011** Building electrics basics 1: choosing electrical supplies London
- **13 Jan 2011** Building electrics

CIBSE Building Performance Awards 2011: Engineering for a low carbon built environment



Attendees enjoy dinner at the 2010 event

The first CIBSE Building Performance Awards will be staged in February next year, celebrating all that's good in the building services sector.

The entries for the new awards, which build upon the CIBSE Low Carbon Performance Awards launched in 2007, are now in, and the shortlist will be announced shortly.

The prestigious ceremony will be held at the historic

Grosvenor House hotel in London on 9 February 2011.

The awards will recognise, reward and celebrate the best examples of actual low carbon performance in practice, allied to excellence in the design, construction, commissioning and operation of buildings of all types, as well as the development of people, products and processes in the building services sector.

www.cibseawards.org/awards/

- **26 Jan 2011** Fire detection and alarm systems for buildings – BS 5839 part 1 London
- MECHANICAL SERVICES**
- **07 Dec 2010** Introduction to Combined Heat and Power (CHP) London
- **17-19 Jan 2011** Mechanical Services Explained Manchester
- LIGHTING**
- **07 Dec 2010** Lighting basics 1: light, sight and colour London
- **08 Dec 2010** Lighting basics 2: lamps and luminaires London
- **09 Dec 2010** Emergency lighting to comply with fire safety requirements London
- **20 Jan 2011** Lighting basics 3: interior lighting applications London
- PUBLIC HEALTH AND WATER**
- **14 Dec 2010** Building Drainage Explained London

Send your event details to cbailey@cibsejournal.com

**Senior Electrical Engineer
£40,000-£45,000, Tonbridge**

Our client, a consultancy established for over 30 years requires an electrical design engineer from a Building Services background. The company is built on long standing relationships with its clients and a reputation for its quality of work within the public and private sector. The successful candidate will have strong technical design skills, be client facing and able to work on their own or lead project teams. Ideal candidates will have completed a relevant engineering degree and be a chartered engineer.

BAR537/JA**Associate Mechanical Design Engineer
£50,000-£65,000, Central London**

We are recruiting for an associate mechanical design engineer with strong technical design skills along with business development acumen. The successful candidate will have previously worked as a mechanical associate or principal mechanical design engineer in a building services consultancy. Leading a team of building services engineers on varied projects, client liaison and development, preparation of budget cost reports, and creating tender documents. The ideal candidate will have completed a degree in engineering and be a chartered engineer.

BAR535/JA**Senior Mechanical Engineer
to £40p/h, Berkshire**

Contract engineer required to deliver Mechanical Building Services design for replacement buildings at one of the largest high technology nuclear research, design development and production facilities in the country. Successful applicants should be able to demonstrate extensive experience of delivering technical work packages without supervision, possess the ability to solve complex technical challenges, and communicate those solutions effectively. Engineers with current Security Clearance and Nuclear, Pharmaceutical, Process or Laboratory Containment experience preferred.

BAR538/CB**b-a-r beeby anderson recruitment****Thinking of your future**

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blueprint recruitment

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**Merry Christmas and Happy New Year
to our clients and candidates from
the team at Blueprint!****Sustainability Engineer | Surrey | NEG! | ref: 7478**

Our client requires an experienced engineer to bolster and develop their green Building Design sector. Experience of passive and active solutions to sustainable building design and a grasp of the relevant regulations is ideal. Technically excellent and able to sell ideas and solutions to clients and other engineers.

Mechanical Design Engineer | London | to £50K+ | ref: 8774

Our client is looking to recruit a senior / principal level engineer to help build and develop a growing team. You will be technically sound, able to liaise with clients, carry out detailed design work and have worked with signature architects. This is a real opportunity to join a successful company and progress your career.

Senior Electrical Design Engineer – Data Centre | London | £NEG! | ref: 6412

Our client is an international consultancy looking to recruit a senior engineer. You will ideally be Chartered and have significant experience, with a particular focus in the data centre sector. Excellent support and development will be provided.

Mechanical Project Engineer/Design Manager | London | £NEG! | ref: 3122

We are currently looking for an experienced mechanical engineer for a major blue chip M&E Contractor. You will have a solid design background and be comfortable with technical input into services, products and subcontractors. Rail experience would be an ideal, but not essential.

M & E Technical Design Managers | UK Wide | to £50K+ | ref: 4123

A multi-national M&E Contractor is currently looking to recruit experienced Technical M&E Design Managers for various locations across the UK. You will have an excellent technical knowledge and able to liaise with clients. A mixed Contractor/Consultancy background is ideal!

For more information or a confidential discussion please contact Mark Butter

t: 02392 603030

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Sustainability Design Engineer

Ref: 11339

An established consultancy requires a degree qualified engineer specialising in Energy Management and sustainable building services design. They require an engineer who is part of a design team looking to achieve the best value low energy designs. You will in part have experience with Chilled Beams, VAV, Computer Room Cooling and CHP systems. The ideal candidate is a mechanical engineer who has experience with energy strategy for planning application and SAP assessor and will have equipment selection experience.

Contact Darren Warmington on 01483 768 600

Electrical and Mechanical Design Engineers - Intermediate and senior levels

Ref: 11162 London & Home Counties - £35,000-£50,000 + excellent benefits

Dealing with top Blue Chip clients, our client has a need for both Mechanical and Electrical design engineers who are looking to develop towards associate Level. You will be expected to work with drive and ambition to design and manage your own projects. Some travel may be expected. Applicants will need to show a proven track record within the M&E building services industry.

Contact Richard Sutton on 01483 768 600

M&E Manager

Ref: 11490

A very recognised and respected Main Contractor is seeking an M&E Manager to join their team. You will be working across a variety of sectors which include Commercial, Health, Education and Residential. The successful applicant will be able to demonstrate a stable career working within the main contractor environment. This position requires experience in the management of subcontractors and their on-site labour, programming, coordination, value engineering and surveying. You should hold a CSCS card.

Contact Darren West on 01483 768 600

Associate Mechanical Director (Design)

Ref: 11098

Will appeal to a Project Team Leader responsible for management of technical and specialist projects in the corporate and private sector. Projects involving design, management, supervision, survey, consultation and report writing. You will also be responsible for assisting in resource and financial planning, maintaining quality of groups output and being involved in the practice operation. This will suit an ambitious senior engineer who is looking to progress. The successful candidate will preferably be Chartered, commercially minded and have experience in the London market.

Contact Darren Warmington on 01483 768 600

Call 01483 768600 or email darrenw@bsvconsultants.co.uk
to enquire about these and other vacancies.

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Assistant Electrical Engineer (Ref. L5121780)

Salary up to £27,319 depending on qualifications
and experience

The University of Exeter is seeking to recruit an enthusiastic Electrical Engineer with some postgraduate experience to work as part of a multi-disciplinary Mechanical & Electrical (M & E) Team in Estate Development Services, delivering the estate infrastructure plan.

Based at the Streatham Campus, this post offers the opportunity for you to build electrical engineering skills reporting to the Senior Electrical Engineer.

You must be willing to undergo training to become a Chartered Electrical Engineer.

The University estate has a wide variety of buildings including laboratories, workshops and teaching spaces, and in addition, the Estate Development Service is responsible for the provision of the high voltage distribution system.

The starting salary will be from £24,273 up to £27,319 on Grade E, depending on qualifications and experience.

Application packs are available from
<http://www.admin.ex.ac.uk/personnel/jobs/L5121780.pdf>
or e-mail hadmin@exeter.ac.uk quoting reference number L5121780.

Head of Engineering (Ref. L5211432)

Salary up to £52,347 depending on qualifications
and experience

The University of Exeter is seeking to recruit a Chartered Electrical Engineer with significant postgraduate experience to head a multi-disciplinary M & E team in Estate Development Services.

Based on the Streatham Campus, this post offers the opportunity for you to build upon existing engineering and management skills.

You will be required to take responsibility for the management of a small department of mechanical and electrical engineers who are working on a programme of projects which include M & E elements of major building projects and projects which are wholly M & E in nature. The capital value of the projects ranges between £500k to £40m.

The department also has significant responsibilities for the provision of high voltage electricity, medium pressure gas supplies and a water network. You will be expected to advise on technical matters and deal with general estate issues relating to the utility infrastructures.

The University is keen to appoint an Engineer with experience of team management, design and project management. You must be able to work on your own initiative and be effective leading multi-disciplinary teams.

The starting salary will be from £38,951 up to £52,347 on Grade G, depending on qualifications and experience.

Application packs are available from
<http://www.admin.ex.ac.uk/personnel/jobs/L5211432.pdf>
or e-mail hadmin@exeter.ac.uk quoting reference number L5211432.

The closing date for completed applications is **12 noon on
16 December 2010**.

The University of Exeter is an equal opportunity employer
and promotes diversity in its workforce and, whilst all
applicants will be judged on merit alone, is particularly
keen to consider applications from groups currently
underrepresented in the workforce.



Catching the bug

Greg Carpenter of Hoare Lea explains how he caught the engineering bug in just one day

Greg Carpenter was just a schoolboy when he was first introduced to the building services sector, but it was enough to get him hooked.

It was while he was completing a work experience placement at an architectural department that his interest was first ignited. 'In the building services department they were designing a night club and choosing lots of whizzy lights and talking about amplifiers and speakers – to a 15-year-old this was awesome!' enthuses Carpenter.

During the past 20 years Carpenter has carved quite a career for himself in the industry, and is now an associate at multi-disciplinary consultancy, Hoare Lea.

In his current role, the 38-year-old oversees the delivery of projects while running a team of engineers, promoting Hoare Lea and finding new work.

'Most of my time in the last three years has revolved around meetings – either with the client team, design meetings with the professional team, or the bread and butter co-ordination meetings with my colleagues in Hoare Lea,' explains Carpenter.

His day typically kicks off with a client or design meeting that can last anywhere between two and four hours, followed by discussions with the Hoare Lea team, either working out how to deliver a particular aspect of design, solving a problem, or on work related to the morning meeting.

Carpenter added: 'Disseminating the information from the meetings to the Hoare Lea team is incredibly important in order to keep the team focused, motivated and up to speed with the pace at which the project is moving.'

'A project as large as One New Change [a large mixed-use development in London], for example, means that there are many aspects to stay on top of



“I am lucky to be surrounded by some great people – the enthusiasm is infectious”

and a number of different people working on different facets; ultimately, these all need to be brought back into a complete work package for delivery. This leaves little time available during the day and lunch is usually held on the move chatting about the latest hot topic.'

Carpenter divides his time between the office and site visits, depending on what stage each project is at.

'My time at Hoare Lea has been all about team work – I'm lucky to be surrounded by great people with lots of ideas and dedication, all working to a common goal – the enthusiasm is infectious.'

So, what of the future? 'In the short term, I am taking a lead role in setting up a new office for Hoare Lea in Cambridge, planned to open in the next three months. My long-term goal would be to become a partner in Hoare Lea, but clearly there is a lot of hard work ahead!'

Email people appointments/role profiles to cbailey@cibsejournal.com

Movers & Shakers



Multi-disciplinary engineering consultancy Cundall has appointed **Andrew Parkin**

as its new acoustics director. Parkin has worked in acoustics for more than 13 years. He will be based in Cundall's Birmingham office and will work on projects across the UK and internationally.



Bryan Glendinning, commercial director of Warmer Heating, has been

appointed chairman of the Grant Aided Heating Installers Network. Glendinning was originally the network's first vice-chairman. He replaces Paul Cooper, the network's chairman of eight years.

Ten new ordinary council members have been elected onto the Institution of Structural Engineers (ISE) council. The new members are: **William Harvey**, **Elisabeth Green**, **Suzanna Ovenstone**, **Barry Ayres**, **Ian Cox**, **Mark Edwards**, **Paul Sau-Chung Tsang**, **Fergus Shaw**, **Kerry Greeves**, and **Matthew Evans**. The new members expressed a passion on wide ranging issues, including sustainability, international engagement and inspiring a new generation of engineers.



NG Bailey, a building services provider, has announced **Steve Parr** as its supply chain and

business transformation director. Parr was formerly supply chain director at Carillion plc. In his new role he will lead the company's supply chain function, as well as being responsible for the company's strategy development.



Members of the Fan Manufacturers Association (FMA) have elected **Mark Jones**, managing director of industrial fan manufacturer Woodcock & Wilson, as their

new chairman. Jones has more than 30 years' experience as an industrial fan manufacturer. In his new role, he aims to raise the profile of the FMA.



Johnson Controls, a supplier of energy efficiency products for buildings, has appointed **Agostino Renna** as vice president and general manager for Energy Solutions in Europe, the Middle East and Africa.



The K&C Group has employed **Bleddyn Jones** as its new construction manager. Jones was chosen by the construction company to manage K&C's commercial and residential developments in north west Wales.

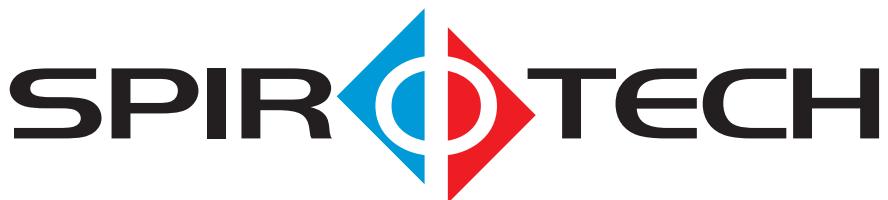


Kjeld Staerk is the new chairman of EPEE (European Partnership for Energy and the Environment), which represents the refrigeration, air conditioning and heat pump industry in Europe. He will help EPEE continue its fight to reduce carbon emissions generated from heating, refrigeration and air conditioning systems.



Steve Rickards has been appointed as the new commercial director for Heatrae Sadia Heating and Baxi Group New Build and New Design. This is a new position, created following a strategic review undertaken by Heatrae Sadia and its parent company, Baxi Group UK, of the future of the water heating market and new build housing sector.

Derek Gow has been appointed as group sales director at HEVAC systems manufacturer, Vent-Axia. Gow will be responsible for the performance of its sales team across residential, commercial and industrial sectors.



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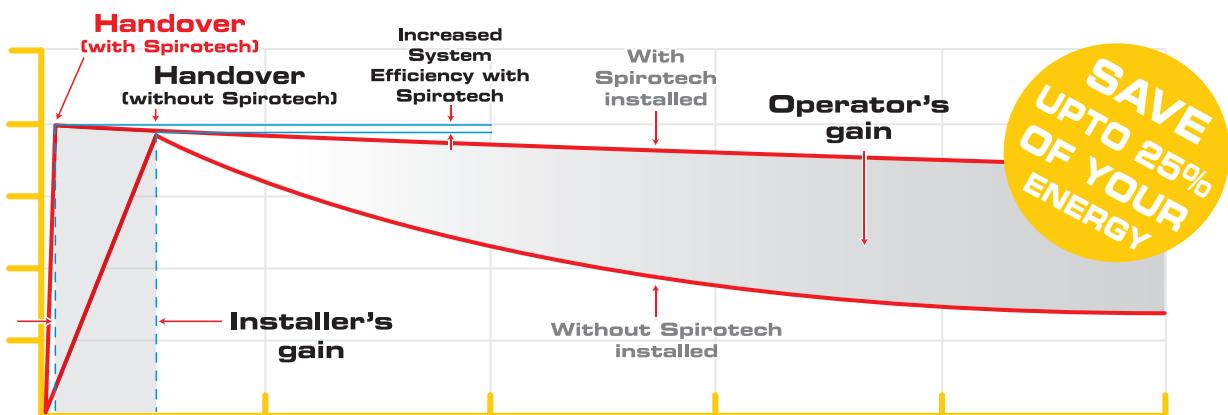
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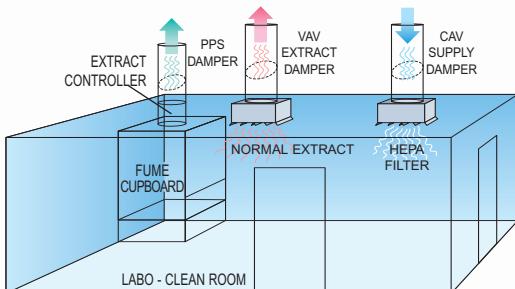


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